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SWM

February 2004
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& Scanning Scene



TWO REVIEWS

Uniden's
UBC68XLT
Budget Scanner

OptoElectronics
X-Sweeper
Near-Field Receiver



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Features

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In the light of recent massive solar activity, which had a very significant effect on radio propagation, here is a comprehensive run-down on the sun's mechanisms that effect radio communication here on planet earth. The late Joe Carr explains.

36 OptoElectronics X-Sweeper

Hot on the heels of the Xplorer comes the X-Sweeper. No, not a man with a broom in one hand and a P45 in the other, but the latest product from the Fort Lauderdale-based OptoElectronics stable. Martin Peters takes a long look.

38 This 'S' Meter Business

Tony Spencer G3VDZ answers your questions about the 'S' meter on your receiver. Is it accurate? Tony argues that you can say, "Yes it is!".

45 WIN! a Roberts RD-3 DAB Portable worth £140

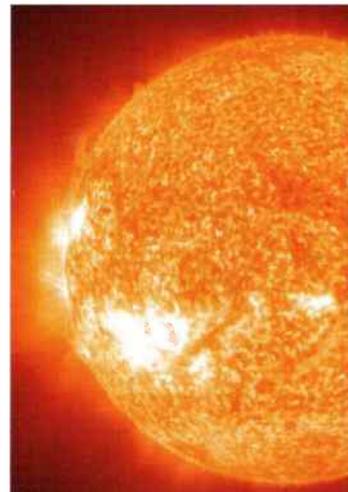
Turn to page 45 now and you could be in with a chance of experiencing digital broadcast radio with this very latest DAB radio courtesy of Roberts Radio and SWM.

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Our Scanning columnist Dave Roberts enjoyed the Christmas period with the latest Bearcat starter hand-held scanner.

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Are you alone with your radio interest? If you want to meet others with a passion for radio, then look no further. Use our comprehensive guide to local clubs - now includes National and International Radio Clubs.



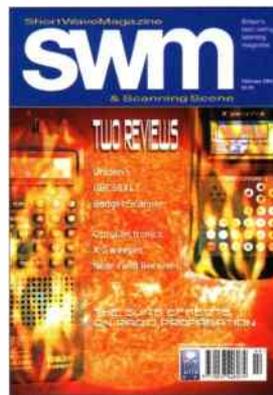
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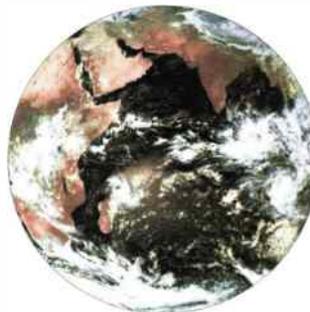
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cover subject: The sun, our source of energy, life and radio propagation as we know it!
Courtesy of NASA



Share your thoughts

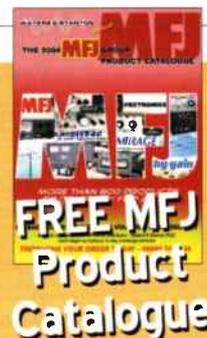
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Join in with the on-line action on the SWM Readers' E-mail Forum - send an E-mail to swm_readers-subscribe@yahoo.com to subscribe - don't miss the on-line action!

Coming Next Month

In SWM March 2004

- Ol' Sol and its Effect on Radio Propagation - Part 2
- DRM Reception without adapters
- Up, up and away - Microwaves cameras on the edge of space
- News, reviews and essential data from the world of listening
- Keep on top of the world of monitoring with SWM
- and much more...



*contents subject to change

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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 £3.25 each and photocopies are £3.25 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 £1 inc P&P.

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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

Long Distance Reception

I'm writing this month's editorial, having just returned to the SWM Editorial Offices after the Christmas and New Year close down, such are the timescales of magazine publishing. I trust that you all had a restful break, if you had one that is. I was fortunate this year in that I was able to get some long sessions with my radios. As a result I managed to catch some good DX. I heard some very faint voice comms from the Antarctic some air traffic controller in Africa and some military forces in south America. I also managed a reasonable QSO with my sons some 4km distant with a recently acquired pair of Telcom 150 PMR446 sets. Which considering they cost me the princely sum of £10 for four was quite pleasing - I should say that they were sold 'as seen' at the Donington Rally held back in October. Only after some fettling on my part did any of the radios actually work. I've still to fix two, but the current working head count represents good value for money.

The above achievement, in terms of long distance communications, simply pales into insignificance compared to the attempts to resolve signals that were expected from the surface of Mars.

In case you've missed the news, the British led *Beagle2* project, the lander and miniature laboratory designed to search for life signs on Mars as part of the European Space Agency's Mars Express Mission, launched in June 2003, was due to land on Christmas Day and establish contact with earth via the *Mars Express* orbiter. Here on earth, no-one is certain whether or not *Beagle2* did actually land as planned.

So far the scheduled communications opportunities have failed to provide any signals from the lander. The diminutive outpost which, once on the Martian surface if all went to plan, should have a mass of a mere 30kg, has insufficient power to communicate directly with earth. There are many possible reasons for *Beagle2* not being heard aside from the obvious conclusion that it was terminally damaged. The ground team have been working furiously to detriment all the possibilities. In the meantime, the extremely high gain antenna of the Jodrell Bank radio telescope - see SWM issues March and April 2000 - has been keeping a listening watch, sadly with no success to date.

The topic of the non-reception of *Beagle2* was being discussed on the **SWM-Readers** Internet E-mail forum. Specifically, the equipment required to receive a direct signal. As I've just mentioned, it needs a set-up like that at Jodrell Bank as the signal levels are extremely weak

due to loss over the enormous path length. What is possible though is to receive the *Mars Express* craft on about 8.4GHz. I'm grateful to **John Locker** for posting this URL which gives details of a system to monitor *Mars Express*. If you're looking for a challenging DX opportunity then take a look at www.amsat-dl.org/p5a/reception_g3ruh.htm

Even if you don't feel confident in building the required equipment there are some off-air sound samples of both *Mars Express* and *Mars Odyssey* orbiter transmissions.

When *Beagle2* was first conceived in 1997 it was to be a lander weighing about 108kg and to be part of a network providing geophysical survey data. That plan was shelved when the mass available on *Mars Express* was revised to only 60kg.

The craft which was named after Charles Darwin's HMS *Beagle*. *Mars Express* is the first 'flexible mission' in the revised ESA long-term scientific programme. *Beagle2* and *Mars Express* were launched aboard a Soyuz rocket with Fregat upper stage boosters from the Baikonur Cosmodrome in Kazakhstan at 1745:28 on 2 June 2003.



SWM Clothing

Back in the mists of time, or rather in the late 1980s we produced a *Short Wave Magazine* T-shirt - I wasn't working for the magazine at that time so I'm not too familiar with the circumstances around the garment availability. I did however, find an example some

years ago whilst clearing out a cupboard. So I am familiar with the design. I was amazed, when just before Christmas I received an E-mail from a reader which said. "Can you help me - A few years ago I ordered from an advert in the magazine a printed tee shirt which said 'Happiness is only a short wave away' with a picture of an old valve domestic radio set. I now would like to replace the T-shirt (many washings!). Do you know the source - are they still available? Any information gratefully received."

As you can probably imagine these shirts are not currently available. However, as with all things, if there is enough demand to make its reintroduction viable, then we can certainly offer it again and make our enquirer a happy man. If anyone is interested in a SWM T-shirt, please let me know and I'll take things further.

02/04 73 Kevin

QSL

THE BEST LETTER WILL RECEIVE A £20
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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.

topqsl

Dear Sir Egotistical Editors & Trips!

Save us from the Egotistical Editors and their trips to old fashioned BBC broadcasting stations! Please - I ask you- before I stop reading *Short Wave Magazine* and *PW* let's hear no more from Rob Mannion's self-centred appreciation of bygone technology! The musings of someone stuck in 1930s technology is bad enough - but when the Editor of *SWM* joins in it becomes intolerable!

It's about time that the *PW* and *SWM* editorial staff realise that the world of h.f. broadcasting is literally dead except for third world countries. Everyone has gone to the Internet. What we need from *SWM* and *PW* are full details of the websites and where we can listen in to all the unlisted channels. Broadcasting via h.f. has passed its 'Sell by date' and although Rob G3XFD, who is approaching 60 years old, can be forgiven for living in the past - Kevin the *SWM* Editor is much younger and should fully realise that the old technology with multi kilowatts of r.f. wasted into space is dead and should be buried.

My argument that the old fashioned wireless broadcasting has been superseded by wired broadcasting via the internet is surely proved when you 'listen in' using your computer. There are literally thousands of broadcasts to be heard. All political views, cultures, styles of music, opinions, interests and many other subjects are catered for. No interference or jamming either!

Yes, I really think radio broadcasting is dead. Even the BBC's much hyped DAB service has its problems and Radio via the Terrestrial Digital Television (TDTV) service is a joke. Half the channels can be missing if there's any variation in the incoming signals. Living as I do here on the south coast, between Southampton and Portsmouth in direct view of the Rowridge BBC station on the Isle of Wight I can get a variety of TDTV radio channels depending on the state of the tide!

Sometimes the reflected signal from the surface of the Solent causes confusion for the set-top decoder. This then ends up with half my channels missing. All this despite having an excellent quality antenna with a very good bandwidth for Group A on the Band IV channels used by Rowridge.

Giving up on the TDTV channels I went on to DAB only to find the resultant reproduced audio quality wasn't good enough because they 'squeeze' too many channels in on them multiplexes.

So, I gave up listening to radio via v.h.f. Band II, then TDTV (despite the hype on the BBC it has many problems for the view/listener), before trying DAB. The DAB has proved to be nowhere as good as the broadcasters claim I've tuned to the internet. Much better and so far I have had few problems, with no variable propagation.

Off-air radio is dead. Both the *PW* and *SWM* Editors are living in the past by paying too much attention to by-gone technology. They might enjoy looking at antique masts and glowing valves but many others such as myself don't. Rob Mannion G3XFD perhaps has the excuse of his age - but Kevin G7TZC doesn't. I've met both Editors and neither seem to be technological fossil specimens - but they seem to be promoting Fossilised Technology. Get modern *SWM* - this is the age of wired broadcasting thanks to the computer.

**Ronald Evans
Warsash
Hampshire**

Ronald, many thanks for your interesting letter. I don't share your view, but if this is what the majority of our readers think, then I'm happy to stop coverage. Perhaps those of you with strong feelings either way will let me know. Although the connectivity of WiFi Wireless LAN systems and 3G mobile phones allow portable Internet access, there is a long way to go before this alternative can offer price/performance/portability to compete with a portable s.w. set. - Ed.

Dear Sir

Many thanks for the surprise package in the form of a Yaesu VR-5000 scanner won in the November 2003 competition received 12 December - a superb Christmas present.

I have been a s.w.l. for 40 years and this is the first time I have ever won a prize. I always look forward to receiving *Short Wave Magazine* each month, there's always something of interest. Once again many thanks to you and of course the firm's that donated prizes. Happy Christmas to you all and a Prosperous New Year.

**D. Foster
Driffield**

Dear Sir

Many thanks for my prize of a Yaesu VR-120D radio in the last *Scanning Scene Extra* competition. Christmas has arrived two weeks early and I am now enjoying investigating my new 'toy'.

**J. Neilson
Glasgow**

Dear Sir

Hello and Happy Christmas to all the staff of *SWM*. Many thanks for my prize of a Yupiteru MVT-7100 scanner which I won in the November *SWM*. The best Christmas present this year, it's given me hours of enjoyment already. So thanks again and good luck to you all in the coming New Year. Great magazine!

**A. Thompson
Cornwall**

Dear Sir

I was absolutely delighted to discover that I'd won the Moonraker MLP-62 Log Periodic Antenna. My neighbour accepted the delivery for me in my absence and turned up on my doorstep with the enormous package when I returned from work.

I assembled the antenna on Saturday morning and hooked it up to my IC-R8500. It works brilliantly. Now I just have to make room for it, as I already have rather a large antenna 'farm' on the roof. Thanks again for a great prize and a great magazine. May I take this opportunity to wish you all a very Happy Christmas and best wishes for 2004.

**Kevin Hughes
Staffs**

Dear Sir

Just a quick note to say many, many thanks for the competition prize I have just received. As someone who lives on the coast between the busy Blyth & Tyne rivers and on the final approach to

Newcastle airport - scanners get a lot of use in my house! The PRO-82 will be a welcome addition.

Again many thanks, Merry Christmas and all the very best for the New Year to you and your team.

**Robin Brown
Northumberland**

Dear Sir

Thank you for the Fairhaven RD-500VX which arrived today. Not only is it a superb pre-Christmas present, but I was also having problems with my trusty old Sony 2001D, (the display was fading and the memory could not be accessed while in this state).

Initial results with the Fairhaven in the 8 and 11MHz bands are excellent. I have been trying an unsupported version of *PC-HFDL* by Charles Brain, (a superb program) and I can see the new radio being put to good use.

Again a huge thank you and A Merry Christmas and Happy New Year to you and all at *SWM*.

**Len Woolley
Cornwall**

Dear Sir

So I have a 'Special Delivery' package to collect from the Post Office. What can it be? I'm not expecting anything. It's from *PW* Publishing! Have they presumed on my ordering the 2004 *WRTH*? It's an Alinco DJ-X2000! I've come up in the *SWM* competition! What can I say? My thanks indeed to *SWM* and, I guess, to Nevada for donating the prize - now I must learn to use it. It is, after all, a form of computer and I am scared of computers, but if I can master this, then I can master a PC.

One thing I can do is to say thank you again and to place my order for the 2004 *WRTH* and *Passport* with you - herewith. Whilst writing, I could also thank you for the regularly delivered *SWM*. I am by no means a 'high tech' person, but there are, usually, several columns to interest me (and via Brian Oddy I make my own small contribution).

My thanks to you all at Broadstone and I wish you a very good New Year.

**R. Illman
Surrey**

The above letters really demonstrate what running reader competitions in Short Wave Magazine is all about! It makes the whole exercise worthwhile. Reading the happy winners expressions of joy, don't forget you could also be one of those winners too - just make sure you invest in a stamp and enter! - Ed.

All-Terrain Performance

On or off the road, Kenwood's new TM-271E delivers powerful mobile performance with 60W maximum output and such advanced features as multiple scan functions, memory names, and TNC connectivity for packet communications. Yet this tough, MIL-STD-compliant transceiver goes easy on you, providing high-quality audio, illuminated keys and a large LCD with adjustable cool-green backlighting for simple operation, day and night.



144MHz FM TRANSCEIVER

TM-271E

- 200 memory channels (100 when used with memory names) ■ Frequency stability better than ± 2.5 ppm ($-20 \sim +60^{\circ}\text{C}$) ■ Wide/Narrow deviation with switchable receive filters ■ DTMF microphone supplied ■ Data connector for packet communications (using 1200/9600bps TNC) ■ CTCSS (42 subtone frequencies), DCS (104 codes) ■ 1750Hz tone burst ■ VFO scan, MHz scan, Program scan, Memory scan, Group scan, Call scan, Priority scan, Tone scan, CTCSS scan, DCS scan ■ Memory channel lockout ■ Scan resume (time-operated, carrier-operated, seek scan) ■ Automatic repeater of set ■ Automatic simplex checker ■ Power-on message ■ Key lock & key beep ■ Automatic power off ■ Compliant with MIL-STD 810 C/D/E/F standards for resistance to vibration and shock ■ Memory Control Program (available free for downloading from the Kenwood Website: www.kenwood.com/j/products/info/amateur.html)

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics UK Ltd. 01923 655284.

E-mail: comms@kenwood-electronics.co.uk Web Site: www.kenwood-electronics.co.uk

Video Evening

The **Bangor and District Amateur Radio Society** meet on the 1st Wednesday of every month in 'The Stables', Groomsport at 2000. On **Wednesday 4 February 2004** the club are holding a video evening, showing (with a projector, on a big screen) videos of some of the bigger recent DXpeditions. This is a great opportunity to see for yourself the work that goes on behind the scenes at these events and to experience the pile-ups from the DX operators position. Visitors and new members are (as always) most welcome. More information from **Mike G14XSF** on **0284-277 2383** or visit the club website at **www.bdars.com**

International Marconi Day

This year the **17th International Marconi Day (IMD)** will take place on the **24 April 2004**. IMD is a 24 hour Amateur Radio event held annually to celebrate the birth of Guglielmo Marconi on the 25 April 1874. Although not a contest as such, it is an opportunity for Amateurs around the world to make point-to-point contact with historic Marconi sites using h.f. communications techniques similar to those used by Marconi himself and to gain an attractive award for achieving the requisite number of Marconi stations worked.

For a station to be counted towards an award by applicants, that station must be registered by contacting the webmaster, E-mail: **webmaster@gb4imd.co.uk** prior to the event with full details of the station. In order to qualify as an 'Award Station' operations should take place from a site which either used Marconi equipment prior to his death in 1937 or from which Guglielmo Marconi carried out experiments during the same period. Full details can be found at **www.gb4imd.co.uk**



BDXC Macclesfield Meeting

The next **North West BDXC** meeting will be held again in the new venue of Macclesfield, Cheshire, with 'kick-off' at 1600 on **Saturday 24 January**. The meeting will be in the Wetherspoons Society Rooms in Park Green, Macclesfield (five minutes walk from the railway station) until at least 1900 before heading to a nearby restaurant for an optional meal. Everyone with an interest in radio is welcome, you don't have to be a BDXC member.

The meetings are informal social occasions where everyone has a chat, a meal, a drink and can share latest loggings, QSL cards, etc. The BDXC concentrates on broadcast DXing, but these meetings attract a host of other radio interests. One such will be 'Summits On The Air' (SOTA), the rapidly growing craze in portable Amateur Radio.

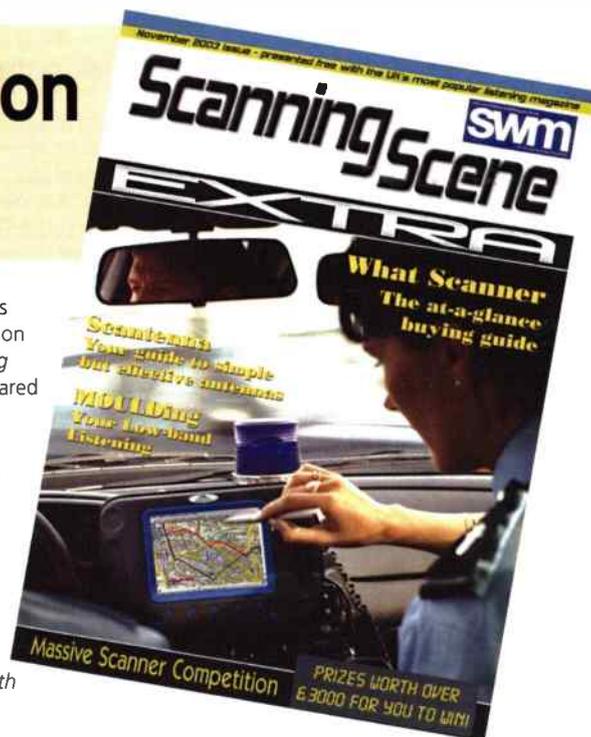
Mobile contact on the evening will be **Gavin** on **(07739) 858351**. Further details/directions from **Tom Read** at **tommyread@hotmail.com** or 'phone **(01625) 612916**.

Cornish Rally

The **Cornish Radio Amateur & Computer Rally** will be held on **Saturday 10 July** at Penair School, Truro. Doors open at 1030. There will be Trade Stands, a Bring & Buy and Refreshments, etc. Further information can be obtained from either **John** on E-mail: **g4lly@dsl.pipex.com** or **Ken**, Rally Organiser via E-mail at: **ken@jtarry.freemove.co.uk**

Competition Winners

Congratulations to our readers below who won the competition prizes featured in the *Scanning Scene Extra* Competition which appeared in the November 2003 *SWM*. The winners are as follows: **G. Sellick**, Taunton, Somerset; **Alistair Dunlop**, Sevenoaks; **J. Neilson**, Glasgow; **A. Thompson**, Hayle, Cornwall; **L. Woolley**, Bude, Cornwall; **R.M. Illman**, Oxted, Surrey; **D. Foster**, Driffield, E. Yorks; **Robin Brown**, Northumberland and **Kevin Hughes**, Tamworth, Staffs. Turn to page 45 now and you could be in with a chance of winning a Roberts RD3!



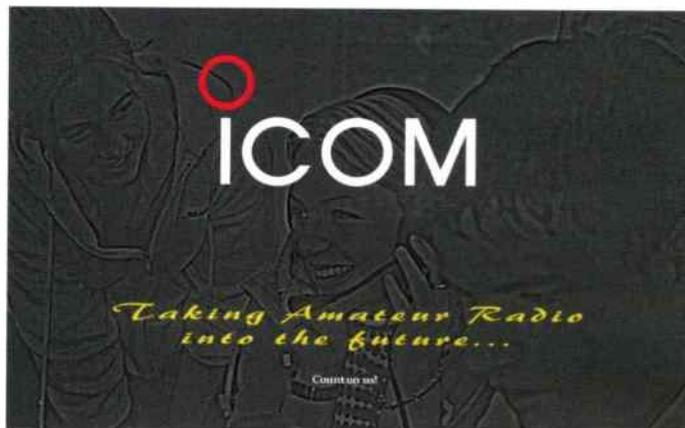
Radiosport Rally

Radiosport's Communication & Electronics Show are holding their rally at the Stevenage Arts & Leisure Centre on **Sunday 15 February 2004**. This Leisure Centre has proved to be an ideal venue for the show, re-located from Picketts Lock. There are two large halls on one level, with restaurants and bars above. Adjacent to the centre is the Leisure Park, offering family entertainment, plus many more places for food and drink. Doors open 1000-1600 and admission is £3. You can find more information at **www.radiosport.co.uk**, E-mail: **radiosport@dsl.pipex.com** or 'phone **(01923) 893929**. Put the date in your diary now!

20 QSL Cards For One

News from **Icom (UK) Ltd.** - they have available a quantity of Icom QSL cards. Each card features stylish Icom branding on the front of each card - and each card can be customised by the user. Therefore, if you have a Special Event Station that requires QSL cards, simply contact Icom Marketing at marketing@icomuk.co.uk stating your station, dates and its purpose and your name, address and telephone number. Alternatively, if you would prefer, Icom can send you 20 of their QSL cards, just send in one of yours, and get 20 of theirs - it's that simple!

Icom also have a wide selection of posters available for their customers. Measuring 254 x 737mm, these glossy posters would be ideal for a clubhouse, Special Event Station or a shack. The posters that are available are: IC-2725, IC-T3H, IC-E90, IC-765PROII, IC-R5, IC-703 and the IC-7400. If you would like any of these posters, contact Icom Marketing (as above) giving your name, address, E-mail address and daytime 'phone number. Please note that the posters are available on a first come first served basis.



Recreational Motoring Faces Its Biggest Threat Ever

A rather worrying news item from the Land Access & Recreation Association (LARA) hit the SWM Newsdesk a few days ago. There are very potentially wide reaching effects especially for those who use vehicles to pursue their hobby on unsurfaced roads. Imagine having to carry antennas, radios and power sources by hand to your favourite portable location that you use to escape the ever growing QRM just because vehicle traffic becomes banned on a right-of-way you've been using for years.

After 100 years, during which time the highways and byways of England and Wales have been explored and enjoyed by generations of drivers and motorcyclists, a proposal just put out to consultation by the Department of Environment, Farming & Rural Affairs (DEFRA) looks set to change the face of recreational motoring forever.

The proposed legislation could affect any type of motor sport which uses minor public roads and it severely threatens some of the UK's oldest automobile competitions, including famous classic trials organised by bodies like the Motor Cycling Club (whose Edinburgh Trial, for example, celebrates its centenary in June 2004).

The change is part of the fall-out from the *Countryside and Rights of Way Act 2000*, which introduced the right to roam for hikers across thousands of square miles of private land - and is largely driven by a vocal and influential minority which wants motor vehicles out of their countryside - full stop.

Illegal motoring is a very real problem in places - but in seeking to combat it effectively, the countryside minister Alun Michael appears to be proposing changes which will hit the law-abiding, while probably doing little to deter the cowboys.

Bill Troguear, chairman of the Land Access & Recreation Association (LARA) says: There is a very real danger that motorcyclists and drivers will lose access to minor tarmac

planning rules are biased against the provision of such sites, so this does not help in diverting inappropriate highway use to more appropriate activity sites.

It is grossly unfair to propose an ill-thought change in legislation that damages our centuries-old highway law, takes away the rights of ordinary people enjoying an arcane, but historic, pastime, does little to tackle the root causes of the problems, and gives yet more exclusive territory to rambles, who already enjoy more access than they can ever possibly want.

In England and Wales, there are around 192,000km of footpaths and bridleways where motorists cannot go. There are around 10,000km of minor, unsealed vehicular roads, much of which is also enjoyed by walkers, cyclists and riders. Walkers now have or will soon have thousands of square miles of open access countryside as well, plus they can wander at will on urban commons and through Forestry Commission plantations. Ramblers already have exclusive rights to most of the British countryside: now they want the rest, too.

LARA will be co-ordinating a response to the proposals and advising club members how to approach their MPs. The closing date for responses is 19 March 2004. Copies of the consultation paper are available on both the LARA and DEFRA websites. For more details, please contact the LARA Motor Recreation Development Officer at mrdo@laragb.org or visit www.laragb.org

MOTORING ORGANISATIONS'

LARA

LAND ACCESS & RECREATION ASSOCIATION

and stone-surfaced roads, thus closing down access to large areas of the countryside.

The motoring organisations do not condone irresponsible and aggressive behaviour in the countryside. Our ancient highways are not scrambles practice tracks, nor a battleground to be conquered. If people want to go fast, or to drive into situations where a winch is a necessity, they should enter competitions held on appropriate terrain. Unfortunately, our

Rural Wireless Broadband For UK

The newly formed Ofcom have just announced the allocation of radiocommunications spectrum intended to deliver a new kind of low-cost wireless broadband connection to the most remote communities in the country, in other words those exchanges that will never hit the trigger point for installation of DSLAMs - the hardware required for the provisioning of ADSL over telephone lines.

Wireless broadband services founded on the newly-released 5.8GHz Band C spectrum range will offer significant benefits to people who live and work in the UK's rural communities, many of whom are unable to access fixed-line broadband infrastructure.

Average connection speeds will vary depending on the configuration offered by each service provider; however, it is anticipated that rural consumers and businesses will typically be offered always-on broadband connections with downstream speeds of up to 1Mb/s.

The 5.8GHz Band C services will be a more powerful variant of existing wi-fi (Wireless LAN) services. They will share spectrum with a number of UK military radiocommunications applications by making use of new Dynamic Frequency Selection technology to minimise interference. Band C spectrum is also currently used by some TV outside broadcast units. Ofcom will be working with broadcasters to ensure interference is avoided.

The new services will be licensed by Ofcom under a 'light touch licensing' regime. This will enable service providers to offer the service at a nominal licensing cost of £1 per terminal installed per year (subject to a minimum cost of £50 per year).

Each household or business connecting to the Internet will require a 5.8GHz Band C terminal. Whilst service providers will need to recover their additional costs (such as equipment purchase, customer support and billing) over and above the nominal licensing fee, it is anticipated that providers will seek to offer rural consumers and businesses a range of wireless broadband services which are both fast and cost-effective.

The first 5.8GHz Band C services are expected to be available in 2004.

Chief Executive of Ofcom Stephen Carter said: "Broadband Britain should be for all of Britain - not just urban communities. We look forward to the introduction of innovative new services using this newly-released spectrum."

February 1: The South Essex Amateur Radio Society are holding their 19th Mobile Radio Rally at the Paddocks, Long Road, Canvey Island, Essex (the Paddocks are situated at the end of the A130). Doors open at 1030. There will be Amateur Radio, Computer and Electronic component exhibitors, home-made refreshments and free car parking with space outside the main doors for disabled visitors. Visit www.southessex.btinternet.co.uk or contact **Brian F. Bellamy G7IIO/M3IIO on (01268) 756331** (no 'phone calls after 2100 please), E-mail: briang7iio@yahoo.com

February 8: The Harwell Rally is to be held at the Didcot Leisure Centre, Mereland Road, Didcot, Oxon, signposted from the A34. Bring & Buy, trade stands, special interests, crafts, catering, licensed bar and talk-in on S22. Free car parking. Doors open 1030 (1015 for disabled visitors) and admission is just £1.50. Ann G8NVI on (01235) 816379 or E-mail: ann.stevens@btinternet.com or visit www.hamradio.harwell.com

***February 15:** The Stevenage Communication & Electronics Show are holding their rally at the Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire. Doors open 1000 till 1600 and admission is £3. More information from **RadioSport Ltd., 126 Mount Pleasant Lane, Bricket Wood, St. Albans AL2 3XD, Tel: (01923) 893929, FAX: (01923) 678770** or visit www.radiosport.co.uk

February 15: The Northern Cross Radio Rally is to be held at Thornes Athletics Stadium, Wakefield, West Yorkshire. One large hall on ground floor - just out of town on the Horbury Road. There will be ample parking on-site, with easy access from M1 J39 & 40 - well signposted. All the usual attractions and doors open at 1030 (1015 for disabled visitors and Bring & Buy). Admission charge is £2. More details from **John G7JTH on (01924) 251822** or visit www.wdrs.org.uk

February 22: The Swansea Amateur Radio Society will be holding their rally at the Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire. Doors open at 1030 and admission is £1.50, children 50p. There will be trade stands, Bring & Buy, local radio interest and repeater groups, 2m talk-in and an operational h.f. station. More details from **Roger Williams**

Special Event

Hosted by the Windermere Steamboat Museum, the **Royal Air Force Amateur Radio Society (RAFARS)** are organising a radio oriented event over the weekend of **7/8 August 2004**. The theme of the event is the use of Mobile Radio in the Lake District, in both Professional and Amateur hands.

It is hoped that there will be participation from Radio Cumbria (including the 'Cumbria Bus' equipped with Internet facilities) with an outside broadcast on at least one of the days from the Museum site. The Police, Fire and Ambulance Services have also been asked to show their vehicles and equipment, together with Mountain rescue teams, the Army and Cadet forces from the area.

The Royal Air Force ARS will mount a Special Event Amateur Radio Station on the site

GW4HSH on (01792) 404422.

February 29: The Cambridge & District Amateur Radio Club Rally is to be held at the Wood Green Animal Shelter, London Road, Godmanchester, four miles from Huntingdon, take the A1198 off the A14 (J24). The Wood Green Animal Shelter is well signposted and there will be wheelchair access along with free car parking. Bring & Buy, Talk-in on S22, bar and restaurant. Doors open 1000 and admission is £2 (£1.50 for OAP/disabled visitors), children free. There's also the opportunity to visit the animal shelter and 52 acre site including water garden and lake. A great day out for all the family. More information from **John G0GKP on (01954) 200072** or visit www.cdarc.org.uk

March 14: The Wythall Radio Club are holding their 19th Annual Radio & Computer Rally at Woodrush Sports Centre, Shawhurst Lane, Hollywood, near Birmingham on the A435, just 3km from J3 of the M42. Doors open 1000 till 1600 and admission is just £1.50. There will be plenty of traders in two large halls and refreshment facilities are available on site. There will also be a Bring & Buy, easy comfortable parking on site. All are welcome. For licensed radio amateurs, a talk-in is available on S22. More information at www.wrcrally.co.uk or contact Rally Organiser **Martin G8VXX on 0121-474 2077** (24hr answerphone) or FAX: 0121-742 3471 working hours or E-mail enquiries to enquiries@wrcrally.co.uk

March 14: The Bournemouth Radio Society are holding their 16th Annual Sale at Kinson Community Association Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open from 1000 to 1600. Talk-in from G1BR5 on 2m S22, Amateur Radio, computer traders, accessory traders, antenna suppliers, Bring & Buy, also specialist groups and clubs and home-made refreshments. Admission just £1. More details from **Olive & Frank G0GOX on (01202) 887721**.

April 18: The Yeovil & DARC are holding their 20th QRP Convention at the Digby Hall, Hound Street, Sherborne, Dorset. Doors open from 1000. There will be a talk-in on S22, three lectures by notable speakers, trade stands, Bring & Buy and excellent catering and parking facilities. More information from **Derek M0W0B on (01935) 414452** or E-mail: m0wob@tiscali.co.uk

***PW Publishing Ltd. in attendance.**

throughout the weekend, using facilities provided by the permanent Amateur Radio station in the Museum Grounds. It is hoped to use the special RAFARS callsign **GB0RAF**.

Hopefully as many Radio Amateur operators as possible will join in the event by bringing their mobile and portable stations for the weekend, or by operating into the Special Event Station. A keen ear will be held out for low power stations operating from sites around the lakes under the 'Summits on the Air' scheme.

Further details and enquiries can be made to **Roy Walker 2E1RAF** at 2e1raf@thersgb.net or direct to the Museum.



Don't Miss March SWM

FREE with the March issue of *Short Wave Magazine* is a 64-page MFJ product guide from **Waters & Stanton**.

- * Comprehensive product range from MFJ, Ameritron, Mirage, Vectronics and HyGain
- * Over 800 products
- * Free discount vouchers
- * Free delivery
- * Freephone order line
- * 14 day exchange scheme if not totally satisfied

The March issue of *SWM* is on sale 26 February 2004. Miss it, miss out!



LM&S

Long, Medium & Short Wave Bands

● **Brian Oddy** *Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS*

If you enjoy listening to the programmes broadcast by specific short wave stations of your choice but you have been unable to find them since the adoption of new frequencies for the winter period then this edition of LM&S, also the one in the January issue, could well help you to locate them!

The s.w. data herein is based upon reports of actual reception sent to me by listeners who reside in the UK and abroad. The frequencies (in MHz), languages, intended target areas and overall transmission times (in UTC) are those which apply at this time and will remain in force until the summer transmission schedules are introduced.

Some idea of the clarity of reception of each transmission at a particular location can be ascertained by referring to the SINPO code ratings quoted in the data, but it is important to bear in mind that the propagation conditions in the s.w. bands are never constant - they vary by the hour, the day and the month and they are also affected by the

level of solar activity, so do not place too much reliance upon them!

Perhaps I should also point out that broadcasting is really a two way process. The programme makers for each station hope that their efforts will attract your attention not only once, by on a regular basis. The engineers at each station have the task of ensuring that the broadcasts to an intended target area can be received as clearly as possible. To that end they may employ two or more transmitters operating in different s.w. bands to carry the same broadcast.

Both the production and engineering staff have little idea of how effective their broadcasts really are without feedback from you the listener, so if you find the broadcasts from a particular station of interest be sure to send them an honest report. Refer to the programme content and tell them why you enjoy listening to the broadcasts, also suggest new ideas that might improve them. To help the engineers, be sure to include a signal rating based on the International SINPO Code, which is very concise and one most broadcasters understand. Subsequently, you may receive an acknowledgement from the station concerned in the form of a letter or a verification (QSL) card. Some readers of this column, who have sent such reports to a broadcaster, have even been contacted by telephone and then invited to take part in a 'talk-in' programme!

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless otherwise stated, all logs were compiled during November.

Up in Wigan, **Jim Edwards** searched the band during the evening; also after midnight and he compiled an interesting log - see chart. At 1935 he heard the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanissetta, Italy on **189kHz** with a fair signal. Much later, he picked up the sky waves from the Rikisutvarpid (RUV) 300kW outlet at Gufuskalar, W.Iceland on **189kHz** at 0225; also those from their 100kW outlet at Eidar, E.Iceland on **207kHz** at 0230. Polatli, Turkey on **180kHz** was heard with Koran type wailing music at 0255.

The RAI Caltanissetta outlet on **189** was also heard by **Richard Reynolds** in Guildford. During their sign off at 2300 he rated the transmission SINPO 23533. Earlier, he listened to a broadcast from R.Belaruskaje via

Sasnovy, Belarus on **279kHz**. with a woman speaking in Belarusian. He rated the transmission 55434 at 2200.

Not far away in Morden, **Sheila Hughes** came across some nice classical music on **177kHz**, broadcast via Oranienburg, Germany at 0730. She says "It made pleasant listening whilst I was having my breakfast".

Down in E.Bristol **Simon Hockenull** picked up the broadcasts from Sasnovy on **279** several times during the evenings of November, but the most unusual occurrence was on the 28th when their signal was present at 1205 and rated SINPO 15341. He often monitored **252kHz** for test transmissions and/or broadcasts from RTE via Clarkestown, Eire but found no trace of them.

Medium Wave Reports

Several listeners searched the m.w band after dark for the sky waves from stations in the Middle East, N.Africa, Europe and Scandinavia and they compiled some interesting logs - see chart.

The conditions at night were found to be rather poor in the early part of November by **Eddie Mc Keown** (Newry, Co.Down) but later in the month they improved. There are some unusual entries in his extensive log including Bushehr, Iran (100kW) on **1503** - see chart.

An extensive log was also compiled after dark by **Geriant Gill** in Llanfairfechan - see chart. Amongst his entries is Iranian Radio via Rasht, Iran (800kW) on **1404kHz**.

The conditions after dark tended to be unpredictable in E.Bristol. The highlight for Simon Hockenull was hearing Batra, Egypt on **819kHz** at 2127 during quieter conditions on the 12th. He logged their transmission as 23432. Quite often the winter daytime conditions made it possible for him to receive some of the European stations during daylight.

Up in Barton-on-Humber **Harry Richards** noticed that the conditions were very poor during the early evening of the 20th. He could hardly hear the transmissions from Solvesborg, Sweden on **1179**, RT Luxemborg via Marnach on **1440** and the Voice of America (VOA) via Munich on **1197**, all of which are usually potent signals at his location, but things improved later that evening. On the 27th he picked up the sky waves from the VOA outlet in Kuwait on **1593kHz** and heard a clear ident "This is the Voice of America" at 2300. He rated the transmission SINPO 23332.

The medium wave local radio outlets attracted the attention of some listeners - see chart. An impressive number were logged mainly during daylight by Richard Reynolds; also by **Ernie Strong** (Ramsey, Cambs) but he was disappointed by his findings in that nothing new was heard.

Short Wave Reports

During November, solar activity often affected short wave propagation, especially in the higher frequency bands. R.France International (RFI) continued to broadcast daily to Africa in the **25MHz (11m)** band but it is not known here just how well their transmissions on **25.820** (Eng 1200-1230, Fr 1230-1300) reached the intended target area.

Listeners:-

- (A) Jim Edwards, Wigan
- (B) Simon Hockenull, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Rhoderick Illman, Oxted.
- (E) Eddie McKeown, Newry.
- (F) Richard Reynolds, Guildford.
- (G) Ernie Strong, Ramsey, Cambs.
- (H) Thomas Williams, Truro.

Long Wave Chart

kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	A*,G
153	Donebach DLF	Germany	500	A*,B,C,E*,G,H*
153	Bod	Romania	1200	A*,G*
162	Allouis	France	2000	A*,C,E*,G,H*
171	Nador (Medi-1)	Morocco	2000	A*,G
171	B'shakovo etc.	Russia	1200	A*,B,C*,E*,F*
177	Oranienburg	Germany	500	A*,B,C,E*,G
180	Polatli	Turkey	1200	A*
183	Saadiouis	Germany	2000	A*,D*,E*,G,H*
189	Gufuskalar	W.Iceland	150	A*,B*,E*,G*
189	Caltanissetta	Italy	10	A*,F*
189	Tbilisi	Georgia	500	G*
198	Droitwich BBC	UK	500	C,E,G
198	WesterglenBBC	UK	50	B*
207	Munich DLF	Germany	500	A*,B,C,E*,G*,H*
207	Eidar	E.Iceland	100	A*,E*,G*
207	Azizal	Morocco	800	A*,F*,G*
207	Kiev	Ukraine	500	G
216	Roumoules RMC	S.France	1400	A*,B,E*,G
225	Polskie R-1	Poland	?	A*,B,C*,E*,F*,G
234	Gavar	Armenia	500	A*
234	Beidweijer	Luxembourg	2000	A*,E*,G,H*
243	Kalundborg	Denmark	300	A*,B,C,E*,G
252	Tipaza	Algeria	1500	A*,B,C*,E*,F*,G,H*
252	Yerevan	Armenia	150	A*
261	Sofia	Bulgaria	60	F*
261	Burg	Germany	85	A*,E*
261	Taldom Moscow	Russia	2500	A*,G
270	Topolna	Czech Rep	1500	A*,B,F*,F*,G
270	RossiOrenburg	Russia	40	G*
279	Sasnovy	Belarus	500	A*,B,C*,E*,F*,G

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

- DXers:-
 (A) Bernard Curtis, Stalbridge.
 (B) Jim Edwards, Wigan.
 (C) Stan Evans, Herstmonceux.
 (D) Bill Griffith, nr.Palermo, NW.Sicily.
 (E) Bill Griffith, in Agrigento, S.Sicily.
 (F) David Hall, Morpeth.
 (G) Simon Hockenhuil, E.Bristol.
 (H) Eddie McKeown, Newry.
 (I) Clare Pinder, Appleby.
 (J) Vic Prier, Seaton.
 (K) Richard Reynolds, Guildford.
 (L) Thomas Williams, Truro.
 (X) Michael Casey, Manchester.

MHz	Station	Country	UTC	DXer	MHz	Station	Country	UTC	DXer
3.210	REE via Costa Rica	Costa Rica	0129	H	4.875	R.Difusora,Boa Vista	Brazil	0246	B,K
3.223	AIR Simla	India	0110	B	4.880	AIR Lucknow	India	0040	B,F,H,K
3.230	WYFR via Meyerton	S.Africa	1950	K	4.885	R.Clube do Para	Brazil	0051	B,H,K
3.255	BBC via Meyerton	S.Africa	1949	B,H,K	4.890	R.Difusora Acreana	Brazil	0230	B
3.315	AIR Bhopal	India	0029	B,H,K	4.895	RFI Paris	via Gabon	2133	B,H
3.320	SABC [RSG] Meyerton	S.Africa	2251	B,H	4.895	AIR Kurseong	India	1655	B,H,J,K
3.365	AIR Delhi	India	1706	K	4.897	Murun	Mongolia	2330	K
3.915	BBC via Kranji	Singapore	2100	B,H,J,K,L	4.905	Anhanguera	Brazil	2247	K
3.945	AIR Gorakhpur	India	1622	K	4.905	Xizang-Tb, Lhasa	China	2217	B,G,H,J,K,X
3.950	Qinghai PBS, Xining	China	0030	B,H	4.910	AIR Jaipur	India	0140	B,K
3.955	R.Korea via Skelton	England	2200	C,H,I,J,X	4.910	R.Zambia, Lusaka	Zambia	2108	B,J,K
3.955	R.Taipei via Skelton	England	1800	C,D,G,H,I	4.915	R.Anhanguera	Brazil	0310	B,K
3.965	R.Taipei via Skelton	England	2218	L	4.915	R.Difusora, Macapa	Brazil	0629	K
3.975	R.Budapest	Hungary	2005	C,H,I	4.915	GBC-1, Accra	Ghana	2253	B,F,H,J,K,X
3.985	VOIRI	Iran	1942	H	4.920	Xizang-Tb, Lhasa	China	2257	B,H,J,K,X
3.990	Xinjiang BS, Urumqi	China	1550	B	4.920	AIR Chennai	India	0040	B,K
3.995	DW via Jutich?	Germany	2220	G,H,J,L,X	4.930	AIR Shimla	India	0133	H
4.005	Vatican R	Italy	2110	H,J,L	4.940	AIR Guwahati	India	0045	B,H
4.500	Xinjiang BS, Urumqi	China	0045	B	4.950	AIR Srinagar	India	0042	B,H,K
4.760	AIR Port Blair	India	0032	B,H,K	4.950	VOA via Sao Tome	Sao Tome	2000	A,B,D,H,J,K,X
4.765	R.Rural, Santarem	Brazil	0243	K	4.955	R.Cultura, Campos	Brazil	2258	K
4.765	RTV Brazzaville	Congo	2120	K	4.960	R.Federacion, Sucua	Ecuador	2306	K
4.770	FRCN Kaduna	Nigeria	2100	B,D,F,H,J,K,X	4.960	AIR Ranchi	India	0055	B
4.775	AIR Imphal	India	1613	B,H,K	4.960	VOA via Sao Tome	Sao Tome	0523	K
4.783	RTM Bamako	Mali	2254	B,H,J	4.970	AIR Shillong	India	1555	B
4.790	AIR Itanagar	India	0033	B,H	4.975	R.Uganda, Kampala	Uganda	2001	B,F,H,K
4.790	Azad Kashmir R.	Pakistan	0128	K	4.980	PBS Xinjiang, Urumqi	China	0045	B,H,K
4.800	CPBS 2 Beijing	China	2254	B,H,J,K,X	4.985	R.Brazil Central	Brazil	2255	F,K
4.800	CNR 1 Shijiazhuang	China	2120	E	4.990	AIR Itanagar	India	0055	B
4.800	AIR Hyderabad	India	0105	B,K	4.995	R.Andina, Huancayo	Peru	0115	B
4.800	LNBS Maseru	Lesotho	1638	K	5.005	R.Nepal, Kathmandu	Nepal	0046	B,H,K
4.805	R.Nac.Amazonas	Brazil	2148	B,K	5.009	R.TV Malagasy	Madagascar	1648	K
4.820	R.Botswana, Gaborone	Botswana	0036	H,J	5.010	CPBS Beijing	China	2232	H
4.820	Xizang, Lhasa	China	2125	B,E,H,J,K,X	5.010	AIR Thiru-puram	India	0047	B,H,K
4.820	AIR Calcutta	India	1620	B,K	5.015	R.Brazil Tropical	Brazil	2259	H,J
4.830	R.Tachira	Venezuela	0037	B,H	5.025	ORTB, Parakou	Benin	2257	F,K
4.832	R.Litoral, La Ceiba	Honduras	0330	B	5.025	R.Uganda, Kampala	Uganda	2234	H,J
4.832	Altai	Mongolia	2328	K	5.030	R.Burkina Faso	Burkina Faso	2236	H,J,K
4.835	RTM Bamako	Mali	2218	B,F,G,H,J,K,X	5.030	AWR Latin America	Costa Rica	0245	B
4.840	AIR Bombay	India	0035	B,H,K	5.030	University Network	Costa Rica	0634	K
4.845	ORTM Nouakchott	Mauritania	2200	B,D,F,G,H,J,K,X	5.035	R.Aparecida	Brazil	0215	B
4.850	AIR Kohima	India	0050	B,K	5.040	AIR Jeypore	India	0048	B,H
4.860	AIR Delhi	India	1925	A,B,H	5.050	AIR Aizawl	India	1550	B
4.865	R.Avorada, Londrina	Brazil	0010	B	5.050	R.Tanzania	Tanzania	1938	H
					5.060	PBS Xinjiang, Urumqi	China	0055	B,H,K

Because their transmissions are beamed away from the UK reception here is dependent upon back scatter and other unreliable propagation modes. The strength of their signal has varied from day to day and sometimes the effects of solar activity have resulted in such a high level of noise that their broadcast has been inaudible. The following SINPO ratings

give an indication of reception during fairly favourable conditions:- 44333 at 1225 by **Thomas Williams** in Truro, 45232 at 1225 in Newry & 21522 at 1259 by **Peter Pollard** in Rugby. On the 16th their transmission was still on the air at 1330 and was rated 35533 with a pronounced echo in E.Bristol.

Reception in the **21MHz (13m)** band has also been unreliable and the effects of solar activity were frequently observed. There were no reports of R.Australia's early morning transmission to Pacific areas via Shepparton on **21.725** (Eng 0000-0900) having reached the UK but their broadcast to Asia on **21.820** (Eng 0900-1400) was sometimes received here. It was rated 45132 at 1102 in Newry & 34333 at 1205 by **David Hall** in Morpeth.

Other broadcasters using this band include BSKSA Riyadh, Saudi Arabia on **21.505** (Ar to N.Africa 0600-1500), rated 43233 at 0815 by

Victor Prier in Seaton; Swiss R.Int (SRI) via Sottens **21.770** (Eng, It, Ger, Fr to Nr.East, Africa 0830-1030) 44333 at 0835 by **Stan Evans** in Herstmonceux; R.Pakistan **21.465** (Ur to W.Eur 0800-1104) 34333 at 1035 in Truro; R.Portugal Int, Lisbon **21.830** (Port to Africa 1100-1300) 45323 at 1230 in E.Bristol; Vatican R, Italy **21.850** (It [News] to Africa 1300-?) 45444 at 1303 in Rugby; BBC via Ascension Is **21.470** (Eng to E.Africa 1300-1900) 25444 at 1308 by **Fred Wilmschurst** in Northampton; UAE R.Dubai **21.605** (Ar, Eng to Eur 0600-1630) 54334 at 1345 by **Bernard Curtis** in Stalbridge; BBC via Cyprus **21.660** (Eng to E.Africa 1400-1700) 45243 at 1400 in Newry; R.Ext Espana (REE) **21.700** (Sp to S.America 1200?-1800) 34334 at 1636 by **Rhoderick Illman** in Oxted; WYFR Okeechobee FL, USA **21.455** (Eng to Eur, Africa 1600-1800) 44444 at 1705 in Morden.

A few broadcasters are taking advantage of the propagation conditions and the low level of co-channel interference prevailing in the **18MHz (15m)** band. They include the Voice of America (VOA) via Sri Lanka? **19.010** (Pashto 0430-0530, 1030-1130, 1430-1530; Dari 0530-0630, 1130-1230, 1530-1630 to M.East), rated 44433 at 1045 in Truro; R.Norway Int **18.950** (Norw to N.America 1200-1229) 25422 at 1228 in E.Bristol; R.Denmark via Sveio, Norway **18.950** (Da to N/C.America 1230-1255) 45244 at 1241 in Newry; R.Sweden via Horby **18.960** (Eng to

- Listeners:-
 (A) Simon Hockenhuil, E.Bristol.
 (B) Sheila Hughes, Morden.
 (C) Rhoderick Illman, Oxted.
 (D) Richard Reynolds, Guildford.
 (E) Ernie Strong, Ramsey, Cambs.

Local Radio Chart

kHz	Station	ILR BBC	e.m.r.p (kW)	Listener	kHz	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,E	1359	Cl.Gold 1359, C'try	I	0.27	D*,E
603	C.G.Litt'brne	I	0.10	A,B,D*,E	1359	R.Solent,Bournemouth	B	0.85	D*
630	R.Bedfordshire(3CR)	B	0.20	A,D,E	1359	Capital G, Cardiff	I	0.20	D
630	R.Cornwall, Redruth	B	2.00	E*	1413	Premier via ?	I	0.50	E
657	R.Clywd, Wrexham	B	2.00	D*	1413	Fresh AM, Skipton	I	0.10	E
657	R.Cornwall, Bodmin	B	0.50	D*	1431	Cl.Gold, Reading	I	0.14	D,E
666	Cl.Gold 666, Exeter	I	0.34	A,D	1449	R.Cambs, Gunthorpe	B	0.15	E
666	R.York	B	0.80	B,D,E	1458	Sunrise, London	I	50.00	A,E
729	BBC Essex	B	0.20	D,E	1458	Asian Net, Langley	B	5.00	A
738	Hereford/Worcester	B	0.037	A,D,E	1485	Cl.Gold, Newbury	I	1.00	A,D
756	R.Cumbria, Carlisle	B	1.00	D	1485	R.Humberside(Hull)	B	1.00	E
756	The Magic 756, Powys	I	0.63	A,D*,E	1485	Southern Counties R	B	1.00	C,D*,E*
765	BBC Essex, Chelmsf'd	B	0.50	A,B*,C,D,E	1503	R.Stoke-on-Trent	B	1.00	A*,B*,C,D*,E
774	R.Kent,Littlebourne	B	0.70	C,D,E	1521	Cl.Gold, Reigate	I	0.64	C,E
774	R.Leeds, Farnley	B	0.50	E	1530	R.Exsex, Southend	B	0.15	A*,E
792	Cl.Gold 792, Bedford	I	0.27	A,D,E	1530	Big AM, W.Yorks	I	0.74	D*,E
801	R.Devon,Barnstaple	B	2.00	A,D	1530	Cl.Gold Worcester	I	0.52	A,E
828	Cl.Gold 828, Luton	I	0.20	A,D,E	1548	Capital G, London	I	97.50	E
828	Cl.G 828 Bournemouth	I	0.27	A,D	1548	Magic AM, Sheffield	I	0.74	E*
837	Asian Net Leicester	B	0.45	A,B,D	1557	Cl.Gold 1557, N.hant	I	0.76	E
855	R.Norfolk, Postwick	B	1.50	B,D,E	1557	Capital G, So'ton	I	0.50	D*
855	Sunshine 855,Ludlow	I	0.15	A,D	1566	CountySnd,Guildford	I	0.50	E*
873	R.Norfolk, W.Lynn	B	0.30	B,D,E	1566	SomersetSnd,Taunton	B	0.63	A,E*
936	Brunel CG, W.Wilts	I	0.18	D,E	1584	London Turkish R	I	0.20	E
936	Fresh AM, Hawes	I	1.00	E	1584	R.Nottingham	B	1.00	B*,D*,E
945	Cl.Gold GEM, Derby	I	0.20	E	1584	H/Worcs, Woofferton	B	0.50	A,E*
945	Capital G, Bexhill	I	0.75	C,D	1584	Tay, Perth	I	0.21	D*
954	Cl.Gold 954, H'ford	I	0.16	A,E	1602	R.Kent	B	0.25	E
954	Cl.Gold 954,Torquay	I	0.32	A,D					
963	Asian Club, Hackney	I	1.00	A,C,E					
972	Asian Club,Souhall	I	1.00	A,C,E					
990	R.Devon, Exeter	B	1.00	A					
990	Magic AM,Doncaster	I	0.25	E					
990	Cl.G. Wolverhampton	I	0.09	A,E*					
999	R.Solent	B	1.00	A,C,D					
999	Valley R, Aberdare	I	0.300	A					
1017	Cl.G.WABC,Shr'shire	I	0.70	A,E					
1026	R.Cambridgeshire	B	0.50	B*,C,D,E					
1026	R.Jersey	B	1.00	A					
1035	Easy R, London	I	1.00	A*,C,E					
1035	R.Sheffield	B	1.00	E*					
1116	R.Guernsey	B	0.50	A,D					
1116	Valley R, Ebbw Vale	I	0.50	A					
1152	Cap.G 1152, Birm'ham	I	3.00	A,E					
1152	LBC 1152, London	I	23.50	C,E					
1161	R.Bedfordshire(3CR)	B	0.10	E					
1161	Southern Counties R	B	1.00	C,D*					
1170	Cl.G Amber, Ipswich	I	0.28	D,E					
1170	Capital G,Portsm'th	I	0.50	A,C,D					
1170	Sligs Big,Stoke-on-T	I	0.20	E					
1170	Swansea Snd,Swansea	I	0.58	A					
1242	Capital G,Maidstone	I	0.32	B,C,D,E					
1251	C.G Amber,Bury StEd	I	0.76	D*,E					
1260	SabrasSnd,Leicester	I	0.29	E					
1278	Cl.Gold 1278 W.York	I	0.43	D,E					
1296	Radio XL,Birmingham	I	5.00	A,D,E					
1305	Premier via ?	I	0.50	E					
1323	Capital G,Southwick	I	0.50	D,E					
1332	Premier, Battersea	I	1.00	E					
1332	Wiltshire Sound	B	0.30	D					
1359	Breeze, Chelmsford	I	0.28	D,E					

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

PORTABLE ANTENNAS

TRI-SCAN III

Freq: 25-2000 Mhz Length: 900mm
This Desktop Internal Antenna comes with 3 vertical capacitor loaded coils, mounted on a unique helically wound tri-pod, to give its own ground plane for smooth reception. Complete with 5 mtrs of RG58 coax, terminated with a BNC. (Get the most from your scanner with the Tri-Scan III Desktop and enjoy great performance without the hassle of erecting an external one).

Our Price £39.95 plus £6.00 p+p.



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Freq: 25-2000 Mhz Length: 900mm
This discone style indoor antenna comes with 4 tuned stainless steel vertical whips, 8 ground plane 12" radials, plus 4 loaded horizontal 3" helical radials. Complete with heavy duty base 5 mtrs RG58 terminated with a BNC. (Don't lose those wanted signals while indoors. Use the Skyscan Desktop at your radio station, on the window seal or even in the loft for increased performance).

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These two superb universal antennas, one for VHF/UHF & one for HF have internal tuned wound coils encased in a fibreglass tube with black covering. Includes two suction cups for easy fitting to any smooth surface, complete with 5mtrs of mini hi-spec coax terminated with a BNC. (With these antennas, take your hobby mobile in the car, at home on the patio or bedroom window. A perfect solution for sometimes awkward antenna installations. Great results - No hassle)

SWP2000

Freq: 25-2000 Mhz Length: 515mm.

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SWPHF30

Freq: 0.05-30 Mhz Length: 770mm.

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MAX-5 ACTIVE

Freq: 25-1800 Mhz Length: 1400mm
This portable active antenna incorporates a easy fold away 300 Ohm receiving element joining to a matching coil, wideband pre-amplifier (9v batt not inc) 4mtrs RG58, terminated in a BNC. (Don't lose performance by not choosing an external antenna! Install the in the loft, hang by the window, or even from a tree while out and enjoy upto 14dB Gain with the MAX-5 pre-amplified Active Antenna).

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SHORT-WAVE WIRE ANTENNAS

MD37 SKYWIRE

Freq: 0-40 Mhz Length: 25mtrs
This complete HF wire antenna system comes with 25 mtrs of enamelled copper antenna wire, dog bone insulator, choke balun, & 10mtr RG58 patch lead terminated with a PL259.

Our Price £39.95 plus £6.00 P+P.



MRVA-HFMKII

Freq: 0-40 Mhz Length: 25mtrs
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SKYSCAN MOBILE

Freq: 25-2000 Mhz Length: 650mm
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Freq TX: 144-146 430-440 Mhz
Freq RX: 100-1300 Mhz Length: 300mm
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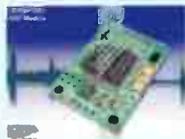
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Asia, Australia, N.America 1330-1400) 34443 at 1350 in Rugby; Family R, WYFR via Okeechobee FL, USA **18.980** (Eng to Eur 1600-2000) 44444 at 1730 in Morden.

Propagation in the **17MHz (16m)** band was also disturbed by solar activity at times. There were no reports of R.Australia's broadcasts to Pacific areas on **17.580** (Eng 0000-0800) or **17.715** (Eng 2100-0000) having been received in the UK.

Mentioned in the reports were Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1600), rated 32222 at 0820 in Seaton; AWR via Moosbrunn, Austria **17.670** (Eng to W.Africa 0900-0930) 43333 at 0905 in Morden; China R.Int via ? **17.690** (Eng to Australia 0900-1100) 44333 at 0905 in Herstonceux; R.Pakistan **17.835** (Urdu to W.Eur 0800-1104) 55445 at 0940 in Stalbridge; All India R. (AIR) via Delhi **17.510** (Eng [Gen.Overseas Svce] to Australia, New Zealand 1000-1100) 32222 at 1032 in Truro; R.Romania Int **17.745** (Eng to N.America

1300-1400) 33422 at 1306 in Newry; BBC via Ascension Is **17.830** (Eng to W.Africa 1100-2100) 25453 at 1330 by **John Parry** in Larnaca, Cyprus & 44444 at 2050 by **Bill Griffith** while in Ponticello, NW Sicily; R.Austria Int via Sackville, Canada **17.865** (Eng to W.America 1640-?) 34333 at 1649 in Oxted; WHRA Greenbush ME, USA **17.560** (Eng to Africa? 1300-1600) 34333 at 1345 in Morpeth; R.Sweden via Horby **17.505** (Eng to ? 1330-?) 33243 at 1350 in Rugby; VOA via ? **17.640** (Special Eng news 1600-1700) 25444 at 1633 in Northampton; R.Nederlands via Bonaire, Ned.Antilles **17.810** (Eng to W.Africa 1900-2100) 25322 at 1930 in E.Bristol.

R.New Zealand has been reaching the UK in the **15MHz (19m)** band. Their 100kW transmission on **15.530** (Eng to NW.Pacific, Asia 1100-1259) was rated 25343 at 1250 in Northampton, however better reception of their broadcasts has been noted in the 25m band - see below. R.Australia has also been reaching the UK in this band. Their

transmission from Shepparton on **15.415** (Eng to Asia 0000-0900) was rated 33333 at 0845 in Truro.

Also mentioned in the reports were the BBC via Ascension Is **15.400** (Eng to W/C.Africa 0630-1000), rated 23222 at 0830 in Seaton; China R.Int, Kunming **15.210** (Eng to S.Pacific 0900-1100) 54444 at 1005 in Morden; R.Bulgaria, Plovdiv **15.700** (Eng to Eur 1200-1300) 54454 at 1221 in Newry; HCJB via Kununurra, Australia **15.390** (Eng to S.Asia 1230-1700) 32333 at 1230 by **Clare Pinder** in Appleby; R.Ukraine Int via Kharkiv **15.520** (Eng to W.Eur 1200-1300) 54433 at

Listeners:-

- (A) Geraint Gill, Llanfairfechan.
- (B) Simon Hockenbull, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Rhoderick Illman, Oxted.
- (E) Eddie McKeown, Newry.
- (F) Clare Pinder, Appleby.
- (G) Richard Reynolds, Guildford.
- (H) Harry Richards, Barton-on-Humber.
- (I) Ernie Strong, Ramsey, Cambs.

Medium Wave Chart

kHz	Station	Country	Power (kW)	Listener	kHz	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600/300	B*,J*	1143	COPE via ?	Spain	2	E*,J*
531	Akraberg	Faeroe Is.	100	B	1170	Sasnovy	Belarus	1000	A*
531	RNE5 via ?	Spain	?	B,E*,J*	1179	SER via ?	Spain	?	E*
531	Beromunster	Switzerland	500	A*,B,E*,J*	1179	R.Valencia, Valencia	Spain	50	D,J*
540	Wavre-Overijse(VRT)	Belgium	150/50	B,E*,H*,J*	1179	Solvsborg	Sweden	600	A*,B*,E*,F*,H*
540	Sidi Benour	Morocco	600	E*,J*	1188	Kuume	Belgium	5	E*,J*
549	Les Trembles	Algeria	600	B*,J*	1188	Reichenbach(MDR)	Germany	5	J*
549	Sasnovy	Belarus	1000	J*	1188	Marcali(VOA/RFE)	Hungary	500	A*,B*,D,E*,H*
549	DLF via ?	Germany	?	H	1188	Munich(VOA)	Germany	300	A*,B*,E*,F*,H*
558	Espoo	Finland	50	E*,I	1197	Virgin via ?	UK	?	D,E*,J
558	RNE5 via ?	Spain	?	H	1206	Bordeaux	France	100	A*,B*,D,E*,H*,J*
558	Cima di Dentro	Switzerland	300	A*	1215	Bolshakovo	Russia	500	A*
567	Tullamore(RTE1)	Eire	500	B,E,H,I	1215	Virgin via ?	UK	?	D,E*,H,I
576	Muhlacker(SDR)	Germany	500	A*,B*,E*	1224	Vidin	Bulgaria	500	A*,E*
576	Barcelona(RNE5)	Spain	50	B*,J*	1224	Lelystad	Holland	50	B*,E*
585	Paris(FIP)	France	8	B,E*	1224	COPE via ?	Spain	?	J*
585	Madrid(RNE1)	Spain	200	B,E*,J*	1233	Litomyss(R.Prague)	Czech Rep	100?	A*
585	Dumfries(BBCScot)	UK	2	E	1233	Nitra	Slovakia	40	B*,E*
594	Frankfurt(HR)	Germany	1000/400	A*,B*,E*,J*	1233	Virgin via ?	UK	?	E*,J
594	Oujda-1	Morocco	100	J*	1242	Marseille	France	150	A*,B*,E*
594	Muge	Portugal	100	J*	1242	Virgin via ?	UK	?	E*,J
603	Lyon	France	300	A*,B*,E*,J*	1251	Huisberg	Netherlands	10	E*,J*
603	Sevilla(RNE5)	Spain	50	E*	1260	SER via ?	Spain	?	E*,J*
603	Newcast(eBBC)	UK	2	E,H,I	1260	Guildford (V)	UK	0.5	D*
612	Athlone(RTE2)	Eire	100	B*,E*,H*,J*	1269	Neumunster(DLF)	Germany	600	A*,B*,E*,H*,J*
612	RNE1 via ?	Spain	10	J*	1269	COPE via ?	Spain	?	D*,J*
621	Wavre (RTBF)	Belgium	80	A*,B*,E*,H,I	1278	Dublin(Cork(RTE2))	Eire	10	C*,D*,E*,J
621	RNE1 via ?	Spain	10	E*,J*	1287	Litomyss	Czech Rep	150	A*,B*,J*
630	Vigra	Norway	100	B*,E*	1287	Lerida(SER)	Spain	10	B*,E*,J*
630	Tunis-Djedeida	Tunisia	600	B*,E*,J*	1296	Valencia(COPE)	Spain	10	E*,J*
639	Prahá(Liblice)	Czech	1500	A*,B*,E*,J*	1296	Orfordness(BBC)	UK	500	A*,J
639	La Coruna(RNE1)	Spain	100	B*,J*	1305	RNE5 via ?	Spain	?	E*
648	RNE1 via ?	Spain	10	E*	1314	Kvitsoy	Norway	1200	A*,B*,E*,H*,J*
648	Orfordness(BBC)	UK	500	A*,B*,E*,H*,J*	1323	W'brunn (VDR)	Germany	800/150	A*,B*,E*
657	RAI Uno via ?	Italy	?	A*	1332	Bрно(Domamit)	Czech Rep.	50/25	A*
657	Madrid(RNE5)	Spain	20	B*,E*,J*	1332	Rome	Italy	300	E*
657	Wrexham(BBCWales)	UK	2	B*,E*,H,I	1341	Lisnagarvey(BBC)	N.Ireland	100	B*,J*
666	Messkirch(Rohrd(SWF))	Germany	150	A*,B*,C*,E*	1341	Tarrasaf(SER)	Spain	2	J*
666	Sitkunai(R.Vilnius)	Lithuania	500	E*,J*	1359	Madrid(RNE-FS)	Spain	600	B*,E*,J*
666	Lisboa	Portugal	195	E*,J*	1368	Foxdale(Manx R)	Is of Man	20	E
675	Lopic(Arrow(Cl.Rock))	Holland	120	B*,E*,H,I	1377	Lille	France	300	A*,B*,E*,J
684	Sevilla(RNE1)	Spain	500	B*,E*,J*	1386	Bolshakovo	Russia	1200	A*,B*,E*,J
684	Avajal(Beograd-1)	Yugoslavia	2000	A*	1395	Flake	Albania	500	B*,E*
684	Potenza	Italy	20	A*	1395	Lopic (Radio 10 FM)	Netherlands	120/40	B*,E*,H,I
684	Droitwich(BBC)	UK	150	H,I	1404	Brest	France	20	B*,E*,J*
702	Monte Carlo	Monaco	40	E*,J*	1404	Rasht (VOIRI)	Iran	800	A*
702	Stovensko 1 via ?	Slovakia	?	A*,J*	1413	RNE5 via ?	Spain	?	E*,J*
711	Rennes (R.Bleu)	France	300	B*,E*,H*,J*	1422	Heusweiler(DLF)	Germany	1200/600	A*,B*,E*,H*,J*
711	Laayoune	Morocco	600	J*	1431	Kopani	Ukraine	500	A*
720	Lisnagarvey(BBC4)	N.Ireland	10	I	1440	Marnach(RTL)	Luxembourg	1200	A*,B*,C*,E*,F*,H*
720	Crystal Palace BBC4	UK	0.75	B	1449	Squinzano (RAI)	Italy	50	E*
729	Cork(RTE1)	Eire	10	B*,E*,J	1449	Redmosst(BBC)	UK	2	E*
729	RNE1 via ?	Spain	?	E*,J*	1458	Flake	Albania	500	A*
738	Paris	France	4	I	1467	Maiaç	Moldova	150	E*
738	Barcelona(RNE1)	Spain	500	A*,D*,E*,J*	1467	Monte Carlo(TWR)	Monaco	1000/400	A*,E*
747	Petric	Bulgaria	500	A*	1476	Wien-Bisamberg	Austria	600	A*,D*,E*
747	Flevo(NOS-1)	Holland	400	B,D,E*,H,I	1485	AFN via ?	Germany	1	J*
756	Braunschweig(DLF)	Germany	800/200	A*,B*,D,E*,J*	1485	SER via ?	Spain	?	J*
756	Billbao(El)	Spain	5	B*,J*	1494	Clermont-Ferrand	France	20	B*,E*,J*
765	Sottens	Switzerland	500	A*,B*,E*	1494	France Blue, Bastia	France	20	D*
774	Abis	Egypt	500	J*	1494	Krasnyy Bor	Russia	1200	E*,J*
774	Enniskillen(BBC)	N.Ireland	1	E*	1503	Bushehr	Iran	100	E*
774	RNE1 via ?	Spain	?	E*,J*	1512	Wolvertem	Belgium	300	B*,D*,E*,F*,H*,J*
783	Leipzig(MDR)	Germany	100	A*,B*,D,E*,J*	1521	Kosice(Cizatice)	Slovakia	600	E*
783	Barcelona (COPE)	Spain	50	J*	1521	Duba	Saudi Arabia	2000	A*,B*,J*
792	Limoges	France	300	B,D,E*	1530	Vatican R	Italy	150/450	A*,B*,C*,E*,J*
792	Lingen(NDR)	Germany	5	E*	1539	Mainflingen(ERF)	Germany	350/700	A*,B*,D*,E*,J*
792	Kavala(VOA)	Greece	500	A*	1539	SER via ?	Spain	?	J*
792	Londonderry(BBC)	UK	1	E*,G	1557	Nice	France	300	A*,B*,E*
801	Munchen-Ismaning	Germany	300	A*,E*,J*	1575	Genova	Italy	50	B*,E*
801	Nurnburg (BR)	Germany	?	D	1593	VOA via Kuwait	Kuwait	?	E*,H*
801	RNE1 via ?	Spain	?	J*	1602	SER via ?	Spain	?	E*
810	Madrid(SER)	Spain	20	J*	1602	Vitoria(El)	Spain	10	E*
810	Westerglen(BBCScot)	UK	100	B,D,E*,J					
810					810	Skopje(MacedonianR)	Yugoslavia	1000	A*
					819	Barra	Egypt	450	B*,E*,J*
					819	Trieste	Italy	25	B*
					819	S Sebastian(El)	Spain	5	B*,E*,J*
					828	Heinenoord(Cl.Rock)	Holland	20	E*
					837	Nancy	France	200	A*,D,E*
					837	COPE via ?	Spain	?	B*,J*
					846	Rome	Italy	1200	A*,E*,J*
					855	R.Bucharest	Roumania	750	A*
					855	RNE1 via ?	Spain	?	C,D,E*,J*
					864	Paris	France	300	A*,B,D,E*,J*
					873	Frankfurt(AFN)	Germany	150	A*,B*,E*,H*
					873	Zaragoza(SER)	Spain	20	E*
					873	Enniskillen(R.U.I)	UK	1	E*
					882	Barcelona	Spain	20	J*
					882	COPE via ?	Spain	?	E*
					882	Washford(BBCWales)	UK	100	D,E*,H*,J*
					891	Algiers	Algeria	600/300	B*,E*,J*
					891	Hulberg	Netherlands	20	E*,J*
					900	Bno(CRo2)	Czech Rep	25	E*,J*
					900	Milan	Italy	600	A*,E*,J*
					900	COPE via ?	Spain	?	J*
					909	Cluj (R.Cluj)	Romania	200	A*
					909	B'mans PK(BBC5)	UK	140	J
					909	M'side Edge(BBC5)	UK	200	H
					918	Domzale	Slovenia	600	A*,B*,E*,J*
					918	Madrid(R.Int)	Spain	20	B*,E*,J*
					927	Wolvertem	Belgium	300	B*,D,E*,H*,J*
					936	Bremen	Germany	100	E*,J*
					936	RNE5 via ?	Spain	?	J*
					945	Toulouse	France	300	A*,B*,E*,J*
					954	Bno(CRo2)	Czech Rep	20	A*,E*,J*
					954	Madrid(CJ)	Spain	200	B*,E*,J*
					963	Pori	Finland	600	A*,B*,E*,J*
					972	Hamburg(NDR)	Germany	100	E*,H
					972	Nikolayev	Ukraine	500	A*
					981	Alger	Algeria	600/300	E*,J*
					990	Berlin	Germany	100	A*,B*,E*,J*
					990	R.Bilbao(SER)	Spain	10	J*
					990	Tywnn(BBC)	UK	1	E*
					999	Schwerin (RIAS)	Germany	20	E*
					999	Maiaç	Macedonia	500	A*
					999	Madrid(COPE)	Spain	50	B*,J*
					1008	SER via ?	Canaries/Spain	?	B*,J*
					1008	Flevo(NOS-5)	Holland	400	E*,J*
					1017	Rheinsender(SWF)	Germany	600	B*,E*
					1017	RNE5 via ?	Spain	?	E*,J*
					1017	Istanbul	Turkey	1200	A*
					1035	Milan	Italy	50	J*
					1035	Lisbon	Portugal	120	B*,E*
					1044	Dresden(MDR)	Germany	20	B*,E*,J*
					1044	Thessaloniki	Greece	150	A*
					1044	Sebaa-Aiouun	Morocco	300	E*
					1044	S Sebastian(SER)	Spain	10	B*,J*
					1053	Iasi	Romania	1000	A*
					1053	Talk Sport via ?	UK	?	C,D,E*,H,I
					1062	Praha (Country R)	Czech Rep	20/1	A*
					1062	Kalundborg	Denmark	250	B*,E*,J*
					1062	R.Uno via ?	Italy	?	C*,E*
					1071	Cairo	Egypt	100	J*
					1071	Billbao(El)	Spain	5	B*,E*,J*
					1071	Talk Sport via ?	UK	?	E*,H,I
					1080	SER via ?	Spain	?	E*,J*
					1089	Krasnodar	Russia	300	A*
					1089	Talk Sport via ?	UK	?	D,E*,H,I
					1098	Nitra(Jarok)	Slovakia	1500	E*,J*
					1098	RNE5 via ?	Spain	?	B*,J*
					1107	AFN via ?	Germany	10	E*
					1107	RNE5 via ?	Spain	?	E*

1230 in Herstmonceux; BBC via Thailand **15.310** (Eng to S.Asia 0600-1800; also to C.Asia, Afghanistan & Iran 1200-1900 & to M.East, Gulf States 1400-2000) 45554 at 1310 in Larnaca, Cyprus; Voice of Turkey, Ankara **15.350** (Tur to Eur 0800?-1700?) 44434 at 1630 in Oxted; BBC via Meyerton, S.Africa **15.420** (Eng to E.Africa 1700-1900) 35322 at 1745 in E.Bristol; BBC via Ascension Is **15.400** (Eng to W/C.Asia 1500-2300) 43333 at 1900 in Rugby & 44444 at 2020 in Ponticello, NW.Sicily; WYFR Family R, Okeechobee FL, USA **15.565** (Eng to Eur 1900-2000) 44333 at 1910 in Stalbridge.

The occupants of the **13MHz (22m)** band now include R.Slovakia Int **13.715** (Eng to Australia 0700-0730), rated 54444 at 0710 in Morden; SRI via Julich, Germany **13.790** (Fr, Ger, It Eng to Nr.East, Africa 0600-0800) 43333 at 0755 in Herstmonceux; Voice International via Darwin, Australia **13.685** (Eng to S/SE.Asia?) 34223 at 1108 in Truro & 23222 at 1312 in Newry; UAE R.Dubai **13.675** (Eng to Eur 1330-1350) 24422 at 1331 in Newry; R.Austria Int via Moosbrunn **13.730** (Ger to Eur) 45534 at 1502 in E.Bristol; Croatian R, Deanovec **13.830** (Cr to Eur) 44444 at 1615 in Stalbridge; AIR via Bangalore 13.620 (Ar to W.Asia 1730-1945) 34233 at 1800 in Seaton; Voice of America (VOA) via Morocco **13.640** (Special Eng 1900-2000) 44334 at 1910 in Stalbridge; DW via Wertachtal, Germany **13.590** (Eng to E/C.Africa 1900-2000) 35444 at 1953 in Northampton.

Good reception over long distances has often been evident in the **11MHz (25m)** band. The broadcasts from R.New Zealand on **11.675** (Eng to Pacific, W.USA 0800-1059) have been reaching the UK quite well. In Truro their 100kW transmission was rated 44434 at 1040. R.Australia's broadcasts have also been received well in the UK. Their transmission from Shepparton to E/SE.Asia on **11.660** (Eng 1330-1700) was logged as 44444 at 1350 in Morpeth & 35444 at 1501 by **Michael Casey** in Manchester.

Other broadcasters using this band include R.Romania Int, Bucharest **11.775** (Eng to N.America 0700-0730), noted as a potent 55555 at 0710 in Herstmonceux; R.Portugal Int, Lisbon **11.875** (Port to Eur 0800-1455) 45433 at 1232 in E.Bristol; Polish R, [R.Polonia] Warsaw **11.820** (Eng to Eur 1300-1359, Sat) 43543 at 1316 in Manchester; China R.Int, Kunming **11.675** (Eng to S.Asia 1400-1500) 44434 at 1430 in Morden; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, N.America 1300?-1630?) 45455 at 1435 in Manchester; R.Nederlands via Tashkent **12.070** (Eng to S.Asia 1400-1600) 34333 at 1500 by **Ian Pakeman** in Folkestone; R.Finland via Pori **11.755** (Fin to W.Eur, W.Africa 0800-2300) 44434 at 1603 in Oxted; Vatican R, Italy **11.715** (Armenian to Eur 1650-1710) 34133 at 1650 in Rugby; R.Nederlands via Madagascar **11.655** (Eng to E.Africa 1800-2000) 54444 at 1820 in Stalbridge; R.Kuwait, Kabd **11.990** (Eng to Eur, N.America 1800-2100) 44333 at 1830 in Seaton; Israel R Int, Jerusalem **11.605** (Eng to Eur, N.America 2000-2030) 44344 at 2030 in

Appleby; AIR via Bangalore? **11.620** (Eng [Gen.Overseas Svce] to UK, W.Eur 2045-2230) 44444 at 2108 in Ponticello, Sicily; WSHB Herald BC, S.Carolina **11.650** (Eng to Eur 2000-2200? Fri, Sat & Sun) 25444 at 2140 in Northampton; R.Vlaanderen Int via Bonaire, N.Antilles **11.730** (Eng to N/C.S.America 2200-2300) 24122 at 2221 in Newry.

In the **9MHz (31m)** band R.Australia's broadcasts were received in the UK on the following frequencies from Shepparton: **9.710** (Eng to Pacific 0800-0900), rated 43333 at 0840 in Herstmonceux; **9.475** (Eng to Asia 1330-1858) 34333 at 1145 in Morpeth; **9.500** (Eng to Asia 1900-2130) 44334 at 2015 in Truro.

Also mentioned in the reports were R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000), noted as 44444 at 0930 by **Gerald Guest** in Dudley; R.Nederlands via Bonaire **9.785** (Eng to E.Asia, Far East, Pacific 1000-1100?) 55445 at 1010 in Stalbridge; R.Mediterranee Int [Medi-1], Morocco **9.575** (Ar, Fr to N.Africa, S.Eur 0500-0400) 44434 at 1030 in Seaton; Croatian R, Deanovec **9.830** (Cro to Eur) 44444 at 1613 in Oxted; Voice of America (VOA) via Kavala, Greece? **9.760** (Eng to Eur, N.Africa, M.East 1700-2200) 43434 at 1730 in Folkestone; Voice of Vietnam, Hanoi **9.730** (Eng to Eur 1800-?) 32332 at 1816 in Newry; R.Nederlands via Flevo **9.895** (Eng to Africa 1800-2100) 33333 at 1827 in Rugby; All India R. (AIR) via Delhi? **9.950** (Eng, Hin to UK, W.Eur 1745-2230) 45433 at 1900 in E.Bristol & 54554 at 2105 in Ponticello, Sicily; Israel R Int, Jerusalem **9.435** (Eng to Eur, N.America 2000-2030) 33233 at 2000 in Appleby; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 44444 at 2115 in Morden; BBC via Cyprus **9.410** (Eng to W/SW.Eur 1500-2200) 25444 at 2123 in Northampton; WTJC Newport NC, USA **9.370** (Eng to N.America 24hrs) 35343 at 2128 in Manchester & 35553 at 0525 in Larnaca, Cyprus; R.Canada Int via Sackville, Canada **9.770** (Eng to Eur, N & W.Africa, Mid.East 2100-2230) SIO 222 at 2131 by **Francis Hearne** in N.Bristol; R.Taipei Int via WYFR Okeechobee FL, USA **9.355** (Eng to Eur 2200-2300) 35443 at 2223 in Manchester.

Broadcasts intended for listeners in many areas may reach the UK in the **7MHz (41m)** band. Mentioned in the reports were those from Christian Science Herald Broadcasting via WSHB in Cypress Creek, USA **7.535** (Eng to N/C.America, W/C.Africa, Russia, Eur 0000-1000, Fri, Sat & Sun), rated 44444 at 0615 in Morpeth; Catholic R. (WEWN) Birmingham, USA **7.570** (Eng to Eur, Africa 0500-0800) 44433 at 0755 in Herstmonceux; World Harvest R. (WHRA) via Maine, USA **7.580** (Eng to E.USA 2300-1000) 55445 at 0855 in Stalbridge; Voice of America (VOA) via Thailand **7.125** (Eng to S.Asia 1400-1800) 34553 at 1407 in Larnaca, Cyprus; R.Bulgaria via Sofia **7.500** (Bul to Eur 1600-1700) 44434 at 1654 in Oxted; Vatican R. Italy **7.250** (Eng to Eur) 54555 at 1715 by **Christopher Pierce** in Harwich; Voice of Russia **7.290** (Eng to Eur 1800-2200) 54444 at 1800 in Appleby; Polish

R. (R.Polonia), Warsaw **7.150** (Eng to Eur 1800-1859) 42442 at 1800 in Harwich & 43333 at 1830 in Morden; R.Slovakia Int **7.345** (Eng to W.Eur 1930-2000) 44444 at 1937 in Newry; R.Tirana, Albania **7.210** (Eng to Eur) 54455 at 1951 in Rugby; R.France Int via Meyerton, S.Africa **7.160** (Fr to C.Africa 1900-2200) 25443 at 2000 in Manchester; Vatican R, Italy **7.365** (Various languages) SIO 333 at 2021 in N.Bristol; Voice of Malta **7.440** (Eng to Eur 2000-2100, Mon to Sat except Fri) 43333 at 2035 in Truro; Voice of Russia **7.340** (Eng to Eur 1800-2200) 44434 at 2010 in Folkestone; R.Romania Int **7.105** (Eng to W.Eur 2030-2100) 43444 at 2030 in Harwich; AIR via Bangalore? **7.410** (Eng [Gen.Overseas Svce] to UK, W.Eur 2045-2230) 45434 at 2100 in Seaton & 44444 at 2105 in Ponticello, Sicily; R.Tashkent, Uzbekistan **7.185** (Eng to Eur 2130-2200) 44444 at 2130 in Dudley & 45454 at 2135 in Manchester; R.Bulgaria via Plovdiv **7.500** (Eng to Eur 2200-2300) 35544 at 2200 in Northampton; R.Romania Int **7.250** (Eng to W.Eur 2200-2300) 44544 at 2235 in E.Bristol; R.Prague, Czech Rep **7.345** (Fr, Eng to N.America 2300-2357) 33232 at 2330 in Harwich.

Many of the broadcast in the **6MHz (49m)** band are intended for listeners in Europe. Some come from Deutsche Welle (DW) via Julich, Germany **6.140** (Eng 0600-1000, 1300-1600), rated 43343 at 1300 in Dudley & 44344 at 1400 in Harwich; R.Prague **5.930** (Eng 1700-1727) 44444 at 1700 in Dudley; R.Slovakia Int **5.915** (Eng 1730-1800) 54344 at 1735 in Folkestone; Voice of Malta **6.185** (Eng 1730-1800) 44444 at 1735 in Newry; Deutschland R, Berlin **6.005** (Ger 24hrs) 43343 at 1940 in Seaton; RAI Rome, Italy **5.965** (Eng 1935-1955) 54555 at 1955 in Rugby; BBC via Cyprus **6.195** (Eng to C/E.Eur 2000-2345) 44444 at 2010 in Ponticello, Sicily; R.Japan via Skelton, UK? **6.090** (Eng 2100-2200) 35443 at 2105 in Manchester; R.Canada Int via Horby, Sweden **5.850** (Eng 2100-2200? also to N.Africa) 33323 at 2115 in Truro; R.Japan via Skelton, UK? **6.180** (Eng 2100-2200) 23432 at 2117 in Manchester; R.Budapest, Hungary **6.025** (Eng 2200-2230) 54444 at 2200 in Appleby; R.Romania Int **5.975** (Eng to W.Eur 2200-2300) 43333 at 2215 in Morden; R.Bulgaria via Plovdiv **5.800** (Eng 2200-2300) SIO 444 at 2258 in N.Bristol.

Some of the broadcasts to other areas may also be received here. Among those noted in the reports were WEWN Birmingham, USA **5.825** (Eng, Sp to N.America 0000-1200), rated 44333 at 0800 in Herstmonceux; WHRI South Bend, USA **5.745** (Eng to N.America 2000-1000) 54434 at 0900 in Stalbridge; BBC via Thailand **5.975** (Eng to S.Asia 1600-1830) 33333 at 1625 in Oxted; VOA via Sao Tome **6.035** (Eng to Africa 1800-2230) 35444 at 2227 in Northampton; R.Prague **5.915** (Eng to N.America 2330-2357) 55445 at 2330 in Harwich; R.Nederlands via Bonaire, Ned Antilles **6.165** (Eng to N.America 0100-0200) 44434 at 0127 in E.Bristol; Voice of Russia **6.155** (Eng to N.America 0200-0400) 44444 at 0245 in Morpeth.

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A superb hinged (rotary) telescopic antenna (0.2-2GHz). PL-259 fitting.

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AT-2000 ANTENNA TUNER



Deluxe SW ATU 0-30MHz. SO239 fittings.

ONLY **£89.00**

(Probably the best ATU around) P&P £6.00
PL-259 to PL-259 patch lead (0.6m).....£5.99
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A low cost, superb passive broadband (150kHz-30MHz). Ideal for indoor or outdoor use and at only 5mtrs long you most certainly will find the space! Using magnetic

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Ready assembled wire antenna offering low noise reception on long, medium, short wave (100kHz-40MHz) adjustable from 6mts to 20mts long. Magnetically coupled transfer

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£64.95 POST £5.00

Q-TEK STEALTH SR-60 DX-10 (R.F. SYSTEMS)



Superb, ready assembled wire antenna system. Not only is this end fed for ease of installation, it is also constructed from extremely high quality components. New 'plyweave' PVC coated wire makes this virtually invisible. Antenna length up to 20m (feeder supplied up to 10m). PL-259 fitted.

OUR PRICE **£69.95** DEL £10.00

A superb quality active antenna with a very high intercept point ideal for weak signal reception without increases in radiated noise. Freq: 100kHz-30MHz. Bomb-proof over loading figures, 90cm long, mains PSU + controller supplied (coax optional).

SEND SAE FOR DATA SHEET **£189.95** DEL £11.00

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Professional active S/W antenna constructed for commercial use. Includes indoor (low noise controller). Ideal for the serious enthusiast. 20kHz-54MHz. Gain: +6dB (reference dipole.)

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Compact - indoor/outdoor scanning antenna. (50MHz-2.6GHz). Superb glass fibre construction. Ideal in areas affected by "nosey neighbour syndrome". This antenna can be put in the loft or outside on the building. SO-239 socket (PL-259 plug needed) 1.3m long (mast clamps supplied).

50MHz-2.6GHz and under 1.3m long

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Comments from John Griffiths

Putting the DC2000 up gave me a tremendous boost to all signals with the ancient AR-2000 coming alive! Signals were well received and I found that I wandered out of airband.

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An amazing vertical (glass fibre) colinear antenna. Quality construction with incredible performance. For the serious scanner enthusiast. *Freq range:* 0.5-2GHz. PL-259 fitting (not supplied). *Length* 3m. Mast clamps supplied. (Gain up to 9dB is easily obtained). Reports have shown this to be an excellent performer!

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Can be used in reverse

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Includes 8.33kHz spacing



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Includes 8.33kHz spacing



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Bandscan

● **Gerry Dexter** *do SWM Editorial Offices, Arrowsmith Court, Broadstone, Dorset BH18 8PW*

America

The drama continues in Costa Rica. Radio For Peace International (RFPI), which operated from the campus of the University For Peace (also known as UPEACE) in that Central American

country blocked access to the radio facility some months ago, ostensibly for non-payment of money owed for the station's portion of a telephone system upgrade.

A few people who were in the facility at the time managed to continue operating despite the lockdown. The latest chapter has seen UPEACE cut off the station's power, forcing it to cease broadcasting completely. The latest word is that some wealthy individual has donated some land to the station and have probably already begun Internet 'broadcasting' from San Jose. Once a new transmitting facility has been set up at this new site near San Jose RFPI will return to short wave.

As if the threat to short wave from the view that satellites and the Internet do it better weren't enough, users of the spectrum also face the very real possibility that broadband via power line (BPL) will kill it completely rendering signals on the h.f. spectrum unreadable. We've had the opportunity to hear what the interference BPL causes will sound like.

One system produces a noise like a Geiger counter gone wild, the other emits a 'theeeuuuu, theeeuuuu' sound as if someone were playing a video game at the next table. The North American Shortwave Association has a group working to fight off this proposal, as do numerous other interested parties, including the American Radio Relay League (ARRL).

Meantime, DRM edges closer. The National Association of Shortwave Broadcasters (NASB) - a USA short wave broadcaster group - is offering weekly broadcasts of the Voice of NASB, transmitted in DRM mode via the VT Merlin Communications transmitter at Rampisham (airing Sundays from 1300 to 1400 on 9.785) and in analogue a.m. Sundays from 0330 to 0400 via WRMI, Miami on 7.385. This series of broadcasts will run through the end of March of this year. A special QSL card is being issued for transmissions. Send your reception report to: **Voice of the NASB, PO Box 526852, Miami, FL.**

Station News

Cuba has added at least one new radio jamming station to aid in its efforts to block reception of the US government's Radio Marti broadcasts and likely the several programs produced by opposition groups and aired via Radio Miami International (WRMI) in Florida. This transmitter was financed by China, which also supplied new units for Radio Havana which has put them into use on



The Statue of Liberty graces this VOA QSL confirming the Kavala relay site back in 1989.

9.550, 9.600 and 11.760MHz.

USA-based Adventist World Radio (AWR) can now be heard via the Radio Netherlands Relay on Bonaire. AWR is using this facility for Spanish to the Americas from 2300 to 0100 on 6.165.

The short wave scene in Guatemala is getting ugly. Radio Cultural/TGNA has left the medium, no longer using its longtime channels of 3.300 and 5.955. Another one which has bitten the dust is Radio Tezulutlan in Coatan, which occupied 4.835 for many years. Also reported to be off the air are La Voz de Nahuala, Radio K'ekchi, Radio Buenas Nuevas and Radio Cultural Coatan. If true, these last three are quite recent departures as we've seen reports of all of them not that long ago.

In Honduras, Radio Misiones International (HRMI) has adopted 3.340 for its broadcasts airing from 1200 to 0500 in both Spanish and English. It seems they plan to re-open 5.010 and the earlier 5.890 as well. Reports for this one can be sent to: **Pastor Noe Raduales, Apt. Postal 20583, Comayaguela, Honduras.**

One of the stations you may turn up on 4.960 - a frequency shared by two other stations - is Radio Cima Cien in the Dominican Republic (often announced as just Radio Cima). Lately, though, this one has also been using Radio Global International as a slogan so don't let that fool you.

Radio Primero de Marzo (Paraguay) has sometimes been reported on 6.105. In truth this is just another relay, transmitted by Radio Cultura in Brazil.

In Peru, Radio Huancabamba (6.536) has become Radio La Ponderosa. Radio Onda Imperial - at one time, anyway, one of the most QSL-resistant stations in South America has reactivated on its old

5.055 frequency. Radio Panorama (5.459) has also returned to the air. Radio Victoria, 6.020 in Lima, is providing the strongest signals from Peru these days.

Radio Imperial, the only active short wave broadcaster in El Salvador (never a hotbed of such activity) continues to be heard occasionally in the North American late afternoons and three early evenings on 17.835 airing religious programs and rancho music. Radio Bosques, an Argentine pirate, has been active occasionally on variable 6.195, although future broadcasts may well show up on or near 6.160MHz.

Radio Transcontinental de America (XERTA) in Mexico City has been struggling for strength

and consistency for several years now, including long periods of inactivity. At present it's being heard on 4.815, but often with very poor modulation (or only an open carrier). Reports can be sent to: **Plaza de San Juan No. 5, Despacho No. 2, Col. Centro de Historico, C.P. 6050, Mexico D.F.**

Also from Mexico, Radio Universidad has been active on 6.045, often airing classical music. Also, Radio Mexico International has taken some damage thanks to financial problems. Broadcasts in English, Portuguese and French language program segments have had to be cut back to just 15 minutes each.

New Transmitter

La Voz de su Conciencia in Colombia may have put a new transmitter on the air by now on their current 6.010 frequency and they hope 5.910 as well. The new home-brew unit will be capable of 10kW. They are also hoping for a 'daytime' frequency in the 31m band.

In Nicaragua, a country in which short wave is hardly on fire as a medium, there's word that a new one has come on the air - apparently operated by the national university in Managua. It's using one kilowatt on 9.905, but we haven't acquired a full schedule for it yet.

In Ecuador, Radio Centinela del Sur in Loja is back on the air at its old spot of 4.773. HCJB's popular *DX Party Line* show which was nearly a victim of the discontinuance of English on the station, is being aired Thursdays at 2000 on WWCR, 15.825, Saturdays at 1420 on 12.160, Tuesdays at 0900 on 9.475, Wednesdays at

0830 on 3.210 and Sundays at 0700 on 5.070. Lesser known WINB, Red Lion, Pennsylvania also carries the programme, but only on Saturdays at 1730 on 13.750 MHz.

One country that seems unaffected by the current anti-short wave fad infecting the industry is Brazil. There it appears that most stations are still



Adventist World Radio issued this card in 2001 commemorating the Marconi Centenary.

active and lately are being well and widely heard in North America. Many DXers are reporting QSLs as well, which is another positive when compared to much of the rest of the world.

Steven Anderson, who operated the illegal pirate/ clandestine United Patriot Radio a couple of years ago is spending 15 years in jail. He was convicted of having shot a car belonging to a deputy sheriff in Kentucky and violating several federal gun laws. Authorities spent more than a year hunting him after he escaped after the shooting.

Propagation Potluck

We are experiencing a sort of propagation 'potluck' these days. The past three months have seen a great deal of solar storm activity, which has caused very spotty reception on the high frequencies. At some times the bands seem nearly empty, but other periods see enhanced reception from this or that area. But whether the times are good or bad we encourage you to keep listening and to support this wonderful medium in any way you can.

Until next time, good listening!

Off^{the} Record

- **Oscar** do SWM Editorial offices
- **E-mail** off.the.record@jpwpublishing.ltd.uk

The radio listening hobby is one which is interesting and fascinating and it has many dimensions to it. Different people enjoy different aspects of it, yet I have noticed that enthusiasts will often tell you that at some stage, listening to free radio stations has played a significant part in cultivating their interest or involvement. Some say that the stations of years gone by are what motivated and inspired them. Others still tune around today hoping to receive interesting signals and looking for innovative programming, something not offered by the conventional stations, or perhaps they identify with that spirit of rebellion to some degree and feel that the establishment still has a lot to answer for. Whatever you wish to read about it, I will continue to write about it here in this column.

Reports & Updates

ABC Dublin has returned to short wave with tests on 6.940MHz. Other possible test frequencies are 6.910 and in-band on 7.130MHz. The station enjoyed much success and popularity for a while, from its launch in 1995 to its closure in 2001, when it had outlets on f.m. in the Irish capital as well as short wave.

The 6.9MHz region is used only occasionally by a small number of European stations, but it is the favoured band of many of the North American operators on h.f. Radio Uranium has closed down, only to be replaced by a new but similar-sounding station called Valley Wave Radio. Scotland's Weekend Music Radio has been using 6.400MHz to avoid the unreliable and often poor propagation conditions on 41m.

Radio Underground is likely to continue to focus mostly on 3.9MHz until spring. The station normally broadcasts during afternoons and evenings, and it is interesting to note that this band is open and working through most of the day during winter months. Kristel AM will resume monthly transmissions on 1179kHz m.w. as from late March.

Radio Pandora plan to experiment with extended hours of broadcasting, and relays via their facilities will continue. Stations carried recently include WRCR and Radio City. Signals from Radio Ozone have been impressive on frequencies around 5.9MHz. I sometimes wonder why other stations don't try this area of the band as it performs well and 48m gets rather

congested sometimes.

A fairly weak signal has been reported around 6.285MHz relaying the satellite Radio Caroline programmes. The WNKR management have been very keen to stress that they are not responsible, even though it is a frequency they have been known to use. OK chaps, we believe you!

Offshore Rumours

A character apparently wishing to be known as 'Mr Fox' has appeared on Internet message boards using E-mail addresses implying connections with Radio Caroline and the station's original founder Ronan O'Rahilly (said to have once been nicknamed 'The Silver Fox'). Message postings spoke of a new ship soon to be arriving to herald a return of offshore broadcasting from the international waters of the North Sea.

Job vacancies were advertised, including PA to the MD and station cook. A live group questions and answers session was held using MSN messenger. Mr Fox's way with words was a little unconventional. Some commented that Ronan does indeed talk that way, as he spoke of The Lady, her necklace (anchor chain), The Vibe, and of course the inevitable Loving Awareness. Whoever this person was, he appeared to have a good level of inside knowledge.

The station would be legal as it would hold a licence and registration from a third world nation. It was hinted that this could be the tiny African island state of Sao Tome and Principe, a former Portuguese colony, now independent and that the ship might be in Portugal.

A Yahoo Internet group was formed called Radio Caroline Chat for interested parties to be kept updated, and in it a link was suggested to a website which appears to be of French origin and claims to speak on behalf of Ronan. This site declares that the real Caroline can only be an offshore and free station, and that a team is working to get her back on air in this form.

True Or False?

So, is the story true or false? Almost certainly false, though I said I would report rumours if interesting, and this one has certainly proved to be entertaining to follow as it has developed. Also part of the enjoyment has been the reaction of the 'anoraks'. They are normally quickly

dismissive of this sort of thing these days, though in this case I think at least a few did wonder for a moment if this time it was something real about to sail over the horizon.

For every offshore station that has ever existed there have probably been some ten or more false rumours. It makes sense to say you don't believe anything and nobody wants to look foolish by having been taken in by a joker. After the *Mi Amigo* sank, there was much erroneous speculation about a new ship, but the *Ross Revenge* did appear, proving that sometimes it does really happen.

In some ways it was a disappointment when the French Caroline website published a press release denying any connection with Mr Fox and his activities, after which he fell rather silent and the Yahoo group suddenly closed. A wind-up exposed, or perhaps part of a more complex master plan? Probably the former is my guess, and if so, you may be wondering why I am adding to the smug satisfaction of a prankster by giving him the oxygen of publicity here. The answer is that it was good fun and the plot and storyline was much better concocted than most rumours, which normally do no more than name a station, a ship and possibly a frequency, and say "coming soon".

The other reason is that it raises many interesting questions and offers up many topics to debate and discuss regarding the possibility of a future offshore station. I hope to do that in more detail in future issues of SWM. Mr Fox may be doing the breakfast show by then. In the meantime, contact me with any thoughts you have about any aspect of this story.

Close Encounters

A mysterious signal has been reported at weekends on an unusual frequency of 6.8265MHz. Listening in a.m. mode one hears non-stop pop music with no announcements, and there is nothing strange about that. Switching to c.w. or any mode which introduces a b.f.o., things become much more intriguing. The carrier can be heard to be stepping and dancing up and down in a strange rhythmic way, producing a dramatic and almost mesmerising musical heterodyne.

It reminded me of the little tune the space aliens used in order to try to communicate with us earthlings in *Close Encounters Of The Third Kind*. I don't know if it is something intentional or accidental, or indeed if the station is aware of it. Perhaps a voltage regulator supplying someone's oscillator circuit is doing strange things, or maybe we are hearing some form of secret coded subliminal message from someone (or something!). Then again, some of the music was French, so perhaps it is them!

Ol' Sol and Its Effect on Radio Propagation Part 1

In the light of recent massive solar activity which had a very significant effect on radio propagation, here is a comprehensive run-down on the sun's mechanisms that effect radio communication here on planet earth. The late Joe Carr explains.

All things considered it's a boring star. It is a mere dwarf star about average in temperature, size and brightness. It is about 1,400,000 kilometres in diameter, has core temperatures about 15,000,000 degrees Kelvin (a degree Kelvin equals the degree Celsius in size, but is referenced to absolute zero, about -273.16°C). But it produces huge amounts of radio, infrared, visible light, ultraviolet, X-ray and gamma rays that interfere with radio reception on Earth. Let's see if we can understand a little about the Sun in order to better understand the propagation anomalies that it produces.

Sun's Structure

The Sun consists of four domains: **interior**, **surface atmosphere**, **inner corona** and **outer corona**. The last two of these make up the **outer solar atmosphere**. The interior domain consists of three zones: **core**, **radiative zone** and **convective zone** (Fig. 1.1). The inner core is the source of the

Sun's energy, and is the location of the thermonuclear fusion reactions that make the Sun run. The core is surrounded by a radiative zone which insulates the core thereby maintaining the higher temperatures.

Finally, there is the convective zone. Large convective cells are formed in this zone. That means that hotter material at the bottom of the convective zone rises, while cooler material at the top falls. These cells can sometimes be seen on the surface of the Sun in the form of bright patches of gas called **granules**. The convection zone produces large magnetic fields that in turn produces sunspots and solar flares and so are very important to radio propagation on the Earth's surface!

Sun Surface Atmospheres

The solar surface is composed of the **photosphere** and the **chromosphere**. Outside of these lays the **outer atmospheres**, which consist of the **solar coronas**. It is in these areas that sunspots, solar flares and coronal mass ejections (CME) occur.

Photosphere

The photosphere is the zone where the sunspots occur. These are the most visible anomalies to be seen on the Sun's surface. They are probably due to intense, highly localised magnetic fields trapped beneath the solar surface. Sunspots have a dark inner region called the **umbra** (shadow), surrounded by a region of lighter material called the **penumbra** - Fig. 1.2.

The number of sunspots varies over an approximate 11 year cycle. Since 1755 the cycles have been numbered, and we are currently near the maximum of cycle number 23. You can see the variation of the numbers of sunspots over the years 1700 until 1997 in Fig. 1.3. Interestingly enough, in doing some work on my genealogy I ran across a graph of immigration from Ulster on a yearly basis over the years 1700 through 1775. The graph nearly overlaid the sunspots graph of Fig. 1.3, but was 'phase shifted' by about one year. The probable explanation is that sunspots affect the climate on the Earth's surface, and that affects the crops that the people would grow. A year or two of high sunspot activity was invariably followed by a year or two of high immigration from Ulster, indicating famine.

Sunspots are a source of solar flares - Fig. 1.4. These are violent solar events that produce high energy types of radiation, low energy particle radiation and electromagnetic radiation, some of which hits the Earth or the Earth's magnetosphere.

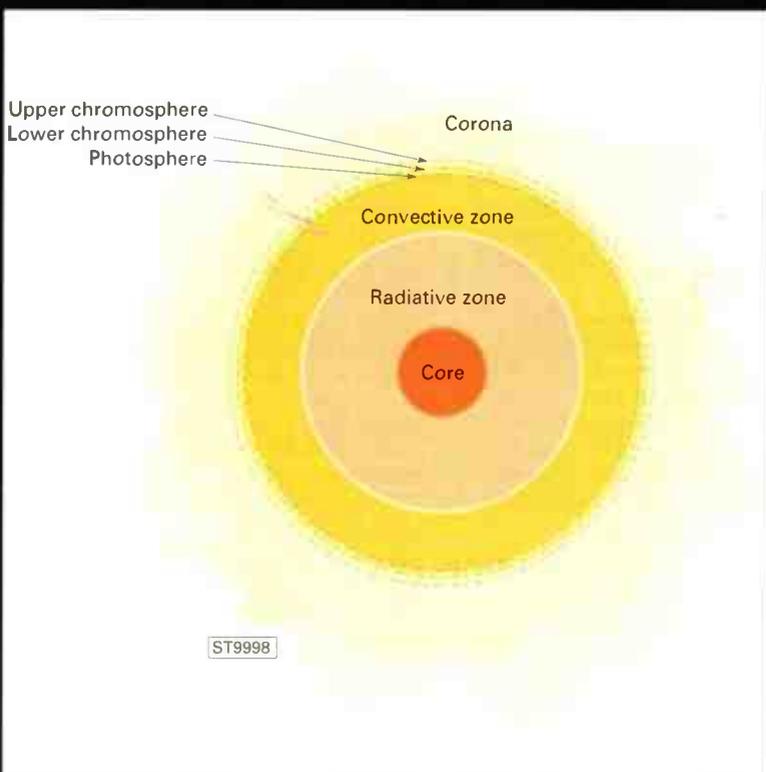


Fig. 1.1: The Sun consists of four domains.

Also seen in the photosphere are bubbles of hot material. These bubbles surface from deep within the Sun and produce bright granules on the surface that expand and then fade in a matter of minutes to hours.

Chromosphere

The middle region of the solar atmosphere is called the **chromosphere** see Fig. 1.1 again and is divided into lower and upper chromospheres. The lower part of the chromosphere is characterised by red hydrogen-alpha spectral lines. A series of very large cellular convection patterns occur within the chromospheres. Close to the boundaries of these convection cells are very concentrated magnetic fields that produce large vertical jets of material. These are called **spicules**, and are about the size of the Earth.

Solar Corona

The solar corona is the Sun's outer atmosphere and it extends many times the solar diameter. It emits huge amounts of X-radiation. At times near the sunspot peaks, violent coronal eruptions occur (which are related to the Sun's 22-year magnetic cycle). Interestingly enough, you can only see the corona well during eclipses of the Sun because it is very faint relative to the photosphere. Otherwise, a device called a **coronagraph** is used to study the solar corona.

The solar corona is concentrated around the solar equator, and is loop shaped. These loops connect areas of strong magnetic fields, and the sunspots are located within these regions.

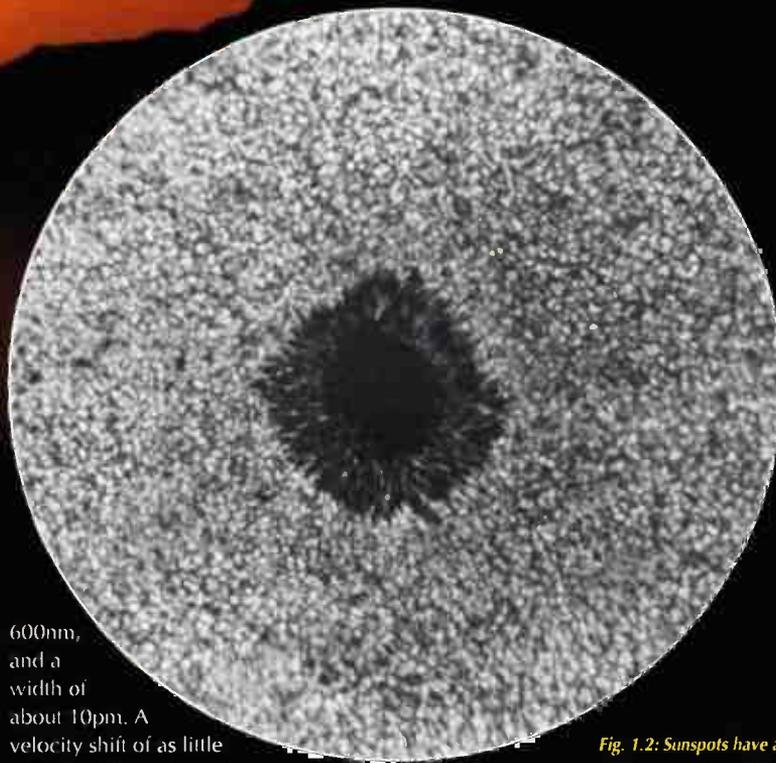
Solar prominences protrude from the corona. These are bright arches of gas that follow strong magnetic lines of force. Prominences might extend 32000km into space, and may be 190,000km in length. These are broken into two types: **active prominences** which may appear and disappear in a matter of hours, and **quiescent prominences** which may last a few days and up to three months.

Inner Corona. The inner corona extends about 1,000,000km into space, and is the portion of the corona that is visible during an eclipse of the Sun. It has a temperature of about 2,000,000° Kelvin, and is the major source of coronal X-rays.

Outer Corona. The Sun's outer corona extends outward towards the Earth. This coronal outflow reaches speeds of 750km/s, and is known as the **solar wind**.

Solar Waves

Solar waves travel on the Sun's surface very much like sound waves travel in the Earth's atmosphere in three oscillation modes: **acoustic**, **gravity** and **surface gravity wave**. They normally produce spectral wavelengths of about



600nm, and a width of about 10µm. A velocity shift of as little as 1m/s shifts the line about 0.002µm. The field of **helioseismology** is the scientific field that studies waves on the surface of the Sun. Temperature, composition and the motion deep inside the Sun influence the period of the solar waves. Furthermore, it gives insight into the Sun's inner workings. In helioseismology, individual oscillations have an amplitude of not more than 0.1m/s.

Fig. 1.2: Sunspots have a dark inner region called the umbra (shadow), surrounded by a region of lighter material called the penumbra.

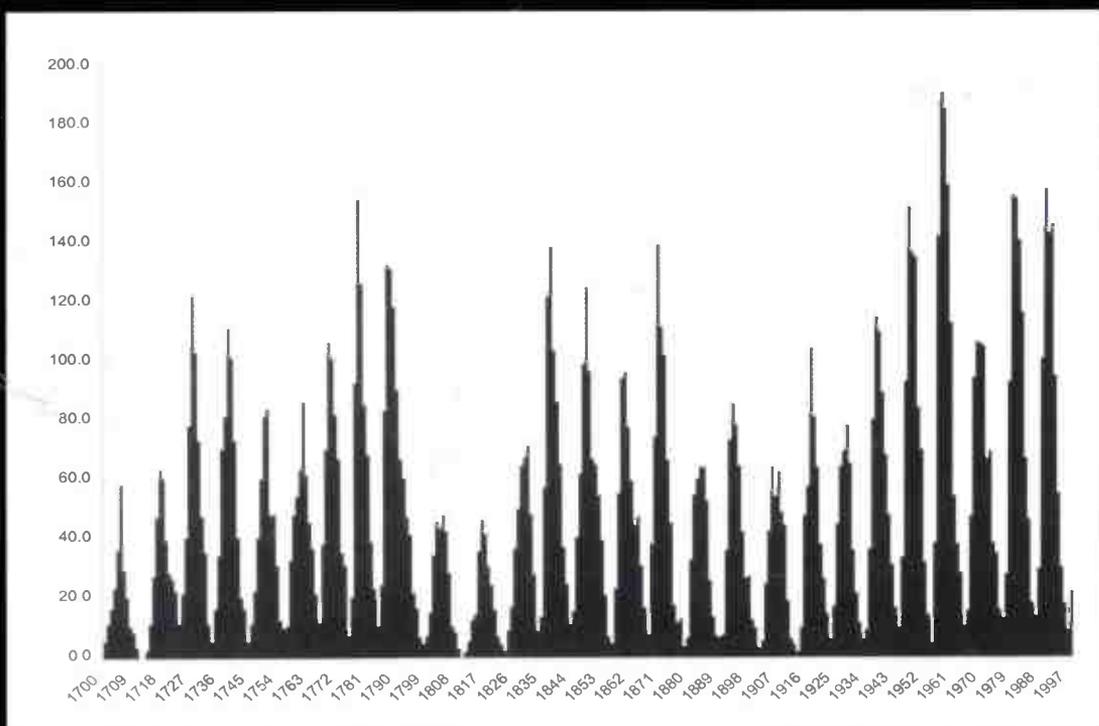


Fig. 1.3: The number of sunspots varies over an approximate 11 year cycle. Since 1755 the cycles have been numbered, and we are currently near the maximum of cycle number 23.

Solar Flares

Solar flares, first observed in 1859, are violent 'explosions' on the surface of the Sun that erupts, goes through its life cycle, and then disappears in a matter of minutes or hours. The temperature in a solar flare is usually 10 to 20 million degrees Kelvin, and can reach temperatures of 100 million degrees Kelvin. It appears that solar flares exist when magnetic energy in the solar atmosphere is suddenly

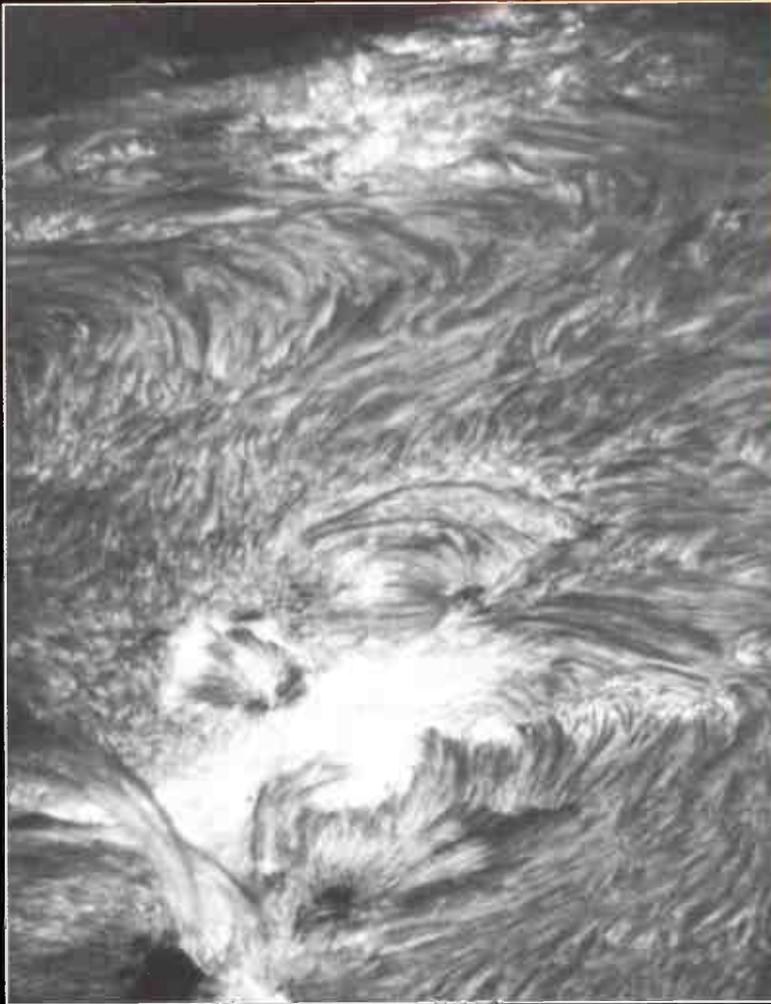


Fig. 1.4: Sunspots are a source of solar flares.

released. Active regions of flare activity may last weeks. During periods of high solar flare activity there may be a wide spectrum of noise present at v.h.f., and less often in the h.f. spectrum.

Occasionally, a solar flare is accompanied by a stream of energetic particles, mostly photons and electrons. The more energetic of these are the protons. These particles travel close to the speed of light, and can reach Earth as little as 30 minutes after the occurrence of a solar flare. The lower regions of the Earth's polar ionosphere will become heavily ionised, producing severe absorption of h.f. and v.h.f. frequencies. This phenomenon is called **Polar Cap Absorption (PCA)**.

Flares can erupt on all areas of the solar disk, although they usually occur in areas where there are large sunspots, or large numbers of sunspots, that are rotating and growing. The incidence of flares follows the same 11 year cycle as sunspots.

Solar flares are the highest energy explosions on the surface of the Sun. And furthermore, they have a direct effect on radio propagation on the Earth. The radiation reaches Earth in about eight minutes via the solar wind. Radio signals can be disrupted, and the solar particles emitted can be dangerous to astronauts and the electronics on board satellites.

Solar Wind

The solar wind consist of a stream of atomic and sub-atomic particles flowing continuously from the Sun. It consists of protons, electrons and helium nuclei. The Sun emits about 1,000,000 tonnes of gas every second! In the vicinity of the Earth the solar wind has a velocity of 750km/s, and extend to 200 Astronomic Units (AU) from the Sun.

Geomagnetic Storm Effects

When large clouds of plasma are ejected from the solar surface, the result is a **Coronal Mass Ejection (CME)**. These CMEs are due to magnetic anomalies within the corona. In addition to CMEs, there is another anomaly called a **Coronal Hole (CH)**. It produces a high speed solar wind stream that affects the Earth's magnetic field.

These anomalies (CME and CH) may give rise to a number of geomagnetic effects such as the auroras, geomagnetic storms and ionospheric anomalies. The CME can even affect short term shifts of about 80km in the Earth's magnetic poles, and contribute to pole reversals every 500,000 years.

The geomagnetic storm causes world-wide disturbances of h.f. and v.h.f. radio propagation that may last several days. Typically, the propagation disturbances last a day or two longer than the geomagnetic storm. During these storms, the auroral activity moves towards the Equator. They can produce scintillations that affect phase sensitive systems operating above 1GHz such as the Global Positioning System - GPS.

Earth's Magnetosphere

The Earth has a **magnetosphere** surrounding it. This is an area that is filled with plasmas which originate in the solar wind. The solar wind interacts with the Earth's magnetic field, and changes both direction and intensity within it. The magnetosphere is doughnut shaped, with the 'holes' at the poles of the Earth. The side away from the Sun is much larger than the sunward side. The magnetosphere exists from about 640km on the sunny side to about 160,000km from the Earth's surface towards 'outer space'. The magnetosphere serves to deflect much of the solar wind, with its dangerous particles, so is necessary to human survival on the surface of the Earth.

Van Allen Radiation Belts

The Van Allen radiation belts were discovered by James Van Allen with sensors aboard the USA's *Explorer 1* satellite. They consist of radiation belts extending from about 640 to 65,000km from the Earth's surface, and are comprised of high energy electrons and protons. These particles were emitted from the Sun during solar flares and were captured by the Earth's magnetic field. There is a belt of high energy Oxygen, Nitrogen and Neon ions that was discovered within the inner Van Allen belt in 1988.

Auroral Displays

The auroras are colourful, striated and rippling displays of light that occur at altitudes of 50 to 970km above the Earth's surface. In the northern hemisphere the auroras are called *Aurora Borealis*, and in the southern hemisphere they are called *Aurora Australis*. Normally, these auroras are only visible within or near the Arctic and Antarctic Circles, although in period of strong solar activity they may be visible in the lower latitudes (at least one *Aurora Borealis* occurred in my area in the past 40 years, latitude 37°N, and we thought it was a nuclear bomb or something). The auroras are important to v.h.f. and u.h.f. radio operations, where they may be used to bounce signals.

Radio Signals

Radio signals are technically called **transverse electromagnetic waves (TEM)**. These waves were first described by James Clerk Maxwell in 1865. Radio waves were first proved to be electromagnetic by Heinrich Hertz in 1887. They consist of a magnetic field and an electric field

interposed to each other, travelling in the same direction. (We are not going to discuss TEM waves here but will discuss what happens to them between the transmitting site and the receiving site. The same concepts apply equally to man-made and natural radio signal sources.

Anyone who listens to radio receivers at all notices that radio signal propagation varies; i.e. it is different at different times. The rules of radio signal propagation are well known, and some predictions can be made (at least in general terms). Listen to almost any band, and propagation changes can be detected.

For example, one of my favourite local m.w. stations broadcasts on 630kHz. During the day, I get interference free reception. But after the Sun goes down, the situation changes. Even though the station transmits the same power level, it fades into the background din as stations to West and South of us start skipping into my area.

Another easily seen example is the 3 to 30MHz high frequency short wave bands. Indeed, even those bands behave very differently from one another. The lower frequency bands are basically ground wave bands during the day, and become sky wave bands at night (similar to m.w.). Higher short wave bands work just the opposite: during the day they are long distance 'skip' bands, but some time after sunset, become short range ground wave bands only.

The v.h.f./u.h.f. bands are somewhat more consistent than the lower frequency bands. But even in those bands Sporadic-E skip, meteor scatter and a number of other phenomenon cause propagation anomalies.

The Earth's Atmosphere

The electromagnetic waves do not need an atmosphere in order to propagate, as you will undoubtedly realise from the fact that space vehicles can transmit radio signals back to Earth in a near vacuum. But when a radio wave does propagate in the Earth's atmosphere, it interacts with the atmosphere and its path of propagation is altered. A number of factors affect the interaction, but it is possible to break the atmosphere into several different categories according to their respective effects on radio signals.

The atmosphere, which consists largely of Nitrogen (N₂) and Oxygen (O₂) gases, is broken into three major regions: **troposphere**, **stratosphere**, and **ionosphere** - Fig. 1.5. The boundaries between these regions are not very well defined, and change diurnally (over the course of a day) and seasonally.

The troposphere occupies the space between the Earth's surface and an altitude of 6 to 11km. The temperature of the air in the troposphere varies with altitude, becoming considerably cooler at altitude compared with ground temperature. For example, a +10°C surface temperature could reduce to -55°C at the upper edges of the troposphere.

The stratosphere begins at the upper boundary of the troposphere (6 to 11 km), and extends up to the ionosphere (~50km). The stratosphere is called an **isothermal region** because the temperature in this region is somewhat constant despite altitude changes.

The ionosphere begins at an altitude of about 50km and extends up to 300km, or so. The ionosphere is a region of very thin atmosphere. Cosmic rays, electromagnetic radiation of various types (including ultraviolet light from the Sun), and atomic particle radiation from space (most of it from the Sun), has sufficient energy to strip electrons away from the gas molecules of the atmosphere. The freed electrons are called **negative ions**, while the O₂ and N₂ molecules that lost electrons are called **positive ions**. Because the density of the air is so low at those altitudes, the ions can travel long distances before neutralising each other by recombining. Radio propagation on some bands varies markedly between day time and night time because the Sun

keeps the level of ionisation high during daylight hours, but the ionisation begins to fall off rapidly after sunset, altering the radio propagation characteristics after dark. The ionisation does not occur at lower altitudes because the air density is such that the positive and negative ions are numerous and close together, so recombination occurs rapidly.

Propagation Paths

There are four major propagation paths: **surface wave**, **space wave**, **tropospheric** and **ionospheric**. The ionospheric path is important to m.w. and h.f. propagation, but is not important to v.h.f., u.h.f. or microwave propagation. The space wave and surface wave are both **ground waves**, but behave differently enough to warrant separate consideration. The surface wave travels in direct contact with the earth's surface and it suffers a severe frequency dependent attenuation due to absorption into the ground.

The space wave is also a ground wave phenomenon, but is radiated from an antenna many wavelengths above the surface. No part of the space wave normally travels in contact with the surface; v.h.f., u.h.f. and microwave signals are usually space waves. There are, however, two components of the space wave in many cases: **direct** and **reflected** see Fig. 1.6.

The tropospheric wave is lumped with the direct space wave in some texts, but has properties that actually make it different in practical situations. The troposphere is the region of Earth's atmosphere between the surface and the stratosphere, or about 6.4 to 11.2km above the surface. Thus, most forms of ground wave propagate in the troposphere. But because certain propagation phenomena caused mostly by weather conditions only occur at higher altitudes, we need to consider tropospheric propagation as different from other forms of ground wave.

The ionosphere is the region of Earth's atmosphere that is above the stratosphere. The peculiar feature of the ionosphere is that molecules of air gas (O₂ and N₂) can be ionised by stripping away electrons under the influence of solar radiation and certain other sources of energy. In the ionosphere the air density is so low that ions can travel relatively long distances before recombining with oppositely

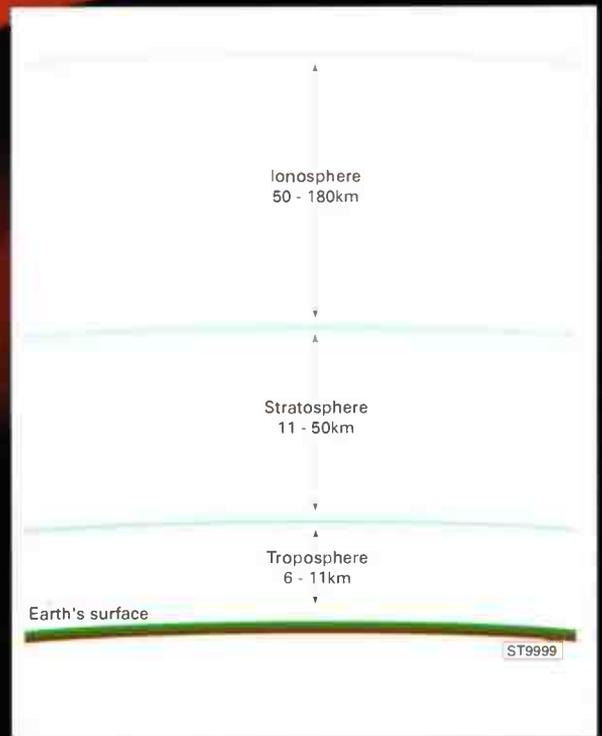


Fig. 1.5: The atmosphere, which consists largely of Nitrogen (N₂) and Oxygen (O₂) gases, is broken into three major regions: troposphere, stratosphere, and ionosphere.

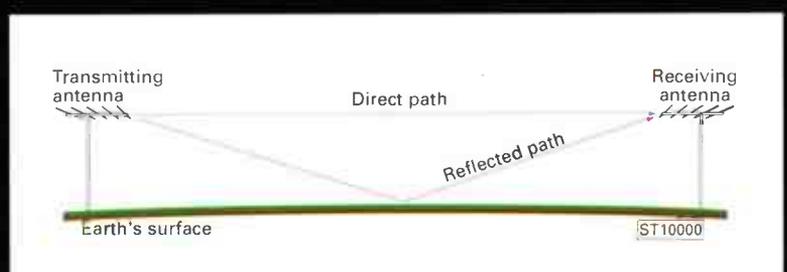


Fig. 1.6: The space wave.

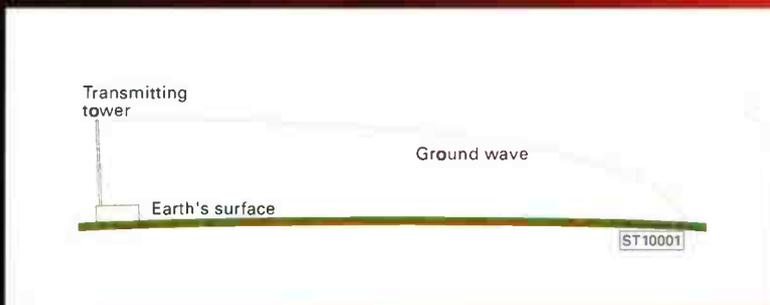


Fig. 1.7: The ground wave, naturally enough, travels along the ground, or at least in close proximity to it.

charged ions to form electrically neutral atoms. As a result, the ionosphere remains ionised for long periods of the day - even after sunset. At lower altitudes, however, air density is greater and recombination thus occurs rapidly. At those altitudes, solar ionisation diminishes to nearly zero immediately after sunset or never achieves any significant levels even at local noon.

Ionisation and recombination phenomena in the ionosphere add to the noise level experienced at v.h.f., u.h.f. and microwave frequencies. The properties of the ionosphere are important to microwave technology because of the noise contribution. In addition, in satellite communications there are some transionospheric effects that can effect signals.

Ground Wave Propagation

The ground wave, naturally enough, travels along the ground, or at least in close proximity to it (Fig. 7). There are three basic forms of ground wave: **space wave**, **surface wave**, and **tropospheric wave**. The space wave does not

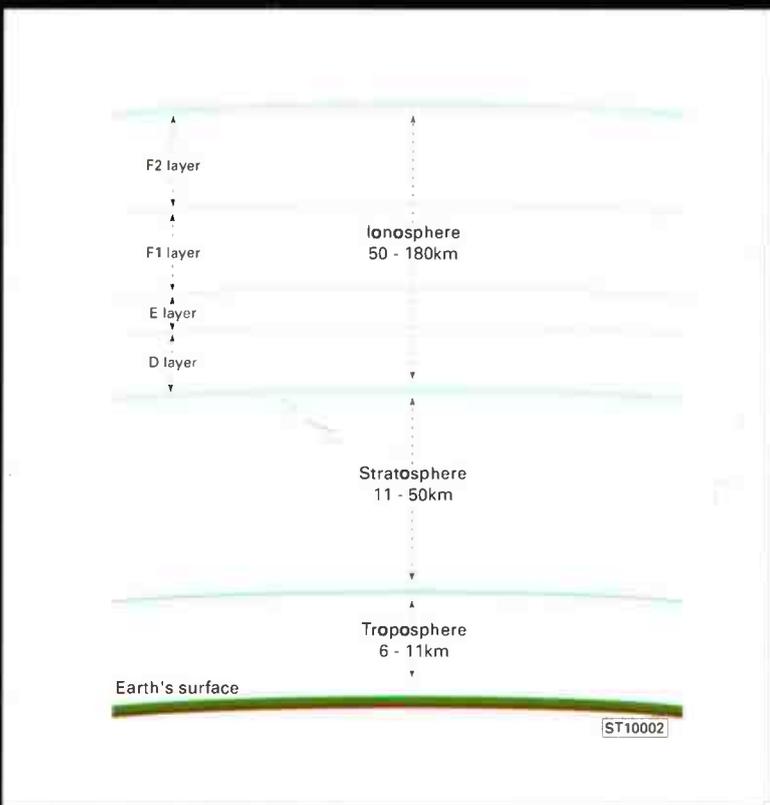


Fig. 1.8: The ionosphere's layers.

actually touch the ground. As a result, space wave attenuation with distance in clear weather is about the same as in free space (except above about 10GHz where H₂O and O₂ absorption increases dramatically). Of course, above the v.h.f. region weather conditions add attenuation not found in outer space.

The surface wave is subject to the same attenuation factors as the space wave, but in addition it also suffers ground losses. These losses are due to ohmic resistive losses in the conductive earth. In other words, the signal heats up the ground! Surface wave attenuation is a function of frequency, and increases rapidly as frequency increases. For both of these forms of ground wave communications are affected by these factors: **wavelength, height of both receive and transmit antennas, distance between antennas, terrain and weather along the transmission path**.

Ground wave communications also suffers another difficulty, especially at v.h.f., u.h.f. and microwave frequencies. The space wave is like a surface wave, but is radiated many wavelengths above the surface. It is made up of two components - again see Fig. 1.6: **direct** and **reflected** waves. If both of these components arrive at the receive antenna they will add algebraically to either increase or decrease signal strength. There is a phase shift between the two components because the two signal paths have different lengths (i.e., D1 is less than D2 + D3). In addition, there may be a 180° (π radians) phase reversal at the point of reflection (especially if the incident signal is horizontally polarised).

Multipath phenomena exist because of interference between the direct and reflected components of the space wave. The form of multipath phenomenon that is, perhaps, most familiar to many readers is ghosting in television reception. Some multipath events are transitory in nature (as when an aircraft flies through the transmission path), while others are permanent (as when a large building or hill reflects the signal). In mobile communications, multipath phenomena are responsible for reception dead zones and 'picket fencing'. A dead zone exists when destructive interference between direct and reflected (or multiple reflected) waves drastically reduces signal strengths. This problem is most often noticed at v.h.f. and above when the vehicle is stopped; and the solution is to move the antenna a quarter wavelength. Picket fencing occurs as a mobile unit moves through successive dead zones and signal enhancement (or normal) zones, and sounds like a series of short noise bursts known no doubt to most of us as 'mobile flutter'.

At v.h.f., u.h.f. and microwave frequencies the space wave is limited to so-called 'line of sight' distances. The horizon is theoretically the limit of communications distance but the radio horizon is actually about fifteen percent further than the optical horizon. This phenomenon is due to refractive bending in the atmosphere around the curvature of the Earth, and makes the geometry of the situation appear as if the Earth's radius is 4/3 the actual radius.

The surface wave travels in direct contact with the Earth's surface and it suffers a severe frequency dependent attenuation due to absorption by the ground. The zone between the end of the ground wave and where the sky wave touches down is called the **skip zone**, and is a region of little or no signal. Because of this phenomenon, I've seen situations on the 15m band (21.390MHz) where two stations 64km apart (Baltimore, MD and Fairfax, VA) could not hear each other, and their communications had to be relayed via a amateur station in Lima, Peru!

The surface wave extends to considerable heights above the ground level, although its intensity drops off rapidly at the upper level. Horizontally polarised waves are not often used for surface wave communications because the Earth tends to short-circuit the E-field component. On vertically polarised waves, however, the Earth offers electrical resistance to the E-field and returns currents to following waves. The conductivity of the soil determines how much energy is returned.

Ionospheric Propagation

Now let's turn our attention to the phenomena of skip communications. Ionospheric propagation is responsible for the ability to do intercontinental broadcasting and communications. Long distance radio transmission is carried out on the high frequency (h.f.) bands (3 to 30MHz), also called the 'short wave' bands. These frequencies are used because of the phenomena called **skip**. Under this type of propagation the Earth's ionosphere acts like a giant 'radio mirror'. Although the actual phenomena is based on **refraction** (not reflection, as is frequently believed) the appearance to the casual observer is that short wave and low-v.h.f. radio signals are reflected from the ionosphere as if it kind of radio mirror. The actual situation is a little different, but we will deal with that issue in a moment.

The key lays in the fact that a seeming radio mirror is produced by ionisation of air molecules in the upper atmosphere. The upper portion of the atmosphere is called the 'ionosphere' because it tends to be easily ionised by solar and cosmic radiation. The reason for the ease with which that region (50-500km above the surface) ionises is that the air density is very low. Energy from the Sun strips away electrons from the outer shells of Oxygen and Nitrogen molecules. The electrons become negative ions, while the remaining portion of the atom forms positive ions. Because the air is so rarefied at those positive and negative altitudes, those ions can travel great distances before recombining to form electrically neutral atoms again. As a result, the average ionisation level remains high in that region throughout the daylight hours, but it decreases after local sunset.

Several sources of energy will cause ionisation of the upper atmosphere. Cosmic radiation from outer space causes some degree of ionisation, but the vast majority of ionisation is caused by solar energy. The role of cosmic radiation was noticed during World War II when British radar operators discovered that the distance at which their equipment could detect German aircraft was dependent upon whether or not the Milky Way was above the horizon. The phenomenon was noticed by scientists at Bell Labs seven years earlier), and became the basis for radio astronomy. Intergalactic radiation raised the background microwave noise level, thereby adversely affecting the receiver's signal-to-noise ratio.

The ionosphere is divided for purposes of radio propagation studies into various layers that have somewhat different properties. These layers are only well defined in textbooks, however, and even there we find a variation in the location above the Earth's surface where these layers are located. In addition, the real physical situation is such that layers don't have sharply defined boundaries, but rather fade one into another instead. Thus, the division into layers is somewhat arbitrary. These layers are designated D, E and F, with F being further sub-divided into F1 and F2 sub-layers, see Fig. 1.8.

D-Layer. The D-layer is the lowest layer in the ionosphere, and exists from approximately 50 to 80km above the surface. This layer is not ionised as much as higher layers because all forms of solar energy that causes ionisation are severely attenuated by the higher layers above the D-layer. The reason for this is that the D-layer is much denser than the E and F layers, and that the density of air molecules allows ions to recombine to form electroneutral atoms very quickly.

The extent of D-layer ionisation is proportional to the height of the Sun above the horizon, so will achieve maximum intensity at midday. The D-layer exists mostly during the warmer months of the year because of both greater height of the sun above the horizon and the longer

hours of daylight. The D-layer almost completely disappears soon after local sunset. Some observers have reported sporadic incidents of D-layer activity for a considerable time past sunset, however. The D-layer exhibits a large amount of absorption of medium wave and short wave signals to such an extent that sky wave signals below 4 to 7MHz are usually completely absorbed by the D-layer on most days.

E-Layer. The E-layer exists from approximately 80 to 110km above the Earth's surface, and is considered the lowest region of the ionosphere that is important to h.f. and v.h.f. radio communications. Like the D-layer, this region is ionised only during the daylight hours with ionisation levels peaking at midday. The ionisation level drops off sharply in the late afternoon, and almost completely disappears after local sunset.

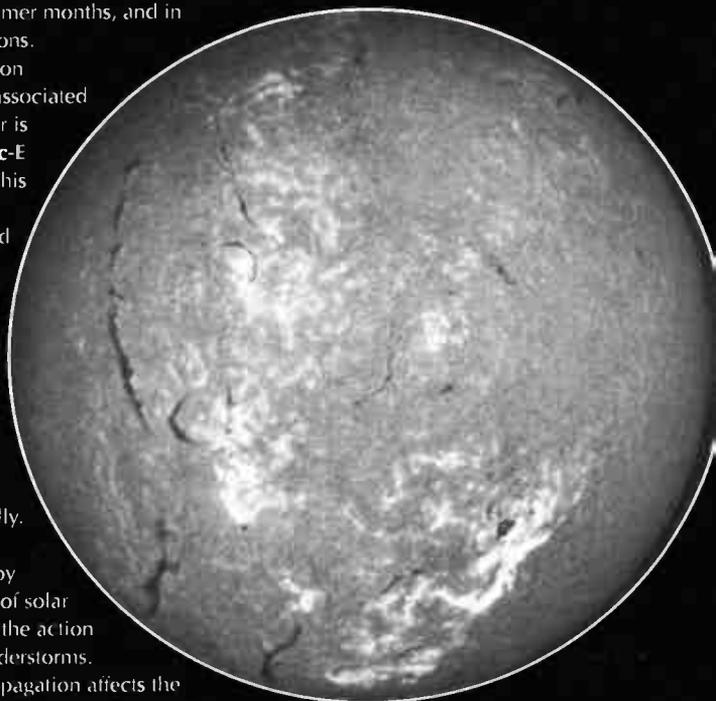
During most of the year, the E-layer is absorptive so will not reflect radio signals. During the summer months, however, E-layer propagation does occur. A phenomenon called 'short skip' (i.e. less than 160km for medium wave and 1600km for short wave signals) occurs in the E-layer during the summer months, and in equatorial regions.

A propagation phenomenon associated with the E-layer is called **Sporadic-E propagation**. This phenomena is due to scattered zones of intense ionisation in the E-layer region of the ionosphere.

The existence of sporadic-E propagation varies seasonally. Sporadic-E is caused either by bombardment of solar particles or by the action of distant thunderstorms. Sporadic-E propagation affects the upper h.f. and lower v.h.f. region. It is observed most frequently in the lower v.h.f. (50 to 100MHz), but is also sometimes observed at higher frequencies. The v.h.f. bands occasionally experience sporadic-E propagation. Skip distances on v.h.f. can reach 800 to 2400km on one hop, especially in the lower v.h.f. region (including the 6m amateur band).

F-Layer. The F-layer of the ionosphere is the region that is the principal cause of long distance short wave communications. This layer is located from about 150 to 450km above the Earth's surface. Unlike the lower layers, the air density in the F-layer is low enough that ionisation levels remain high all day, and decay slowly after local sunset. I have observed multi-hop ionospheric skip to distant points until nearly 0100, but that is rare. Minimum levels of ionisation are reached just prior to local sunrise. Propagation in the F-layer is capable of skip distances up to 4000km on a single hop.

During the day there are actually two identifiable, distinct sub-layers in the F-layer region, and these are designated the 'F1' and 'F2' layers. The F1 layer is found approximately 160 to 240km above the Earth's surface, while the F2 layer is above the F1 to the 430-480km limit. Beginning at local sundown, however, the lower regions of the F1 layer begin to de-ionised due to recombination of



Continued on
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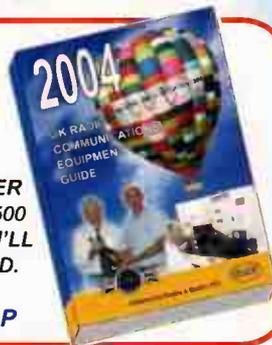
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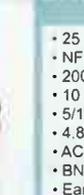
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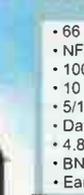
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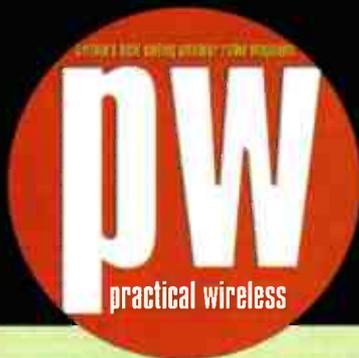
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- **Y Stations**
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Handy hints and tips on getting started
- **In The Community**
Activities of the Norfolk Amateur Radio Club

Plus all the usual features packed with information for the radio enthusiast...

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positive and negative ions. At some time after local sunset the F1 and F2 layers have effectively merged to become a single reduced layer beginning at about 280km.

The height and degree of ionisation of the F2 layer varies over the course of the day, the season of the year, and with the 27 day sunspot cycle. The F2 layer begins to form shortly after local sunrise and reaches maximum shortly before noon. During the afternoon the F2 layer ionisation begins to decay in an exponential manner until, for purposes of radio propagation, it disappears sometime after local sunset. There is some evidence that ionisation in the F-layer does not completely disappear, but its importance to h.f. radio communication does disappear.

Ionospheric Variation and Disturbances

The ionosphere is an extremely dynamic region of the atmosphere, especially from a radio operator's point of view, for it significantly alters radio propagation. The dynamics of the ionosphere are conveniently divided into two general classes: **regular variation** and **irregular disturbances**. Let's look at both types of ionospheric change.

Ionospheric Variation

There are several different forms of variation seen on a regular basis in the ionosphere: **diurnal**, **27-day** (monthly), **seasonal**, and **11-year cycle**.

Diurnal (daily) variation. The Sun rises and falls on a 24-hour cycle, and because it is a principal source of ionisation of the upper atmosphere one can expect diurnal variation. During daylight hours E and D levels exist, but these disappear at night. The height of the F2 layer increases until midday, and then decreases until evening when it disappears or merges with other layers. As a result of higher absorption in the E and D layers, lower frequencies are not useful during daylight hours. On the other hand, the F layers reflect higher frequencies during the day. In the 1 to 30MHz region, higher frequencies (>11 MHz) are used during daylight hours and lower frequencies (<11 MHz) at night.

27-Day Cycle. Approximately monthly, this variation is due to the rotational period of the Sun. Sunspots (Fig. 1.2) are localised on the surface of the Sun, so will face the Earth only during a portion of the month. As new sunspots are formed, they do not show up on the earth side until their region of the sun rotates earth side.

Seasonal Cycle. The Earth's tilt varies the exposure of the planet to the Sun on a seasonal basis. In addition, the Earth's yearly orbit is not circular, but elliptical. As a result, the intensity of the Sun's energy that ionises the upper atmosphere varies with the seasons of the year. In general, the E, D and F layers are affected, although the F2 layer is only minimally affected. Ion density in the F2 layer tends to be highest in winter, and less in summer. During the summer, the distinction between F1 and F2 layers is less obvious.

11-Year Cycle. The number of Sunspots, statistically averaged, varies on an approximately 11-year cycle. As a result, the ionospheric effects that affect radio propagation also vary on an 11-year cycle. Radio propagation in the short wave bands is best when the average number of sunspots is highest. Peaks occurred in 1957, 1968, 1979 and 1990.

Solar events sometimes make the radio mirror seem almost perfect, and makes spectacular propagation possible. At other times, however, solar disturbances disrupt radio communications for days at a time.

There are two principal forms of solar energy that affects short wave communications: **electromagnetic**

radiation and **charged solar particles**. Most of the radiation is above the visible spectrum in the ultraviolet and X-ray/gamma-ray region of the spectrum. Because electromagnetic radiation travels at the speed of light, solar events that release radiation causes changes to the Earth's ionosphere about eight minutes later. Charged particles, on the other hand, have finite mass so travel at a considerably slower velocity. They require two or three days to reach Earth.

Various sources of both radiation and particles exist on the Sun. Solar flares may release huge amounts of both radiation and particles. These events are unpredictable and sporadic. Solar radiation also varies on an approximate 27 day period, which is the rotational period of the Sun. The same source of radiation will face the Earth once every 27 days, so events tend to be somewhat repetitive.

Solar and galactic noise affects the reception of weak signals, while solar noise will also either affect radio propagation or act as a harbinger of changes in propagation patterns. Solar noise can be demonstrated by using an ordinary radio receiver and a directional antenna, preferably operating in the v.h.f./u.h.f. regions of the spectrum. Aim the antenna at the Sun on the horizon at either sunset or sunrise, and tune the receiver to an unused frequency (Note: 150-152MHz is used for radio astronomy, mostly solar flux, observations). A dramatic change in background noise will be noted as the sun slides across the horizon.

Sunspots. A principal source of solar radiation, especially the periodic forms, is sunspots. Sunspots can be as large as 110000 to 130000km in diameter, and generally occur in clusters. The number of sunspots varies over a period of approximately eleven years, although the actual periods since 1750 (when records were first kept) have varied from nine to fourteen years. The sunspot number is reported daily as the statistically massaged **Zurich Smoothed Sunspot Number**, or **Wolf Number**. The number of sunspots greatly affects radio propagation via the ionosphere. The low was in the range of 60 (in 1907), while the high was about 200 (1958).

Another indicator of ionospheric propagation potential is the **Solar Flux Index** (SFI). This measure is taken in the microwave region (wavelength of 10.7cm, or 2.8GHz), at 1700 at Ottawa, Canada. The SFI is reported by the National Institute of Standards and Technology (formerly called National Bureau of Standards or NBS) radio stations WWV (Fort Collins, CO) and WWVH (Maui, Hawaii).

The ionosphere offers different properties that affect radio propagation at different times. Variations occur not only over the eleven year sunspot cycle, but also diurnally and seasonally. Obviously, if the sun affects propagation in a significant way, then differences between night time and day time, and between summer and winter, must cause variations in the propagation phenomena observed.

The K and A indices are recorded at Boulder, Colorado. The K index is recorded at three hour intervals over the course of the day, and indicate current activity. A K>3 indicates high geomagnetic activity is in effect. Fast climbing K indexes means that the noise levels and fading will also increase rapidly, with the effects being felt at higher latitudes first.

The A index is a 24-hour averaging of the K index. It shows the overall trend in solar activity. An A index under 7 means good conditions are in effect unless a solar flare or some other anomaly occurs.

To be concluded in March SWM

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- Size: 69 x 88 x 22 mm
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- 66 - 956 MHz (with gaps)
- AM/FM
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Ultra modern Scanning Receiver

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- 66 - 88MHz, 108 - 170MHz, 300 - 470MHz, 806 - 1000MHz
- Modes: AM/NFM
- Memories: 200

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BEARCAT UBC 180XLT

A stylish new Sports Scanner with 8.83kHz Airband steps

- Frequency: 25 - 87, 108 - 174, 406 - 512, 806 - 960 MHz
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A MUST HAVE for enthusiasts

- 500 channels
- 25-1300 MHz (with gaps)
- AM, FM, WFM

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SPORTCAT

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- UK Freq Coverage
- 66 - 512MHz (with gaps)
- Pre-programmed UK Search Bands
- 80 Channels
- Programmable Chain Search
- Priority Channel Scanning
- Scan+Search rate: 10 Ch/Sec
- Supplied c/w: Antenna, Earphone, Beltclip, Op. Guide

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- Size 238(W) x 93(H) x 243(D)
- Optional FM Unit - E33
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ICOM IC-R75

Communications Receiver

- 0.03 - 60MHz
- Twin PBT built-in
- PC control capability
- Synchronous AM detection



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ICOM IC-R5

- 495 kHz-1309.995MHz
- AM, FM, WFM modes
- PC programmable
- 1250 memory channels
- Dynamic Memory Scan
- CTCSS & DTCSS Decoder
- Auto Squelch



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STEEPLETONE MBR747

Multiband Receiver

- Covers LW/MW and
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- Marine/Airband (108 - 175MHz)
- Battery/Mains



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PALSTAR AA30

- Active Antenna and/or Matcher for Receiver use only. A low loss antenna tuner suitable for random long wire, dipoles, Beveridges, Delta loops, inverted V's, Verticals, G5RV and most receive antennas. Dr use as a stand one active antenna.
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Worldband Radio

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- Selectable scan modes
- 700 memories
- Audio descrambler
- Bug detector
- Selectable int./ex antenna
- Internal or external supply
- Priority channel monitoring

with 8.33kHz for airband

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ALINCO DJ-X3

- 100kHz-1300MHz
- AM/FM/WFM
- 700 memory channels
- Steps: 5/6.5/8.33/10/12.5/15/20/25/30/50/100kHz
- Bug detector
- Stereo FM (with headphones)
- Size: 56w x 102h x 23d mm
- Supplied c/w: 3 AA dry cell, battery case, carrying strap

with 8.33kHz for airband

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ALINCO DJ-X10E

Advanced featured scanning RX

- Receives: 100kHz - 2000MHz
- AM, WFM, NFM, SSB, CW
- 1200 memory channels
- Channel scope
- Advanced scanning features
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- Cloning facilities
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- Switchable attenuator

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The R30 is a compact portable high performance shortwave radio (capable of running from internal batteries or 12V DC) providing excellent strong signal handling, high sensitivity and dynamic range.

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- 20Hz, 500Hz tuning steps, synthesized (low phase noise performance)
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- Analog S-Meter
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SCANMASTER Product sheet 2003

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- length: 1mtr

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16 EL LOG PERIODIC DESIGN

- 105 - 1300MHz
- Gain 11-13dBi
- 'N' type connector
- 500W

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DEDICATED CIVIL & MILITARY AIRBAND ANTENNA

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 - Uses 'N' Type connector

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OptoElectronics X-Sweeper

Hot on the heels of the Xplorer comes the X-Sweeper. No, not a man with a broom in one hand and a P45 in the other, but the latest product from the Fort Lauderdale-based OptoElectronics stable. Martin Peters takes a long look.

The new X-Sweeper is a 30-3000MHz near-field receiver with a difference. An integral graphical display allows the user to observe rapidly all analogue signals that are present - simultaneously and not just each frequency in turn. Once a signal is detected, the X-Sweeper demodulates f.m. audio through its built-in speaker.

One thousand unique frequencies can be stored in memory, along with the number of times each channel was used or 'hits' - up to 65000 times per channel. Hits are date and time-stamped along with their relative signal strength. Additionally, if the GPS option is (factory) fitted, accompanied by their geographical location. On the face of it, a powerful and versatile piece of apparatus.

If you're looking for a potted history of the evolution of near-field receivers then you're invited to take a look at August 2003 *SWM*, where you'll find a review of the OptoElectronics Xplorer.

The advantage of using a near-field receiver is that it continuously monitors a huge segment of the r.f. spectrum all at once, negating the requirement for a lengthy, hit-and-miss tuning process. They seek out any f.m. transmissions in the vicinity and allow them to be heard via an on-board speaker.

This means that you can theoretically capture any nearby f.m. transmission, so long as it is significantly stronger (15dB) than the ambient noise floor. In practice, quite often a tall order in these days of mobile 'phone masts on every other street and pagers overlooking all but the smallest communities.

What makes the Xplorer - and now the X-Sweeper - stand head-and-shoulders above their poor relations is that the frequency of the transmission being intercepted is displayed and can also be committed to memory.

Alternatively you can consider these

devices as frequency counters that also allow you to listen in to the measured transmission. They're near-field receivers and frequency counters rolled into one.

Spectrum Display

What distinguishes the X-Sweeper is its graphical display of the spectrum, which near-instantaneously indicates all r.f. activity in its near-field. No way can you go out on an operation and expect to work covertly with the X-Sweeper. At 212 x 110 x 58mm (h x w x d) and a hefty 680g to boot.

Apart from the X-Sweeper's front-facing display, loudspeaker and 25-way keypad, all the other interesting stuff takes place on the top panel. Here you will find the rotary volume and squelch controls and no less than five connectors.

The largest of these is the 50Ω BNC antenna socket (it could be that the review model is a prototype, as part of the plastic case has been modified quite crudely to accommodate the BNC's shank).

Moving on, there are 3.5mm jack sockets for audio out at headphone level and RS-232 connection to a PC. A 2.5mm socket provides an outlet for the Reaction Tune facility.

Finally, a 9-12V 500mA d.c. external supply can be connected via the power socket, which is centre-pin positive. There is no helpful little symbol to indicate polarity so if you're using anything but the supplied mains adapter, be careful.

The X-Sweeper will run off conventional batteries as well as NiCads or Metal Hydride cells. If using rechargeable cells, be advised that the power supply does not double up as a charger. You will have to reinvigorate them in a separate device.

Removing the batteries requires you to detach the rear compartment's cover after first removing the two captive screws. Quite a palaver. Given that the manufacturers advise that the batteries be taken out when using the external supply, this could become a somewhat tiresome routine.

The not insignificant clonk when the set is turned upside down (and back) turns out merely to be the batteries rattling around in their compartment.

Don't be tempted to run the X-Sweeper from your car's cigar lighter socket or base station power supply. The 13.8V (or more) available is likely to damage the unit.

There's a rubber stand that swings out from the back of the set. It's reinforced with stiff but bendy wire, which allows you to set



the angle at which the X-Sweeper presents itself on the bench or other surface.

Liberally Sprinkled

Inside, the motherboard and its 'piggybacked' companions are liberally sprinkled with surface-mount devices and chips and, of course, the display.

A tin plate screen shields the input circuitry, and twin cables, from the battery and loudspeaker, clip to the board via two pin connectors. The power connector fouls a fixing screw such that the board-mounted plug does not seat well on the p.c.b., again leading me to believe the review model is a prototype.

On the third, and smallest, sub-board lays the keypad, which consists of 27 conventional, p.c.b.-mounted switches. You'll remember that the front panel's membrane has only 25 labelled buttons. On closer inspection there's a pinhole under the right-hand arrow, which allows operation of one of the hidden buttons. The other, located just under the left-hand arrow, can only be accessed with the front panel detached.

What these two buttons do remains a mystery. One is probably a processor reset, whilst the other may initiate a test routine for the purposes of servicing. I didn't press either, just in case the 'self-destruct' label had fallen off.

Switch on and you are greeted immediately with a bright, blue and white welcome message proclaiming this to be the X-Sweeper test receiver. By default you will then be transported to the SWEEP mode, from where the machine hunts the spectrum for activity.

You may initially want to enter the SETUP menu to refine a number of the user settings. Here you can adjust the contrast, invert and back-light the display and also enter the time and date.

You can decide between MEASURED frequency display, where the unit will show the measured frequency, usually within 1 or 2kHz, or CHANNEL display whereby the X-Sweeper snaps to the nearest conventional channel.

Auto-skip allows the unit to display the



The spectrum display in action.

frequencies it detects and then continue to sweep up the band. Auto-hold forces the X-Sweeper to stop and hold on the first occupied frequency it detects.

You'll also find options relating to the connection of a PC, and an external, rather than the internal, GPS facility. Finally, you can enable and adjust the so-called LOG MEMORY MODE.

With the set-up procedure complete it's time to get sweeping. Once initiated, determine the sweep range, first by selecting one of ten span widths from 100kHz to 3000MHz and then entering the centre frequency. With a 300MHz span width and a centre frequency of 550MHz selected, the effective sweep range will be 400-700MHz.

Sweep Range

It's worth pointing out that although the X-Sweeper will only display, lock onto and demodulate transmissions within the pre-determined sweep range, strong signals falling outside these limits will nevertheless and unavoidably be seen by the receiver as contributing to a higher noise floor, affecting the X-Sweeper's ability to lock onto other transmissions.

Whilst sweeping, a small arrow traverses back and forth at the bottom of the display. If any signals are detected, the arrow freezes at the appropriate point under the scale and the frequency is marked, bar graph-style: the higher the peak, the stronger the signal. You can elect to swap the strength indicator for one showing the relative number of hits per captured channel.

All hits can be automatically stored into memory. Each memory channel holds information relating to the captured signals' frequency, signal strength, the number of occasions that frequency was detected and the date and time of the last occurrence. If the GPS option is enabled the latitude and longitude are also displayed. In LOG MEMORY MODE, every hit, even those on the same channel, is individually stored along with the time and date stamp.

Unless you press the HOLD key, the sweep resumes after the transmission ceases.

If the X-Sweeper repeatedly halts on the local pager or broadcast outlet - and it will - you can lock each out on an individual basis by pressing the LOCKOUT key. Up to 1000 channels can be locked out in this fashion.

Fine Balance

Press the SWEEP key to enter the SCAN mode. Here, the X-Sweeper will scan only for frequencies previously committed to memory. It does not hunt for new finds. This feature can be useful for determining whether previously logged frequencies are still active. If preferred, you can increment manually through each of the memorised channels by pressing HOLD and then the SKIP key.

In v.f.o. mode it's possible to enter a specific frequency via the keypad.

So what's the X-Sweeper like to use? The review unit came supplied with a base-loaded telescopic whip, which, when extended to its full 800mm, probably resonates somewhere

around 50MHz.

Sitting in the office at home, the X-Sweeper locked into my local 153MHz pager base station, the Reading bus company on 205MHz, Berkshire Ambulance on 166MHz, a Thames Valley Police v.h.f. to u.h.f. repeater on 452MHz, some TETRA activity on 394MHz and finally, the nearby outlet for a commercial radio station on 107MHz. All within a couple of minutes.

Careful adjustment of the squelch control is required. It can be a fine balance between too low a threshold - which causes the sweep to halt for no apparent reason - and too high, when the unit fails to halt on even quite strong transmissions.

In addition to those signals already mentioned, transmissions made from the shack from 145, 433MHz and PMR446 handhelds were all quickly traced and reproduced over the speaker, as was the 864MHz audio sender.

Amplitude modulated (a.m.) transmissions, as expected, were traced and measured but the audio was very scratchy indeed and not really easily monitored. In v.f.o. mode, by entering a frequency directly, it may be possible to slope detect a.m. signals but I didn't attempt this.

The X-Sweeper's specification allows for f.m. transmissions of up to 100kHz deviation to be analysed. No surprise, then, that it could not detect the microwave oven, the transmissions from our four-channel video sender and that from my sugar cube-sized 'spy cam'. I assume that because they are all wideband devices, none of these either indicated on the spectrum display, let alone triggered the frequency counter.

There is a low battery warning, which flashes up on the display. However, after testing a set of alkaline AA cells to destruction, the X-Sweeper gave me just 10 seconds warning before switching itself off. Interestingly, even when using the external supply, if anything more than about 15 seconds of loud audio is issued from the speaker, up comes the low battery warning, after which the unit closes down. This is surely not as intended and may indicate that the provided power supply is not up to the task. Indeed, the X-Sweeper's specification stipulates a 500mA supply. So the 200mA adapter sent with the review model may be struggling.

Mono Audio

I plugged a pair of stereo headphones into the unit only to discover that, as with the Xplorer, it's actually a mono socket and not as

described in the manual. Not only that, but the action of plugging the headphones in crashed the processor on several occasions. Presumably, by placing mechanical pressure on the board (all sockets are board-mounted) when plugging the headphones in, this highlighted a problem with some aspect of the unit's electrical construction.

Reaction Tuning, a feature that automatically tunes a suitably tethered scanner to the transmission just captured, was not checked, as no interconnecting cable was supplied with the review model but I imagine it will work like the tried and proven Scout. Likewise, the GPS option had not been fitted so this area of the X-Sweeper's operation remained untested.

OptoElectronics and others supply a range of antennas, of all sizes and resonant frequencies, to suit your particular monitoring

requirements. If the majority of your work lies in the u.h.f. range, using an antenna that also operates efficiently at v.h.f. will only serve to cloak your desired targets with out of band activity. A Band II, 88-108MHz notch filter is also available separately.

So after all that, does the X-Sweeper warrant its £1500 (£1700 with GPS option) price tag? It simply depends on whether you require the spectrum display and the geographical data that the GPS facility provides, as it is these two features that distinguish the X-Sweeper from all other models in the

hobby and semi-professional sector.

Is it For You?

For around half the cost you could opt for the Xplorer, which not only measures the target frequency - and commits it to memory, if required - but also displays any CTCSS or DCS encoding and d.t.m.f. tones that may be a component of the transmission. All in a smaller, lighter package.

But, if a graphical representation of the spectrum is important to you, then the X-Sweeper is your only choice at this kind of price level.



The rear of the X-Sweeper's main p.c.b.



Buttons and display uncovered.

Many thanks to **Walters & Stanton** for their generous loan of the review unit. For more information on the X-Sweeper which costs £1499.95 and other OptoElectronics products **W&S** can be contacted at **22 Main Road, Hockley, Essex S55 4QS. Tel: (01702) 206835 or www.wsplc.com**

This 'S' Meter Business

Tony Spencer G3VDZ answers your questions about the S-meter on your receiver. Is it accurate? Tony argues that you can say "Yes it is!"

A short while ago I was asked "Is your 'S' meter accurate?" to which I answered, "What do you mean by accurate?". The reply to that was "You know what I mean, does it read correctly?". Clearly this was going nowhere, so I've decided to put pen to paper and put the record straight. I hope this article will answer many of your questions and dispel some of the myths about this 'S' meter business. I have written this article so that even those with little technical knowledge can grasp what are quite difficult concepts and I hope the more experienced among you will bear with me if some of my explanations are a little verbose.

What is an 'S' meter? On amateur equipment, it is primarily an indicator, whether it be a moving coil meter or a fancy looking barograph, that indicates changes in the received signal. It can be used to indicate actual signal levels too, but whether you can say it is accurate for this purpose is not a straightforward question to answer, as I will explain later.

Although it is not necessary to be good at maths, a basic understanding of the decibel (dB) will enable you to get a better understanding of this article. A decibel is not a unit of measure, or a direct measurement of an actual level. It is just a way of

expressing a ratio, between levels, of large differences or changes in units such as voltage or power, using a manageable range of numbers. The use of a decibel scale, compresses a large range of numbers into a small range by using a logarithmic (log) scale rather than going into any formulas.

I have provided a quick 'look-up' table, see Fig. 1, and although it only shows a few representative (dB) values, there should be enough so you get the idea. (The use of dB is to be found in other measurements, but that's outside the scope of this article). The values shown in the table are not actual voltage or power levels, but just a multiplication or division factor that you would apply to any voltage or power change to obtain the dB value. For example, taking the figures for a 6dB change, you can see

that any voltage would increase by twice and the associated power would increase by four times.

Let's substitute some actual voltages to illustrate the scaling. If we have a voltage of 5V and it increases to 10V, it has risen by 6dB (5x2). Likewise, for exactly the same voltage change, the power level dissipated would have increased by four times. But unless we have a resistance somewhere to dissipate that power, I cannot illustrate the power increase.

Worked Examples

For the following worked example, I'll assume a 50Ω load (although it could have

any value). Voltage and resistance is related to power by the following equation:

$$\text{Power} = \frac{V^2}{R}$$

Working this out using 5V and 50Ω gives a power of 0.5W. Using 10V gives 2W. The increase from 0.5W to 2W is four times. Although I have explained it in terms of an increase, the same would apply to a decrease, a 6dB change causing the voltage

to halve and the power to decrease by four times. It is common when expressing a decrease to assign the dB figure a negative value, for example -6dB would equate to a reduction to one quarter of the the original power. The important thing to notice is that in a range of just 0 to 100dB we have expressed changes in voltage up to 100,000 times and even more for the power!

Sometimes, there may be one or more other letters attached to the 'dB' (used to express a actual reference level). The common references encountered in radio circles are: 'μV' (microvolts) and 'm' (milliwatt) and written as dBμV or dBm. The term dBμV uses a voltage level, 0dBμV being the reference level of 1μV. For example 20dBμV equates to 10μV (20dB = 10 times the voltage). It is common to specify the input to a receiver in dBμV. The term dBm has a reference level of 1mW, a power level of 0dBm being the reference level of 1mW.

For example, 20dBm equates to 100mW (20dB = 100 times the power). To express levels below the reference level, a minus sign is used, for example -20dBμV is 0.1μV (one tenth of 1μV) and -20dBm is 10μW (one hundredth of 1mW). The dBm is a unit of power and a resistance **must** to be specified to give this unit real meaning, which can be any value, but 50Ω is commonly used in radio work and 600Ω for professional audio. Just as with the dB, this is a useful way of expressing a wide range of numbers, but now we have related it to a unit, we can express a wide range of actual levels using the dB notation.

S-meters

Now to look at S-meters. It is standard on amateur radio equipment to scale the meter in 'S' units (or 'S' points) from 1 to 9 and thereafter in +dB, normally in 10 to 20dB increments, although not all 'S' meters are scaled in this way. Each 'S' point is generally accepted to be a 6dB change in signal level. (There is no reason in principal why an 'S' point cannot be equal to any dB value, it is just that 6dB has been accepted as the standard). What this means is that to change the meter by an 'S' point, the voltage on the receiver antenna input must have doubled if rising, or halved if falling. It doesn't matter whether it is from S1 to S2 or from S8 to S9, the relationship of 6dB still holds true.

To achieve an 'S' point change, a transmitting station would have to quadruple its power or reduce it to a quarter. If the indication changes by two 'S' points,

Fig. 1: A 'look-up table' of voltage and power level changes, with their decibel equivalents.

dB value	Voltage ratio	Power ratio
0	1.0	1
3	1.414	2
6	2	4
10	3.162	10
12	4	16
18	8	64
20	10.0	100
24	16	256
30	31.62	1,000
36	64	4,096
40	100	10,000
42	128	16,384
48	256	65,536
50	316.2	100,000
54	512	262,144
60	1,000	1,000,000
70	3162	10,000,000
80	10,000	100,000,000
90	31,620	1,000,000,000
100	100,000	10,000,000,000

the signal change would be 12dB. The same also holds true for indications above S9, it is just that the meter is scaled directly in dB rather than 'S' points. A change of 10dB is an increase in voltage on the receiver antenna input of 3.162 times or a decrease in voltage by the same scale, equating to a 10 times power change. For a 20dB change, the voltage will change by 10 times, equating to a power change of 100 times, and so on.

Notice that as far as 'S' meters indications are concerned, we have not yet referred to actual voltage or power levels, as all we're concerned with at the moment is the amount of change and we'll deal with actual levels later on. If you are lucky, the 'S' meter on your receiver will behave as described above, but as likely as not it may not be correct over some parts of the scale.

Possible Checks

Within limits, it is possible to check your 'S' meter scaling by injecting a signal from a signal generator into the receiver antenna input via a set of accurate attenuators. Each 6dB of attenuation switched in will reduce the indication by an 'S' point and by the appropriate dB value at the top end of the scale. If you don't possess suitable equipment, many receivers now include a switched attenuator in the antenna circuit and by tuning into a steady signal and switching a known amount of attenuation in and out, you can ascertain whether your 'S' meter indicates the correct change. Although this method is prone to many errors, such as the accuracy of the attenuators and the v.s.w.r. of the antenna and the receiver input, it can still give a useful guide to the accuracy of the scaling.

Virtually all multimode receivers have an automatic gain control (a.g.c.). This keeps the audio level to the speaker at a constant volume and prevents the receiver circuits from being overloaded when presented with high signal levels at the antenna input. This control is achieved by generating a voltage in the receiver that changes in response to the incoming signal and is applied to the receiver circuits to reduce the receiver gain. The stronger the signal, the higher the voltage that is generated to reduce the receiver gain and if this voltage is applied to a meter, a deflection of the meter will occur that changes with signal level. It doesn't matter at all what the actual level or polarity of this a.g.c. voltage is, because the 'S' meter circuits can be adjusted so that it indicates from zero to full scale over the a.g.c. voltage range.

It's unusual for the change in the a.g.c. voltage to be directly proportional to the

signal level throughout the whole a.g.c. range as it rarely follows a linear relationship. Nor is the voltage level likely to be logarithmic, or indeed to follow any other



a.g.c. time constant is selected. For signals containing fast level changes such as single sideband (s.s.b.) and Morse (c.w.), a slow a.g.c. setting will hold the peak level for a short time, so a reading can be observed. How your 'S' meter responds to a.m. transmissions may vary from receiver to receiver, but usually when the a.g.c. is set to slow, the meter will indicate 6dB higher when the carrier is 100% modulated, as opposed to the unmodulated condition. (This is because the peak envelope power of 100% modulated a.m. transmission is four times that of the carrier power). For f.m. and most data transmissions there will be no difference between the a.g.c. fast and slow settings.

On most amateur receivers, the control marked 'RF Gain' is



particular 'law'. This doesn't matter because the 'S' meter can be scaled to indicate correctly, but unfortunately, it seems that many manufacturers don't seem to do this. Perhaps they think it is more aesthetically pleasing to have the meter scale graduations equally spaced.

This aesthetic scaling usually results in a scale that is inaccurate at the lower end, becoming more accurate at higher signal levels. The a.g.c. system in the average receiver will handle signals over a range of typically a 100dB, thus enabling the 'S' meter to indicate signals over a wide range of signal levels. An 'S' meter scaled 0 to S9+60dB will indicate signal levels over the range of 114dB (54dB for S0 - S9 plus the 60dB at the top end). Or it will should the meter be scaled correctly

Fast Or Slow

Because the 'S' meter indicates the a.g.c. voltage, the meter response time will vary too, depending on whether a 'slow' or 'fast'

not a true r.f. gain, because it usually superimposes a voltage on the a.g.c. line, thus producing a manual gain control voltage. This has the effect of deflecting the 'S' meter when this control is operated, whether there is a signal present or not. If the receiver has a true r.f. gain, the only effect of this control would be to reduce the 'S' meter indication when a signal is present, just as an r.f. attenuator would.

Receivers operating in f.m. only do not require a.g.c. because the loudness of the audio in the loudspeaker is determined (apart from the volume control) by the frequency deviation and not the signal strength. As the signal level increases, the receiver circuits limit, that is to say the voltages in the receiver derived from the signal do not increase as the signal level increases. This is a desirable effect in f.m. receivers because it rejects signals which change in amplitude, such as the ignition and other types of impulsive interference. However, this is not so desirable when obtaining a voltage to operate an 'S' meter,

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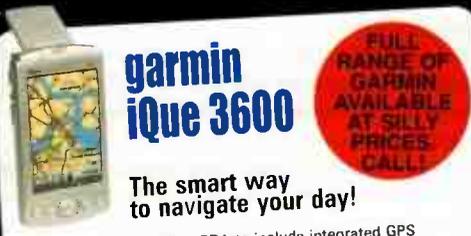
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because there is nowhere in the i.f. stages of the receiver which has a voltage that varies with the signal over a wide range of signal levels.

Having no 'real' a.g.c. circuit is reflected in most f.m. only receivers by having a very restricted range of 'S' meter indication

of perhaps only 10dB or so, thus the 'S' meter can never indicate signals conforming to the amateur standard. Any meter scaled '1-9' and then some tens of dB above that, is likely to be completely inaccurate. There are exceptions, such as some of the early f.m. CB transceivers, which were originally designed for a.m. reception and still retain the original a.g.c. system for driving the 'S' meter. Also, some receivers which have an f.m. board as an optional extra take the 'S' meter from the f.m. board and not the a.g.c. line, hence the indicated signal level in the f.m. mode may be at variance compared with indications in the other modes.

Not Much Difference

Many a time I've heard stations carefully tuning their antenna tuning unit (a.t.u.) to reduce their v.s.w.r. reading and maximise their power and wondering why the receiving station says that it doesn't make much difference to the receiver's 'S' meter. If you examine this a little further, it's obvious why this is so. Suppose a transmitting station manages to reduce his v.s.w.r. meter reading with his a.t.u. from 2:1 down to 1:1. This would result in his station delivering 100% of the transmitter power to his

you might expect.

Likewise I have heard transmitting stations that have been very disappointed with the 'S' meter increase when they turn on their linear amplifier. Suppose a station is transmitting 100W and then turns on a 400W amplifier. If the receiving station was receiving an S7 signal with the amplifier off, he will only receive an S8 signal with it on. The extra power equates to a 6dB power increase. So, you don't get much increase from those extra 300W - but they cost a lot to create!

The links to power changes and 'S' meter readings make it easy to reduce the power and yet still communicate. Substituting a few figures, we can see why QRP stations can still communicate so effectively. For example, suppose a station transmitting 100W produces an indication of S9+20dB. Should the transmitting station reduce its power by 1000 times (a 30dB reduction) to just one tenth of a watt (100mW), the signal level should still indicate just over S7. Which unless the noise level is very high will still produce a readable signal.

Actual Levels

So far we have just talked about 'S' meters indicating changes in level, so now we will try to put some actual levels to those 'S' meter readings. When a receiver is set up at the factory, the manufacturer has a specification that details what the 'S' meter indicates for a certain signal level at the antenna input. For example, in the maintenance manual for the Icom R9000 receiver, it specifies that the 'S' meter is set to read S9 for an antenna input of 50µV. On the Kenwood R-5000 receiver, S9 is set to 20µV, the manufacturer actually marking this on the 'S' meter scale adjacent to the S9 mark.

There is nothing magic about setting the meter up at S9, it could be set up anywhere on the scale. Some receivers have preset adjustments for setting up at several points on the scale in order to maximise accuracy. Other manufacturers may use different conditions for setting up

The extra power equating to a 6dB power increase. So, you don't get much increase from those extra 300W - but they cost a lot to produce!

antenna instead of only 89% delivered with a 2:1 v.s.w.r.

This improvement of delivered power equates to an increase of the delivered power of about 0.5dB. So, if an whole 'S' point equates to 6dB, then 0.5dB of change isn't going to show much increase on the 'S' meter! If you reduce your v.s.w.r. by actually making changes to your antenna, the 0.5dB figure will probably not hold good because you are actually changing the radiating (and receiving) characteristics of your antenna and not just changing the power delivered to it. There is no substitute for making your antenna resonant to get the best results, rather than just using an a.t.u.

Although I have given an example for a transmitting station, exactly the same will apply when using an a.t.u. to optimise the match of a receiving antenna. Rather than optimising the power transfer from the transmitter to the antenna, you are optimising the power transfer from antenna to the receiver. Unless the v.s.w.r. of your antenna is extremely poor, improving the match by using an a.t.u. may not give you as much increase on your 'S' meter as

the 'S' meter indication, meaning that different equipment may give different reports for exactly the same level at the receiver's antenna input. Some manufacturers may even set the 'S' meter to different levels for different models in their equipment range.

Knowing what level S9 (or any other point) is set to, will enable you to work out what the signal level is at all points on the scale by using the figures in the table, unless you are doing some experimental work, knowing the actual voltage on the receiver's antenna input is purely academic. Although your 'S' meter indicates the voltage produced by the signal at the antenna input, it does not actually measure how strong the signal is in free space.

Suppose we have two receivers in the same location with their 'S' meters set up exactly the same, and connect them up with different antennas and tune them into the same signal, the chances are their 'S' meters will read differently. This shouldn't really be the case if you are trying to measure how strong the signal is, because the signal strength at the same location in free space will be

exactly the same! The reason for this is that the two antennas are not identical in the way they convert the signal in free space to an actual voltage.

Field Strength

Field strength is measured in decibel units of microvolts per metre (dB μ V/m) which is the voltage that a signal would produce across a metre distance of free space. To measure field strength you will have to apply a correct factor that your 'S' meter level reading which takes into account all the characteristics of the antenna and relates it

Designed For Communication

Amateur radio equipment is primarily designed for communication and it will work happily without an 'S' meter! If you really wanted to measure an actual signal level, you would use a proper measuring receiver or perhaps a spectrum analyser. In this type of equipment, certain characteristics are tightly controlled, such as gain and input impedance over all its frequency range and under all environmental conditions and measuring errors due to changing equipment characteristics are corrected.

To make statements about signal strength levels, you

If you happen to like it set on the generous side, it will have the advantage that it will make the transmitting station feel very happy in the knowledge that he is so strong!

to the strength of the signal in free space. The performance of an antenna will vary with frequency and there will need to be correction figures throughout the frequency range of the antenna.

Because a field strength measurement is independent of antenna differences (because corrections have been applied), the term dB μ V/m is universally used as a measurement of signal strength. Although field strength measurements are used in professional circles, actually calculating the correction factor for your antenna is very difficult, this making field strength readings virtually impossible for amateur stations.

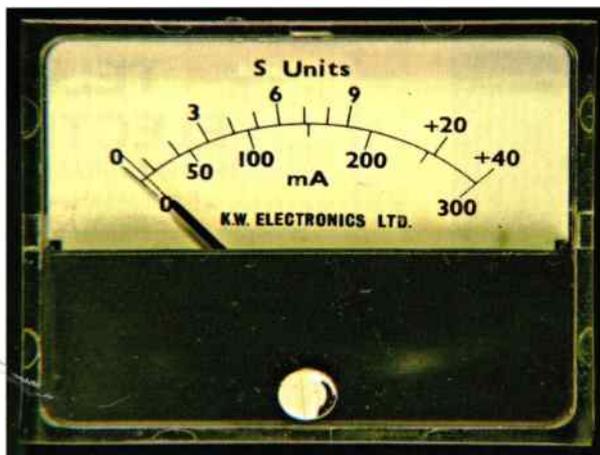
Within reason, what actual voltage level reads S9 (or at some other specified point) on your 'S' meter doesn't matter. If you are not happy with your 'S' meter readings you can always go inside your receiver and adjust it to read what you like and if you are happy with the results, that's OK. If you happen to like it set on the generous side, it will have the advantage that it will make the transmitting station feel very happy in the knowledge that he is so strong! He should however not be fooled by a very strong report, because it's the signal to noise ratio of the received signal that determines readability and not what the signal shows on your 'S' meter!

Most amateur receivers have several preset controls that have an effect on how your meter indicates. There is usually one or more that set the accuracy for indicating signal changes, and one to set meter zero. There are also presets to control the gain (usually i.f. gain) that sets the actual level for some point on the scale. In practice, these adjustments are interdependent and if you don't know exactly what you are doing, never go inside your receiver and make adjustments because there is a chance it might never work properly again - just leave things well alone!

need a piece of equipment that has the capability to measure changes accurately. One that can measure actual levels accurately too and is very expensive! The average amateur receiver probably won't indicate exactly the same 'S' meter reading for the same level at the antenna input over the whole of its frequency range or at all temperatures, because it's not designed for it.

Well, can we say what 'S' meter is accurate and what

one is not, if you accept that accuracy is defined as that when it is indicating changes in signal level, it does so in conformance to the meter scaling, then the answer is yes. If it indicates changes correctly and also indicates the actual level as given in the receiver specification, then you can say it is accurate on both counts. However, if the receiver is not built to the same standard as proper level measuring equipment, the actual level indicated may be in



error on different frequencies or operating condition, even though it may still indicate changes correctly.

One thing we can say is that no matter how accurate your 'S' meter is when indicating antenna voltages, because it is not a field strength meter. Please remember, it doesn't actually tell you how strong the signal is in free space. We could have the situation of two different models of receiver which are both set up to meet their specification but indicate different 'S' meter readings for exactly the same input signal level at the antenna input, because the specifications for setting the 'S' meter are different for each receiver.

The question is, which of the above two receivers is correct? The answer is that both of them are! So, as you can see, answering the 'S' meter accuracy question is not as easy as you might think, but at least now if anyone asks whether your 'S' meter is accurate, you will be able to give them a well informed answer.

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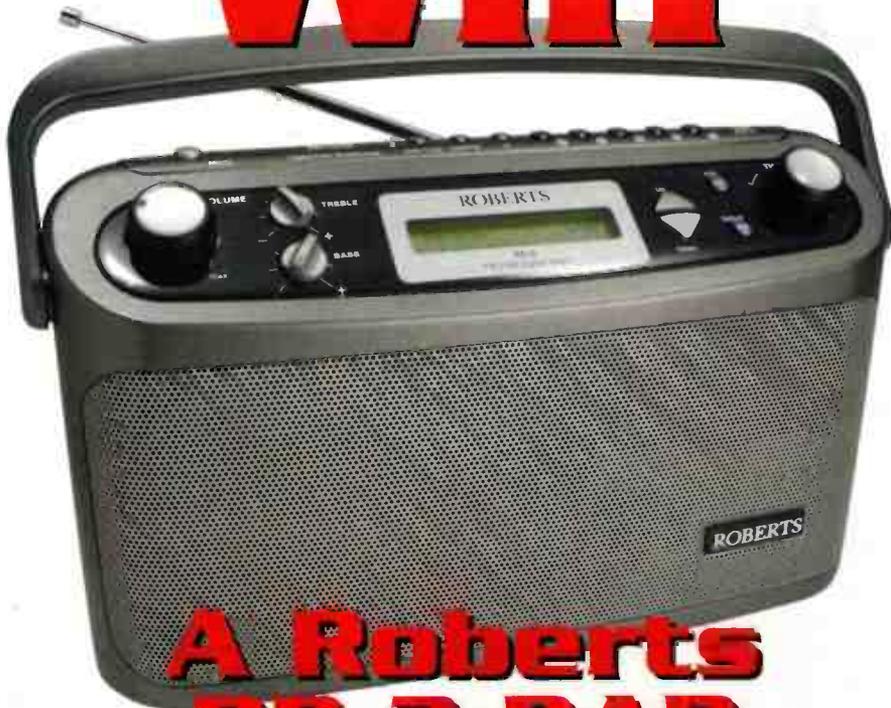
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The last twelve months has seen an explosion in the take-up of digital radio in the UK. Around half of all portable radios sold now support DAB. Continuing on-air promotion of the system and the availability of an ever-increasing number of affordable models has conspired to make DAB the success it now undoubtedly is.

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Roberts has come up with a DAB radio that resembles, almost exactly, one of their traditional analogue ranges.

We reviewed this retro look effective DAB receiver at the end of last year, now you have a chance to win one for yourself.

Our thanks to **Roberts Radio** www.robertsradio.co.uk for donating the prize RD-3 portable DAB radio.

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Q1: How many memories does the RD-3 offer?

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Q3: In which *SWM* can you read a review of the RD-3?

The closing date for this competition is 26 February 2004, the winner will be drawn on 4 March 2004 - the first correct answer drawn will win. The winner will be announced in the April 2004 *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.

Roberts Competition Feb 2004

Uniden's UBC68XLT - Reviewed

Our Scanning columnist Dave Roberts enjoyed the Christmas period with the latest Bearcat starter hand-held scanner.



The UBC68XLT is new on the market and as I received a pre-production radio for this review it came with a photocopy draft handbook, which is written in simple English that even I can understand! Full marks for that then. The review radio wasn't supplied with a power supply or charger as this item will be available as an optional purchase, for details see later. The radio came with a belt clip and earpiece and a 145mm rubber helical antenna that fits on the left hand side of the top panel via a BNC connector. This is much more useful than an SMA, which is becoming typical on modern scanners as it enables the radio to be easily hooked up to an external or mobile antenna. Also inhabiting the top of the set is the socket for the earphone followed by a rotary squelch control. Finally, the volume rotary with combined on/off is on the right. The set is a reasonable size at 63mm wide by 38mm deep and 178mm tall (excluding the antenna). All in all it represents an easily grasped handful and appears to be of sturdy construction. The front panel houses the easily read display that can be illuminated if required and there are two dozen push buttons for frequency entry, search control, lockout, priority, light, key lock and all the usual other functions that are inherent in scanners these days.

Grand Decal

Below the controls is the speaker and below that a rather grand decal points out that the set is a 80 channel UK Band Radio scanner (by) Uniden Bearcat. At this point I could hear a bell ringing in the distance. It turned out to be the local lie detector that had been activated. It had been sounding since I took the UBC68XLT out of the box. You see one of the buttons on the front panel announces WX and pressing it initiates a search of the NOAA weather alert channels at 162MHz. These are broadcast in the USA and Canada and although the UBC68XLT may have a good receiver, the gadget just ain't going to hear them over here.

I continued with my examination of the unit.

The battery box holds four AA cells. These can be either a rechargeable type or Manganese Alkaline. A two position switch in the battery compartment must be set to the type of cell in use.

A socket on the left side of the radio enables the optional charger or p.s.u. to be plugged in when rechargeable batteries are installed and the switch is correctly positioned.

All-in-all then, the set is ergonomically pleasing and sturdy. The draft handbook states that the UBC68XLT has coverage from 66-88MHz (channel/search step not specified in the book), 137-144MHz (likewise no step mentioned), 144-148MHz - interesting this, 144-146 are 12.5kHz spacing then the steps revert to 5kHz.

Then coverage runs from 406-512MHz and the step size is 12.5kHz throughout this range. This scanner is f.m. only and in any case does not cover air band so you won't be listening to the aeroplanes on this one. Scanning/search speed is 10 channels per second which is a reasonable rate. There are five pre-programmed search bands but in any case these can be overwritten with any frequency criteria provided the scanner covers these frequencies. The UBC68XLT has 80 channels and they are extremely easy to program, either during a search or directly if you happen to know the frequency. You can allocate any one of the channels as a priority to be checked every two seconds. Individual channels can be locked out and during a search up to ten frequencies can be set to be 'skipped' when searching, if required.

All wide band receivers of this type will detect spurious signals created within the set and the 'skip' function can be used to lock these out during a search thus preventing the radio stopping on a hissing noise when no 'real' signal is present. Or you can just elect to 'skip' a boring frequency that you don't want to hear. The five search bands can be individually switched on or off thereby allowing the radio to look for frequencies in any or all bands. A most useful state of affairs.

Signal Located

When the radio locates a signal in either search or scan mode then that frequency will be held for

two seconds after the carrier drops, then the search or scan will resume. There is no automatic 'hold' option to stop the scan or search when a signal is heard and the user will have to hit the 'manual' button to stop the scan or one of the up or down arrows to hold a frequency found during a search. Which one of these you hit will determine which way the search resumes when you hit the search button again.

All this has, hopefully, given you some idea of how this set should work. Life's not like that though is it!

It's winter - we've all got colds. There's snow on the hills and I want to listen to the council highways department. The local radio mast is about 5km away and it's well within my line of sight. They have several frequencies in low band v.h.f. Let's put them in then. Like I said it's so easy to program. Select a vacant channel. Here we go...85.3875 'ENTER'. Oh no, it's 5kHz spacing on this band so the UBC68XLT thinks that it'll give me the nearest option i.e. 85.395. Darn it! This means that as the local authority are on 12.5kHz spacing only a few of their frequencies will be able to be entered in the UBC68XLT.

Further investigation is called for and I spent most of an afternoon pushing buttons in an attempt to find out just what it was doing at low band. It was snowing outside anyhow and really cold and it was either push buttons on a radio or get a shovel out of the little shed and widen the septic tank outfall. No contest - the radio won hands down. The conclusion is that the UBC68XLT is quite happy searching in 5kHz steps until it reaches the frequency of 84.095 which for some reason it considers cathartic. Then suddenly for no reason it changes to 20kHz spacing.

Easily Programmed

As I previously mentioned the high band coverage is from 137-174MHz in all. In the UK, 12.5kHz spacing is pretty much standard at these frequencies with even 6.25kHz coming into usage. This radio only has 12.5kHz spacing between 144 and 146MHz the rest of the v.h.f. high section is all 5kHz.

Marine v.h.f. and other u.h.f. frequencies are easily programmed in as are their respective searches.

Now I've put some search parameters in and entered some channels let's see how it receives.

Seeing as the radio will not accept many of the frequencies that are in use in my neck of the woods I had to confine myself to entering some amateur and marine frequencies at v.h.f. and u.h.f. I did manage to enter a couple of low v.h.f. frequencies that are in sporadic use with the local authority but most of their channels cannot be entered into the Bearcat due to its odd frequency step restrictions, but as I said earlier the UBC68XLT has a big problem with frequency availability down in that region.

The UBC68XLT receives just fine. No scanner is going to exhibit terrific sensitivity across all the bands that it covers (the nearest hand-held to perfection is in my opinion the Yupiter MVT-7100) but this radio performs acceptably. When it is allowed to pick anything up at low band the signals are received with roughly the same level of efficiency as a PMR radio on the same band. Moving up through the frequency ranks the UBC68XLT is happiest at high v.h.f. From 140 to about 160MHz the sensitivity appeared to be very good with scratchy signals being heard on the Bearcat with its helical antenna that were not being received on more expensive scanners with similar antennas fitted. At u.h.f. the '68's hearing tails off slightly but to no great detriment. Plug an external antenna into the BNC socket on this radio and it will perform as well as many of the cheaper priced base scanners on the market and better than some.

Audio

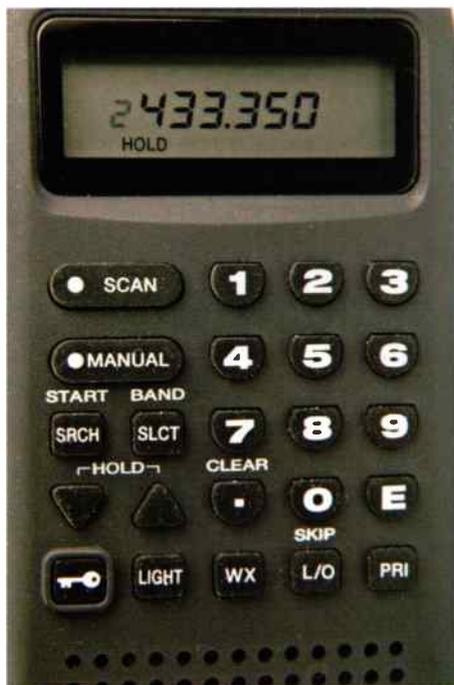
Now to the audio. Like most of the Bearcat hand-held scanning receivers this unit has what I consider to be really good recovered audio. It's easy to listen to and the speaker is a sensible size in comparison to the whole of the set. Audio output is almost a quarter of a watt and I found this to be adequate for comfortable listening when the set was tucked into the driver's door armrest of my car. So many manufacturers are making radios that are so darn small you need eyesight like the Hubble telescope to check which control to push.

Sensibly, Uniden have not travelled this stony path with their products and this results in a radio that's comfortable to hold, easy to drive and with room enough for a speaker large enough to do a proper job.

Battery consumption does not appear to be excessive. The radio arrived here with four AA cells of various parentage installed. My first job was to replace them with Duracells. I have run this radio now for many hours and the batteries show no signs of flagging. In this respect it compares favourably with several other hand-held sets in my possession.

Resume

The UBC68XLT is intended as a radio suitable as a first scanning receiver but to fulfil this role I reckon it really should at least have civil airband available. Assuming that the low v.h.f. channel spacing problem is sorted out and if 12.5kHz stepping could be made available at all frequencies it would be a sensible purchase.



Our thanks go to Nevada for the loan of the UBC68XLT. The scanner costs £79.95. An optional UK mains adapter is available at £12.95 as is a set of four 1.8AH NiMH rechargeable cells and suitable charger for £39.95. Nevada can be contacted on 023-9231 3090 or Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT. Their website is www.nevada.co.uk

Specifications

Frequency Coverage:	66-88MHz 137-144MHz 144-148MHz 148-174MHz 406-420MHz 420-450MHz 450-470MHz 470-512MHz n.b.f.m.
Mode:	n.b.f.m.
Memory Channels:	80
Memory Banks:	8
Frequency Bands:	5 pre-programmed banks (can be modified) 144.0000-145.9875 (spacing 12.5kHz) 2m amateur band 156.0000-162.9900 (spacing 5kHz) marine Band 165.0000-173.9900 (spacing 5kHz) PMR band 430.0000-439.9875 (spacing 12.5kHz) 70cm amateur band 450.0000-453.9875 (spacing 12.5kHz) public service band
Scan Rate:	10 ch/s
Search Rate:	10 steps/s
Scan Delay:	2s
Audio Output:	240mW Nominal into 8Ω speaker
Power Requirements:	12V d.c., Using Optional Adapter or 4 x AA Alkaline or re-chargeable NiCad
Antenna:	Rubber helical antenna (included)
External Connectors:	Earphone, d.c. power
Weight:	340g (inc antenna)
Size:	63.5 x 178 x 38mm (WHD)

Satellite

TV News

• Roger Bunney 35 Grayling Mead, Fishlake, Romsey, Hants SO51 7RU

Over the past 15 years or so of satellite 'zapping' much of the news material received has been of tragedy - so much the content of today's news. The Balkans, the Middle East (Iraq), Somalia, Afghanistan, Rumania, September 11, the Paris Concorde crash, the loss of the Shuttle, Bali - and in recent times suicide bombers across the globe. November 15, victims of another suicide bombing, members of the Italian military on duty in Baghdad, were brought home in a Hercules transporter. The live outside broadcast from an Italian military airfield showed a night-time scene of many coffins each carried in solemn procession from the aircraft, past the guard of honour into a fleet of waiting hearses. A sombre moment for Italian military history. 'SKY ITALIA SAT NET 1' linked the sad pictures into the Italian TV networks over *Eutelsat W1*, 10°E - 10.961GHz-V SR 4167 + FEC 5/6 and a parallel news feeder was also present over *Telecom 2D*, 5°W @ 12.614GHz-H (4885+3/4).

Saturday November 15 was not a good day. Whilst Italy mourned its dead, the French also mourned the loss of at least 13 persons at the Alstom shipyard in St. Nazaire. The *Queen Mary 2* has been under construction for Cunard and nears completion for her maiden voyage early 2004. A social visit by families of senior workers had been organised that Saturday, as many of them crossed a gangway it collapsed, hurling them about 18m down into the empty dry dock. The regional news from the Nantes studio were quickly on the scene and presented live reports over 'F3.OEST/6MBT' on *Telecom 2D* - 12.733GHz-H (5632+3/4) from the dockside, the *Queen Mary 2* in the background only partially lit. The next day more TV production staff appeared and longer reports were being aired from the dockside into network, again over the *Telecom 2D* 12.733 slot. A rather sad weekend.



Mid November and excitement in London as the 'Bush World Tour' hit Buckingham Palace. Not unexpectedly Buckingham Palace featured heavily in the satellite news feeds with the President himself entrenched inside the Palace. Sky News were running a dedicated feed from a purpose built portable studio on the pavement opposite the Palace - inserting reports and vox-pops as appropriate. After the 1900 offering on November 19, the Sky News crew made tracks, signals downlinking from *Eutelsat W2*, 16°E @ 12.563GHz-H (5632+3/4). Meanwhile the 'BT TES-10' truck was on another nearby Buckingham Palace pavement feeding onto *W1* @ 16°E with similar type content, a familiar feed frequency of 10.967GHz V (4167+3/4). A few days later and the 'Bush World Tour' surfaces unannounced in a tent on a military base near Baghdad - this on November 27 and significantly 'Thanksgiving Day'. The USA President is seen to emerge from behind a tent screen to loud cheers and to make a speech and is seen informally mixing and talking with the military personnel. He then partakes of a traditional Thanksgiving turkey before flying home.

Meanwhile, the USA Thanksgiving Day celebrations include the traditional Macys' processions in both New York and Chicago - Macys are large department stores in both these cities. These are very colourful and

spectacular with large floats and flying balloon shapes, the processions similar to the New Year's Day ones held across the USA. Both the Presidential - Baghdad - visit and the Thanksgiving Day processions were carried as content on the 'CNN NEWSOURCE' NSS-7 lease @ 21.5°W - 11.563GHz-H (6111+3/4).

Can anyone identify the following mid afternoon 'ATV FEED' seen on *W2*, 12.540GHz-H (5632+3/4, in PAL, December 7 with service ident 'CCN/BROKAT1'. Content were street interviews in a language similar to Russian as were the captions, after the PAL feed terminated, the same material was repeated using 525 lines NTSC!

Roy Carman (Dorking) whilst monitoring *W2*, 16°E mid November found some remarkable heli-cam footage of the last Concorde trip, not so much supersonic but at paddling speed. One of the aircraft had been given to a floating water museum in New York and the TV helicopter covered the Concorde being towed on a barge slowly across New York harbour. How Concorde actually arrived on the barge itself is still unclear, but it's comforting to know that at its final resting place it will receive much TLC. Footage on 11.190GHz-H (5632+3/4). *SESAT* is a relatively quiet satellite at 36°E, it once carried the 'Fox News' output from the Jerusalem/Tel Aviv bureau but they moved on the 60°E *Intelsat 904* (perhaps they're cheaper?). Unusual therefore to find English based outside broadcast feeds on *SESAT* but the Welsh sections of the *Wales Rally GB* in mid November utilised several frequencies for dedicated OB cameras around the block. Roy C. found four cameras were resident on the bouquet as follows - 11.079GHz (RALLY GB CLUSTER); 11.088GHz ('RALLY GB CLUSTER'); 11.097 ('AUTO 13.5MHZ'); 11.106 ('ntl:UKI-589 Enc.'). All camera output feeds were horizontally polarised @ SR 5632+ FEC 3/4.

An interesting programme channel that appeared later November on *Atlantic Bird-3* (5°W) is 'ICELAND LIVE' @ 12.5453GHz (27500+3/4). On the nearby 8° West *Telecom 2D* slot several RTL German programme feeds often downlink, on the following frequencies. Check out 11.522GHz; 11.531; 11.540; 11.549GHz usually vertical (sometimes horizontal and running SR 6666 + 7/8 or at times an SR of 4444 and an FEC either 3/4 or 7/8. These RTL affiliates operate from the cities along the Western side of Germany. Info from Alan Richards, Nottingham.

Alan actually caught an interesting BBC feed over the rarely reported *PAS-1R* @ 45°W early December at 11.576GHz-H (5632+3/4). Tony Blair was in Nigeria for the Commonwealth Conference and whilst there planted a tree. The Nigerian scenery was 'stunning' apparently. The service ident for the PAL MPEG 4:2:0 news feed - 'BBC-CHOGM-ABUJAJ'. Whilst in the area Alan checked out *PAS-6* @ 43°W and the *Galavision-Mexico* programme - 12.584GHz-V (27500+3/4) and December 6 during their *Otre Rollo* programme from 2230 hours featured live 'joke inserts' on split screens from Monterrey, Tijuana, Vera-cruz and Merida.

Interesting on the same satellite the *Fox News Edge* programme - 12.576GHz-H (19850+3/4) - included a live Argentinean feed in the 'Torneos y Competencias' programme - the world is becoming even smaller...



Queen Mary 2 tragedy, news reports from St. Nazaire, November 15.



'Fox News' test card via Eutelsat 10°E.



The sat truck 'Links n Things'.



A traditional test pattern from Eritrean TV (Arabsat).



End of the Dr. Dish@TV programme from 1°W.



Military turnout for the return of the Italian military dead - 10°E.



The Globecast test card prior to the football matches 10°E.



The USA Thanksgiving Day Macys' processions.

Amateur

Bands

- **Clive Hardy** SWM, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
- **E-mail** clive@pwpublishing.ltd.uk

The G5IJ is a long, usually 20m, wire antenna transformer connected to coaxial cable. The theory's been covered before, in PW August 2002, so this piece is just about building a simplified and primarily receive only version of the antenna. Instead of using twin inner windings on the toroid connected to 300Ω twin feeder, a single winding is connected to a single long wire element.

Although some capacitance is lost by dispensing with the twin feeder that's intended to be used for the main element, the broad functionality is retained. A T130-2 toroid is used as the transformer has to be some size or other, so I've gone for one that's not too big, but not so small as to be fiddly to work with.

Apart from the toroid, the ingredients are a couple of metres of 20s.w.g. enamel coated wire (e.c.w.), a metre of RG-174 miniature coaxial cable, an SO-239 chassis socket, a screw terminal and a plastic box. All the bits were obtained from Sycom, but other suppliers can no doubt provide the necessary items. So let's go straight to the construction.

Step One

Wind 27 turns of e.c.w. onto the toroid. Spread the turns evenly around the whole of the toroid. Cut one end close to the toroid and tin that end with solder.

Try not to breathe the fumes generated by



the enamel coating being burnt off by the solder. Trim back the outer and shield of the coaxial

cable and tin the inner ready to connect to the winding.

Step Two

Connect the tinned end of the winding to the inner of the coaxial cable. The outer of that end of the coaxial is unconnected. Leave a short 'tail' from the connection, it will be required later.

Wind 13 turns of the coaxial around the toroid over the initial winding. Strip a small section of outer



insulation from the wound coaxial cable adjacent to the previously soldered joint to expose the screen.

The Final Touches

Solder the tail from that joint to the exposed screen. To prevent movement and strain on the joint take the coaxial to the far side of the toroid and fix it in place with a cable tie or lacing cord. Fit the whole thing in a box. Connect the free end of the coaxial to a suitable socket - I've used an SO-239 - and the end of the winding to a terminal of some sort. That's it, job done!

Does it Work?

I used light stranded (7/0.2) insulated wire for the main element and RG-58 coaxial cable between the transformer and shack. Using the MFJ Antenna Analyser, a plot of the s.w.r. from 2 to 30MHz. The best description of the plot could be similar to a decaying sinewave.

Although the match is never perfect on any frequency, neither is it particularly bad. A simple a.t.u. would probably be all that's needed to better match the antenna to the receiver across the whole h.f. band. On transmit, the LDG auto a.t.u. that I use with my Yaesu FT-840 had no problems matching it on all the h.f. amateur bands.

When I put the antenna up in my roof space in a 'U' configuration a similar undulating s.w.r. plot to the outdoor antenna was obtained, but with more pronounced peaks and dips. With a little adjustment of the wire length, in practice adding a little over a metre, some of the dips below 3:1 could be moved to more or less coincide with half a dozen amateur bands!

With a less than perfect installation that may well have been pure chance. Luck or not, a match is a match! Despite this, I don't think anyone is claiming anything exceptional in the antenna's performance. A good second string is one term I've heard. Whatever its technical merits, without doubt its great advantage is that it is effectively one length of cable, so fixing it up in various locations is quite easy. Happy soldering!



If It's Not Your Day!

Sometimes it doesn't matter how much effort you put into a station set up. Circumstances just take it upon themselves to conspire against you! **Frank Martin** in Boreham Wood uses a rather good Drake receiver and a 'pukka' antenna at his home.

Unfortunately he's plagued with electrical noise, so manages to do rather better on the listening front at his work location. There he uses a Realistic DX-394 connected to a mere nine metres of nondescript wire slung up into a convenient tree!

Up and Coming

Italians, **Carlo 1K1AOD**, **Flaviano 1ZMOV**, **Marcello 1K2DIA** and **Silvano 1ZYSB**, will be operating from Nukumona, Tokelau Island, mid-Pacific, from the 13 to 25 February. I've no idea of frequencies, but it looks like the callsign might well be ZK3/own call.

Bulgarian **Danny LZ2UU** will be operating from the Antarctic base 'St Kliment Ohridski' on Livingstone Island, South Shetland until late February on all bands using c.w., RTTY and s.s.b. Digital mode enthusiasts should listen out on all the

bands for the Mexico RTTY International Contest, which starts at 1800 hours on the 7 February and runs until 2400 hours on the 8th.

Things Are Looking Up

Since the band conditions have improved **Phillip Davies** in Shropshire has been putting his ear to the speaker and managed to log some interesting calls. The 28MHz band alone produced 62 countries heard during the



CQ World Wide DX Contest in late October.

Some calls heard on that band around that time which deserve a mention are: 5U7JB Niger Republic, EY7AD Tadzikistan, VK9XW on Christmas Island in the Indian Ocean, OA40 Peru, and HC8N on the Galapagos islands.

On 24MHz I was pleased to see Phillip had heard W1AW, the station of the Amateur Radio Relay League (ARRL) - USA's national amateur radio society based in Newington, Connecticut. On 14MHz an interesting one was 4K0GNY on the *Chirag 1* oil rig in the inland Caspian Sea.

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● **Enigma** 17-21 Chapel Street, Bradford, West Yorkshire BD1 5DP Fax: (01274) 77004
● **E-mail** enigma@pwpublishing.ltd.uk

Reader **Brian Greenaway** of London has asked us which is, or was, the busiest every Number Station. This is a difficult question to answer, for 'busy' can mean either sending many different messages per day, or it could mean transmitting for many hours, but sending few or no messages. In the latter case, **S28** the Buzzer (UZB-76 on 4.625MHz), **S30** the Pip (3.757 and 5.450MHz) and some of the 'R' single-letter transmissions are the clear winners at 24h/day for decades! Even when a station appears to be communicating large amounts of information, we can never really be sure that, just because a station sends a great deal of traffic, that this means that all this traffic is valid. Some of it, or even all of it, on any particular day, may be dummy traffic, or even repeats from years before. A station may send the same message to an unresponsive agent for many months.

This question also depends on which stations we are concerned with, for a station's habits are important too. When some stations appear to be sending many messages, they are more likely to be valid messages than in the case of other stations doing the same. Some families, such as Family III (especially **M3**) habitually send 'ancient repeats', which cannot, in any way, be genuine real-time operational instructions. The keeping of meticulous long term logs is important for only then can we determine a station's habits, and in the case of this family, we discovered a long time ago that a message, for example, sent on 17 January 1996, was identical to another message sent on the same date two years later, at the same time and by the same schedule number. The same applies to certain other families, or maybe just particular schedules in those families, for example, we may find that SN 278 of G7 regularly sends repeats of messages sent many months earlier, but other schedules of this station do not. Nothing is straightforward in the shadowy world of Numbers Stations and this is what makes the subject so challenging!

Firmer Ground

We are on much firmer ground when we speak of a 'busy' station as one which transmits very often. During the Cold War, East Germany's **G8** transmitters had their carriers running almost continually on two parallel frequencies (changing these between hours or darkness and daylight) and for about

half of this time traffic was being sent - commencing on the hour, every hour. Since the end of the Cold War, only two Europe-base true numbers stations stand out as being the busiest: **OLX** and **E3** (Lincolnshire Poacher) and now that **OLX** is no longer with us, we are left with **M16's E3**, which is now by far the busiest station in terms of hours per day transmission time. We could also multiply this by three, for three transmitters operate in parallel. Since **ENIGMA** began, only four stations have transmitted at regular hourly intervals.

E3 and **E3a** (Cherry Ripe) - E3 up to 12 hourly transmissions daily, each 3/4 hour long (35 minutes of this always being 'blanket' message text). E3: three parallel frequencies; E3a: two parallel frequencies.

M19 'MPL' - (British) a short transmission sent every hour of the day (at h+20) on 10.160MHz only.

M16 '8BY' - (French - bogus callsign) - a repeated list of 3-figure groups repeated for 20 minutes at every hour of the day (commencing at h+40). Three parallel frequencies.

M6/S5 'OLX' - (Czech - genuine callsign) messages of varying lengths (up to 30 minutes) on the hour 23 hours per day (omitting 2300). Three parallel frequencies.

8BY is still operating without change, but is not a typical ('text-type) Number station, in that it sends short lists rather than messages. During the time it was being monitored, **MPL** was never known to have sent any messages, so we only possess its null-message format details. It may have been operated by Interpol (who also ran the Morse and teletype station **GMP** from West Wickham). There are several far-eastern stations, as well as **E3a**, which operate hourly or virtually continuously, but seeing that **ENIGMA** is mainly concerned with European stations, (the E of **ENIGMA**!) and that these stations are more difficult to receive here, we won't be covering them.

Criggion Site

'**John Smith**' of Newport, Pagnell, comments on the mention of the recent closure of the BT station at **Criggion** in the latest *ENIGMA 2000 Bulletin*. The site hosted a 350kW v.l.f. transmitter operating on 19.6kHz as a reserve for **Rugby's** ancient **GBR** on 16kHz - which is still operating. It was built during the Second World War and operated then by the Post Office and latterly by British Telecom on behalf of the Navy, as was the case with

GBR. **Criggion's** callsign was **GBZ** and its vast antenna was unique (like so many v.l.f. antennas in that it made use of a cliff face (as well as six towering masts). Where is **GBR's** reserve now? Maybe our newest v.l.f. station, **Anthorn** (built in the 1960s) has taken on this role. It is run by NATO and has the largest and most impressive antenna in the country, using 13 enormous masts in a double hexagon configuration. It also operates on 19.6kHz using the callsign **GQD**. The narrow bandwidth on v.l.f. makes it only suitable for unmodulated low speed single channel telegraphy modes (Morse and Teletype). Due to the wavelengths, v.l.f. antennas are notoriously inefficient and very high powers are needed to push out a few kilowatts, but as submarines can receive nothing but very low frequencies when under water, it is these transmitters, and only these, which would be used to send the orders to deploy nuclear missiles. Therefore, **BT** has always placed a key role here.

Further Questions

Mr 'Smith' also picks up on another **ENIGMA 2000** remark about 'three vertical lattice masts which look as if they might have something to do with short wave radio' seen in a photo of **Menwith Hill** - the NSA's notorious spy base. 'Could this be a Number site?' he asks. No, these h.f. antenna are all used for **SIGINT/ELINT** gathering purposes. Now officially known as **RAF Menwith Hill**, the only **RAF** element is a single **RAF** liaison officer who deals with the 'natives' - as the Americans call the local people! We are surprised about how little is known about the site's extensive h.f. facilities. The h.f. antenna farm has been there over 40 years, predating the famous publicity-seeking 'golf balls'. It includes many rhombics, stacked h.f. Yagis, log periodics and a **CDAA** array (used for fast auto-direction finding). The NSA also effectively runs the large satellite ground station at **Morwenstow** (officially **CSOS Bude**), but there are no h.f. facilities there.

Enormous Tower

We have recently received reports of an 'enormous' lattice tower having just been built at this country's main **RN** receiving station at **Forest Moor**, from the brief description given, this sounds as if it is intended for l.f. and m.f. reception - addition to the large number of h.f. antennas on the site. Sorry, but again nothing to do with Numbers transmissions!

Decode

- **Mike Richards G4WNC**, 49 Cloughs Road, Ringwood, Hants BH24 1UU
- **E-mail** decode@pwpublishing.ltd.uk **Web site** www.mikespage.btinternet.co.uk

New From Skysweeper

Now here's something refreshingly new. The nice people at Skysweeper have recognised that not everyone can afford or would want to spend a fortune on a utility decoder. The answer - bring-out a 'lite' version at a really good price. Sounds simple I know, but that's exactly what Skysweeper have just done with the release of the new *Skysweeper Lite*.

As the name implies, *Skysweeper Lite* is a stripped-down version of the full standard and professional versions. However, the strip-down

make this an excellent entry level decoder. Here's a run-down of the modes you get: c.w., RTTY, PSK31, PSK63, PSK125, MFSK16, 2MFSK16, 4MFSK16 and SkyBoost. These modes also feature transmit as well as receive capability.

You're probably not familiar with SkyBoost as this is a relatively new mode that has been developed by Skysweeper so it's not in wide scale commercial use. In addition to the excellent range of modes, there's analysis tools to help you along including FFT, 3DFFT, waterfall and signal. You get all this for just £29.99 if you

graphic interface that let's you put together your own combinations of decoders and analysers.

The power of the graphic interface is often overlooked, but it does give tremendous opportunity to customise the decoder to your preferences. (You really do need at least a 1025x768 screen monitor resolution for best effect. Ed.) Through the addition of modules in parallel or in series with the signal path you can create exactly what you want. Having the configuration displayed so clearly is very helpful and you can use signal monitors at various points in the decode path to check the decoding and filtering process. The new *Skysweeper Lite* is available to download in demo version, so you can try it before you buy - what more could you ask? Pay a visit to Pervisell's site for more information and downloads: www.pervisell.com

New ACARS Decoder

Hot news from AirNav Systems is the launch of their impressive new *ACARS Decoder 2*. At the time of going to press the new version was about to hit the streets. However, the development team at AirNav let me have a Beta copy to try so I can give you an early insight. The ACARS system is at the core of automated messaging for commercial aircraft and carries all manner of vital data. One of the most basic sets of data is the automatic transmission of take-off and landing times back to the aircraft operator. This is vital data for ensuring the smooth operation of any busy modern airline. As well as basic company data, ACARS is also used to report weather data and aircraft performance information. Much of this data is encoded, but you will also find a few plain text messages from the crew.

Although the coding makes reading of raw messages tedious, sophisticated decoders, like the one reviewed here from AirNav, can interpret the data and transform it into sense. In most cases the decoder is able to pluck-out the aircraft registration and the flight ID from every message. This is usually sufficient to identify the aircraft type, airline and the route being flown. The trick is to cross reference this basic data with a flight database.

However, AirNav's *Decoder 2* goes a step or two further to make ACARS decoding really interesting. Installation of the decoder is really easy and following on-line purchase, you just have to download the 5MB installation file. The whole installation process is well automated and everything is ready to roll very quickly. For

Source	Cl	Last Date/Time	Regist	Type	Comp	Flight	Routing
Local	4	20031215 200558	PS-SAW	Boeing 747-444	South African Airways	SA0221	London/Heathrow-Cape Town Intl
Local	1	20031215 200808	HB-LJP	Airbus A320-214	Swiss International Air Lines	LX0371	
Internet	1	0000 2108	D-ABAD	Boeing 737-861	Air Berlin	AB3251	
Internet	1	20031215 2108	D-AIPK	Airbus A320-211	Lufthansa		
Internet	1	20031215 2115	HB-LJL	Airbus A320-214	Swiss International Air Lines	LX0339	London/Heathrow-Zurich
Local	3	20031215 210445	HB-LJL	Airbus A320...	Swiss International Air Lines	LX0357	
Internet	1	20031215 2125	D-ABBG	Boeing 737-8...	Air Berlin	AB3389	
Internet	1	20031215 2131	D-AHFK	Airbus A320-211	Lufthansa		
Local	1	20031215 211141	N840FJ	Dassault Falcon 50	Unltd	G50001	
Internet	1	20031215 2133	D-ABAC	Boeing 737-861	Air Berlin	AB3747	Palma de Mallorca, Spain-Augsburg, G
Internet	1	20031215 2135	G-OBYV	Boeing 767-304ER	Britavia Airways		

ACARS Decoder 2 neat flight listing grid.

The screenshot shows the main interface of AirNav ACARS Decoder 2. It features a 'Quick Navigate' sidebar on the left with a list of locations. The main area is divided into several sections: 'Live ACARS Data' with a table of flight messages, 'ACARS mode' information, and a 'Photos by Airliners.net' gallery on the right. The bottom status bar shows 'Receiving Messages: 29', 'Flights: 19', and 'MagMin: 0.24'. The Windows taskbar at the bottom indicates the local time as 2003/12/15 22:57:26.

AirNav ACARS Decoder 2 main screen.

has been carefully judged and most of the basic modes and tools you need are fully functional. There's certainly more than enough goodies to

order by post or £27.99 when ordered via Pervisell's secure website. As you can see from the screenshot, *Skysweeper Lite* keeps the unique

Windows XP users there is a reminder to run the program in Windows 98/ME compatibility mode - this is really easy to do and the prompt guides you through the process. With the installation complete, you just click the icon on the desktop to get started. One of the great features of AirNav's Decoder 2 is the use of a standard soundcard for the audio input. You just need a screened lead between the 'Line-out' on your scanner and the 'Line-in' on your PC's soundcard. Don't use the 'Mic input' - it usually overloads far too easily.

With all the connections complete, you can run the program and start decoding. To help get the best results from the decoder, there's a colour coded level indicator at the bottom-right of the main screen. The trick here is to provide a good signal, but keep clear of the red area. Difficult to be sure without some proper testing, but the Decoder 2's performance seemed to be very good indeed. I tried feeding-in some pretty noisy signals but the decoder seemed to cope remarkably well - looks like they've made some improvements to the decoding algorithms.

Moving onto the main decoder software, the whole interface has been completely re-worked and brightened-up which gives a great feel to start you off. Probably the most noticeable new feature is the automated link with www.airliners.net which gives you a photo of the aircraft next to each ACARS message. Now this is really good for impressing your friends!

The new decoder also adds a new dimension to the monitoring hobby - seeing a picture of the aircraft really brings the messages to life. The photos on www.airliners.net are really very good and you can see

thumbnails or double-click on the image to get a full size photo - great service. As well as showing a thumbnail against each message, there's a separate picture viewer frame that just shows the photos. If you want to get seriously into the messages

you have the facility to disable both sets of photos and return to a simpler interface. Of course, to receive these pictures you do need to have an active Internet connection, so this feature is ideal for those of us lucky enough to have broad-band or an 'anytime' Internet connection. I have to say that the photo link was really impressive and the whole process remarkably quick.

Sat at home, I could hear a short burst of ACARS on the scanner followed instantly by the message appearing on the screen. Just a few seconds later a full colour photo is delivered to the desktop! Another important addition to the ACARS Decoder 2 is the facility to take data from on-line ACARS servers. To the purist this

may seem like cheating, but it certainly provides a stack of information that you wouldn't otherwise be able to access. If you're just receiving your ACARS data from your v.h.f. radio scanner you will be restricted to basic Line-of-sight reception.

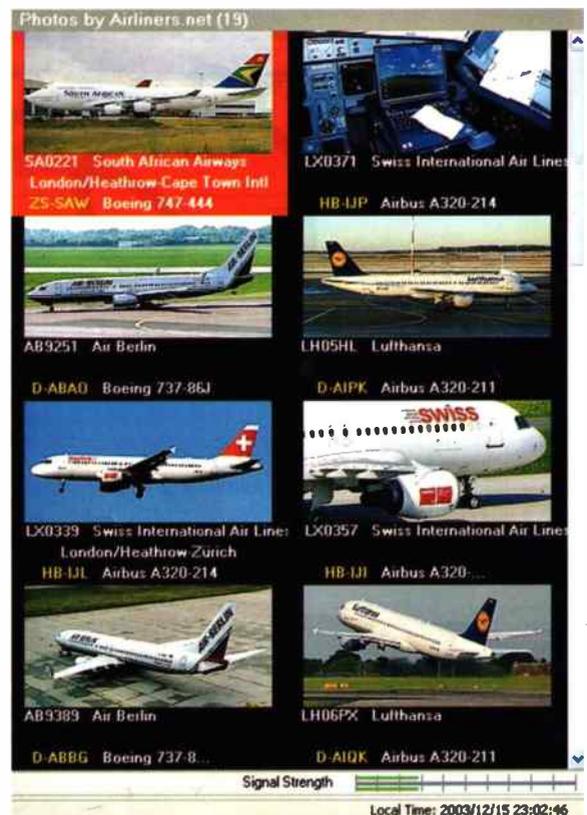
However, when you add Internet data from ACARS servers you can track aircraft over a much greater range. The decoder comes with a number of servers in its database, but there is also the facility to update the server list direct from the Internet. The servers in the review version covered the entire globe, so were well dispersed. Selecting a server is just a matter of clicking on the name and you're in business. To further enhance this feature, Decoder 2 also allows you to connect to a custom server, i.e. you just punch in the details yourself.

The team at AirNav have put a lot of thought into the mixed use of local and Internet data and all messages are tagged with the source so you can easily differentiate between messages received locally and those via a Net server. The main text window shows you full details of each message and the top of the screen has a couple of toggle buttons so you can quickly switch between Internet and local data. In addition to the main text window, Decoder 2 automatically sorts all the messages into a 'Live ACARS Grid' and a 'Flight List Grid'.

The Live ACARS Grid simply lists all the receive messages in a tabular format with one message per line. Rather than just sorting the messages by line, the decoder refers to the internal flight database and adds airline name, route details, aircraft model and other useful data. The

Flight List Grid is another neat table that consolidates all the received messages into a list of flights, i.e. one line per flight. Again the database is used to enhance the basic message.

Just to finish-off the features, the decoder can be set-up to act as a DDE client to send decoded ACARS data to other applications. The most obvious route is to link-up with AirNav's sophisticated *AirNav Suite 4* and get into some really serious flight tracking. If you haven't twigged yet, I have to say I really liked the new ACARS Decoder 2. The decoding algorithm is very effective and the combination of live data and the benefits of Internet access make this a really impressive monitoring package. At \$59.95 from the AirNav site it's not a bad price either. If



Aircraft photos to your desktop.

you want to find out more, take a trip to the AirNav site at: www.airnavsystems.com

Klingenfuss

It's that time of year again when the new *Guide to Utility Stations* drops through the letterbox. Joerg Klingenfuss has been producing this wonderful enthusiast's reference for more than 20 years now and it continues to be one of the most up-to-date reference available. Over the years the binding and print quality has improved considerably. Despite comprising nearly 600 pages crammed with information the book now rests open easily and holds a page comfortably without closing or flicking pages. This might seem a petty point, but anyone who suffered a large book with over tight binding will know what I mean.

Despite the huge quantity of data the type face has been very well chosen and the information was easy to read, even for my tired eyes. In addition to the main frequency list with over 10,000 active frequencies, there are a host of information packed chapters. The Meteorological Radiofax and RadioTelex Services section provides a really useful listing of all FAX and RTTY station by country. Not only are the stations and frequencies listed, but FAX schedules are included where available.

Another often missed, but extremely useful section is the Alphabetical list of stations. This provides a list showing every country along with all the main utility stations. This includes Met, diplomatic, coastguard, forces, maritime and a host of others. Against each operator are all the known operating frequencies and even websites for some. The 2004 *Guide to Utility Stations* remains a favourite with enthusiasts for good reason.



Skysweeper's excellent graphic interface.

Propagation

Forecasts

- Jacques D'Avignon VE3V9A
- E-mail: 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.

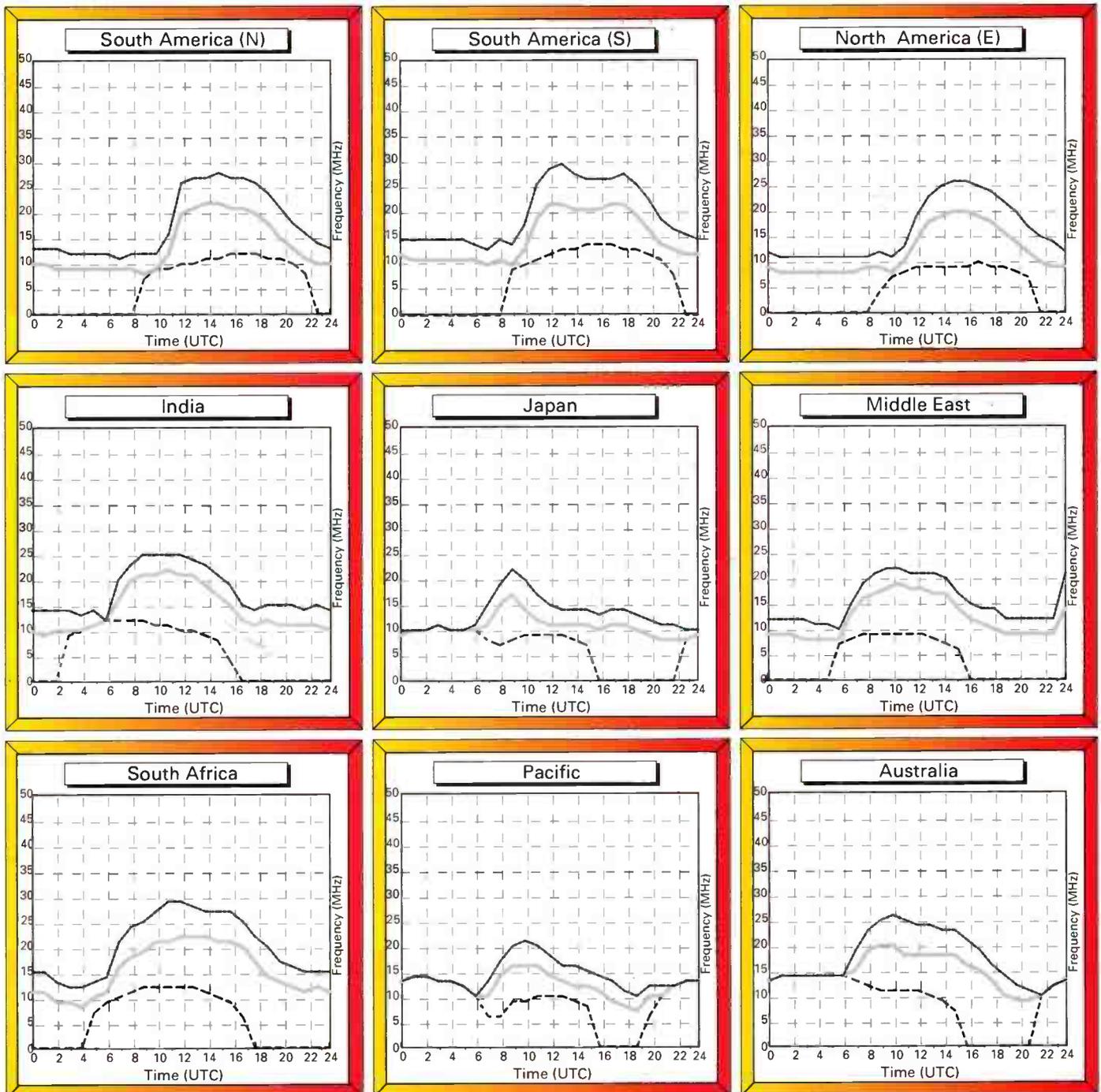
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

February 2004
Circuits to London



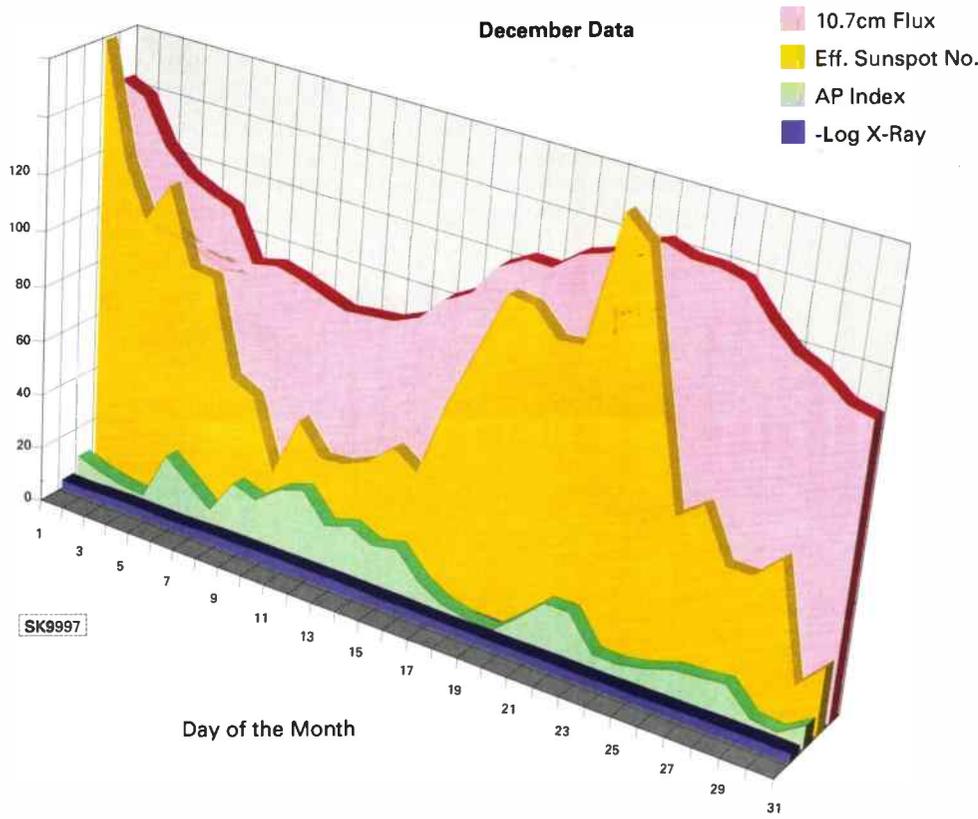
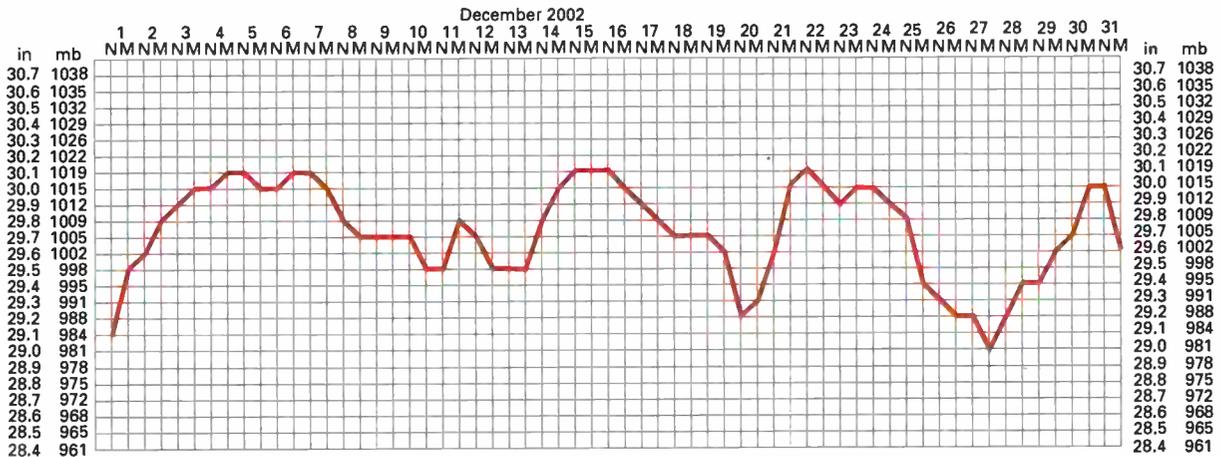
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Propagation

Extra

- **Kevin Nice** G7FZC/MBSW/M,
SWM Editorial Offices, Broadstone
- **E-mail:** kevin.nice@pwpublishing.ltd.uk

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, December 2003.



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.

Infoⁱⁿ Orbit

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

The New Year festivities will be over when this appears, but we can look forward to another year of activity on the weather satellite (WXSAT) front. We should see the launch of two new polar orbiters - *SICH-1M* and *NOAA-N* (to be re-named *NOAA-18* in orbit). Meanwhile, amateur and professionals help with the continuing tests of *MSG-1* and hardware tests continue with METOP - Europe's future polar WXSAT.

SICH-1M

Launch of the Ukrainian-Russian *SICH-1M* remote sensing satellite has been delayed to mid-2004 due to late deliveries of components from Russia, according to a report from Sweden. The *SICH* polar orbiters (like *OKEAN*) are not conventional WXSATs, they carry power-consuming radar systems to map ice concentrations and provide specialist measurements - but they do transmit bursts of telemetry on 137.40MHz.

The official announcement of the new delay was made in Moscow in December (news from Ukrinform). According to **Georgi Chernyavsky**, general director of the Russian Science Academy's Centre for Space Observations, "The launch of the Ukrainian-Russian satellite *SICH-1M*, which is meant for monitoring our planet from space, has been postponed to mid-2004. The satellite is undergoing tests before being launched from the Plesetsk Space Range with a Cyclone-3 booster".

He explained "*SICH-1M* is equipped with devices to monitor the planet's surface in the optical, infrared and u.h.f. bands, which will secure high quality photo's of the earth, irrespective of dense clouds or night hours' darkness. The satellite will be helpful in appraising the icing condition for ships in the

Arctic zone and in detecting most promising areas for netting fish. The satellite will also be very helpful in making forecasts about snow melting, soil humidity levels, flooding and so on".

SICH-1M will be carrying some well-proven equipment, including radar and a microwave imager. The side-looking, real aperture radar RLSBO, utilises 0.031m for radar, producing a swath of 450km width for up to 15 minutes continuous transmission. Another instrument scheduled for inclusion on *SICH-1M* is RM-0.8, the passive microwave imager operating at 0.08m to produce microwave images of the ocean surface and ice sheets. These components are included in the 137.40MHz signal that monitors have received from previous *SICH* and *OKEAN* satellites.

Previously, transmissions tended to occur when the satellite was passing over Europe and the decoded image usually included different sections - a visible channel, the microwave and the radar channels. These satellites produced some of the most unusual images ever received in the 137MHz band.

Figure 1 shows the relative positioning of these different scans.

When NOAA-N Fell Over

A couple of months ago I mentioned the sad tale of *NOAA-N Prime* which fell off the turn-over cart on 6 September, sustaining severe damage. The satellite is being built for NOAA at Lockheed Martin Space Systems in

Sunnyvale, California. A preliminary analysis showed that engineers believed that 24 bolts used to hold the spacecraft were in place. Unfortunately they had been removed by other engineers, apparently without the correct recording of the removal and it appears that no-one noticed that the bolts were not present. NOAA-N is scheduled for launch in 2008. **Figure 2** shows the scene after the fall.

Building For The Future

The National Oceanic and Atmospheric Administration (NOAA) and the US General Services Administration (GSA) have started work on the site of a new \$61 million Satellite Operations Centre in Suitland, Maryland. The new building is expected to open in 2005 and will house current and future environmental satellite operations. The new facility will be the nerve centre for NOAA's next-generation satellite series. When construction is complete, the new building - see **Fig. 3** - will contain high-technology equipment, including 16 antennas to control more than \$3 billion worth of environmental satellites.

The new facility will replace NOAA's current facility located in an old World War II era Federal Office Building. NOAA's Satellite Operations Control Centre (SOCC) provides command, control and communications facilities for constellations: NOAA's Geostationary Operational Environmental Satellites (GOES); NOAA's Polar-orbiting Operational Environmental Satellites (POES) and the Department of Defence's Defense Meteorological Satellite Program (DMSP). The polar satellite system of the future - the National Polar-orbiting Operational Environmental Satellite System, as well as the future geostationary system - the *GOES-R* series that will launch in 2012 - will be based in the new building.

MSG-1 (METEOSAT-8) News

METEOSAT-5 was launched in 1991 and after many years service, was replaced by *METEOSAT-6*. EUMETSAT received a request to support the international INDOEX

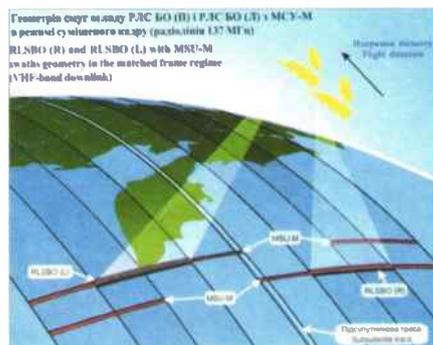


Fig. 1: Scanning the earth - *OKEAN-O* series satellites.



Fig. 3: Artist's impression of NOAA's new Spacecraft Operations Control Centre in Maryland.

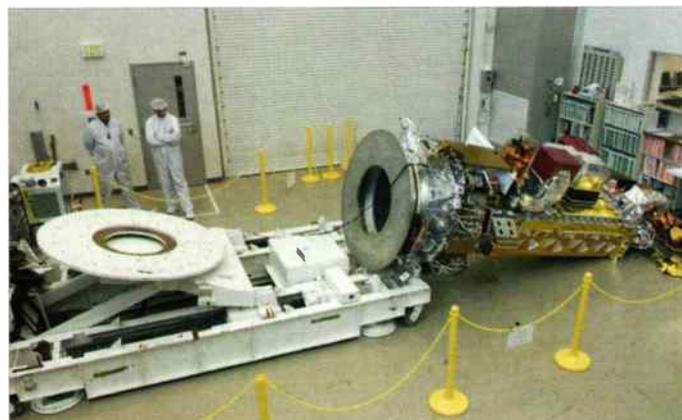


Fig. 2: NOAA-N Prime after the fall.

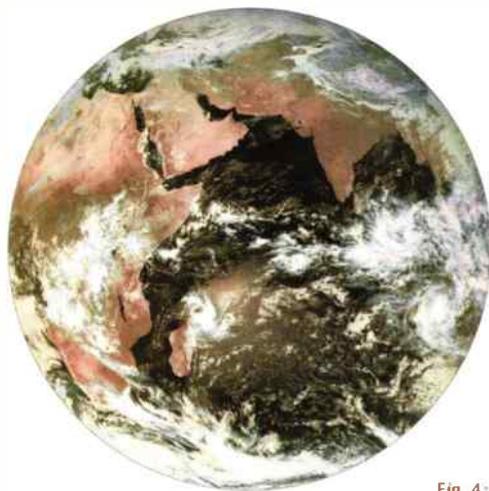


Fig. 4:
 METEOSAT-5 image 10 December 0600 -
 from MSG-1 ©EUMETSAT 2003.

experiment by providing METEOSAT imagery for the Indian Ocean area for the duration of that experiment - especially for the intensive field phase. The process of drifting to 63°E was completed in May 1998 and the service started in July as the Indian Ocean Data Coverage (IODC) service. On Tuesday 25 November 2003, 3-hourly Indian Ocean Data Coverage (IODC) images were added to the Foreign Satellite Data service on EUMETCast (see end of column).

Encryption Scheduled For MSG-1 (M-8)

Access to MSG-1 (METEOSAT-8 as it is also known) will eventually be limited by encrypting the transmission to those people that have paid for and been approved to have, de-encryption equipment. From 1 March onwards, access to METEOSAT-8 image data other than the essential data set (6-hourly image data, Foreign Satellite Data, Meteorological Products and EUMETSAT ATOVS Retransmission Service) will be controlled by the EUMETCast Key Unit (EKU) encryption mechanism. The EKU is the USB decryption hardware used, in conjunction with personalised information, to restrict data access to an individual user reception station. A fee of 40 Euros is to be charged per EKU.

MSG-1 Manoeuvres

John Tellick, secretary of the Remote Imaging Group (RIG) reports that EUMETSAT has decided that MSG-1 will be drifted from its present commissioning position of 10°W to 3°W, the normal operational position in December 2003, in preparation for the start of operational 0° longitude services, replacing METEOSAT-7's operational service in January.

John understands that imaging will continue whilst the satellite is drifted. Registered EUMETCast users will be notified of developments. METEOSAT-7 will remain at 0° longitude and continue WEFAX/HRI direct dissemination until the end of 2005.

Another Success For John!

John recently achieved a significant breakthrough for amateur WXSAT hobbyists. He announced changes to EUMETSAT's MSG Data Access Policy for which he has been striving for many years. One of his previous achievements was the 'no fee for UK amateur users' Agreement from the UK Meteorological Office. He announced that at the recent EUMETSAT Council meeting it was agreed that:

- (1) Amateur users would now be categorised as educational users.
- (2) There will be a common policy of free access to MSG data for all amateurs across Europe in the EUMETSAT Member States.

These decisions have involved liaising with the UK Meteorological Office, EUMETSAT, its Council, and World Meteorological Organisation (WMO) on behalf of amateurs everywhere. John mentioned several people including EUMETSAT staff and also contacts at the UK's Meteorological Office.

Officers of Werkgroep Kunstmanen have had regular discussions with the Dutch Meteorological Office and undertook a recent demonstration and talk about amateur reception and the processing of MSG data. John added cryptically "...and there is yet more good news to come. More of that later".

METEOSAT Third Generation

Even as the METEOSAT Second Generation tests continue, planning for a follow-on series of European METEOSATs is underway. METEOSAT is one of the key EUMETSAT contributions to the Global Observing System (GOS) of the World Meteorological Organisation (WMO).

The series of four MSG satellites will deliver observations and services until at least 2015 - possibly longer due to the high level of availability expected from the operational system. The typical development cycle for a new complex space system means that it has

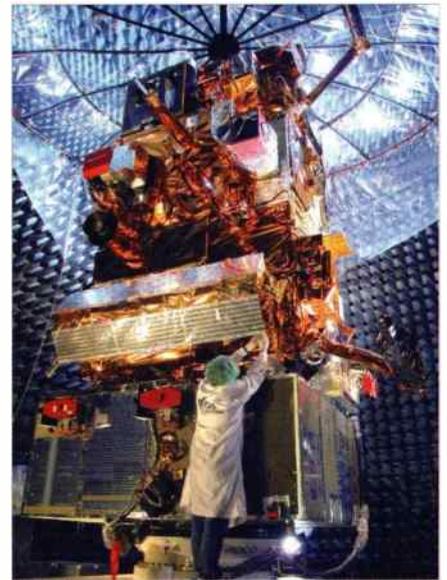


Fig. 5: METOP under test in Toulouse.

already become necessary to plan for a METEOSAT Third Generation (MTG) system. MTG needs to be available around 2015, before the end of the nominal lifetime of MSG.

Preparatory activities for MTG started at the end of 2000 in cooperation with the European Space Agency (ESA), following the decision of the EUMETSAT Council to proceed with a Post-MSG User Consultation Process aimed at identifying the foreseeable needs of EUMETSAT users in the 2015-2025 timeframe. MTG imagery: the early plans are to obtain 0.5km imagery every two to five minutes. Wow!

METOP Satellite Under Test In Toulouse

EUMETSAT is currently preparing the European component of the Initial Joint European/US Polar satellite System IJPS. EUMETSAT instruments will be carried on the METOP satellite, developed in cooperation with ESA, for launch in the year 2005. METOP-1 will be the first of a series of operational satellites providing service well into the years following 2010.

Beginning in 2005 the Astrium-built METOP satellites will deliver data from polar orbit for mid- to long-term weather forecasting and for climate research. The first flight model of the METOP satellite series



Fig. 6: Artist's drawing of a METOP satellite - courtesy Astrium.

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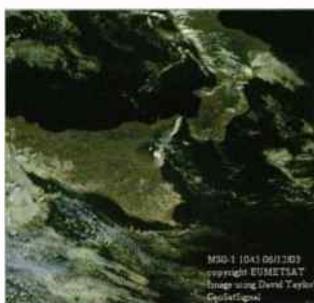


Fig. 7: Mount Etna on 6 December from Robert Moore ©EUMETSAT 2003.

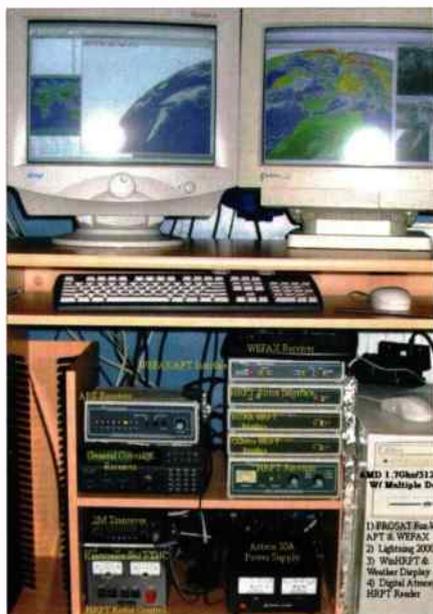


Fig. 9: Mike Long's WXSAT station.

built by EADS Astrium for the European Space Agency and EUMETSAT, has successfully completed a major test campaign at the Intespace facilities in Toulouse.

After the coupling of the two satellites main modules, namely the Payload Module and the Service Module, which were mated for the first time at the end of June, the satellite has been subjected to extensive electromagnetic compatibility testing. During this test the mutual compatibility of the core satellite, its associated transmit/receive antennas and the numerous sensitive METOP payload elements has been successfully demonstrated.

Correspondence

Professor **Robert Moore** of the University of Liverpool sent me this picture of the snow on Mount Etna, an image from *MSG-1*, to illustrate how well the WXSAT captures detail even during the late autumn period under low illumination.

Chuck Vaughn has been moving house within north America and has only recently been able to re-install his h.r.p.t. system. He posted **Fig. 8** showing *FENGYUN-1D* in early December.

Amateur Station Profile

During recent years, **Mike Long** has posted images of various formats so I thought that a look at his station could be of interest to those



Fig. 8: *FY-1D* 1 December 2003 1450 from Chuck Vaughn showing North America.



Fig. 10: Mike's h.r.p.t. dish.

thinking of setting-up their own equipment. Like other enthusiasts, Mike has a comprehensive suite of electronics!

His computer is the heart of the weather station, processing and archiving a.p.t., WEFAX and h.r.p.t. satellite imagery. It also logs lightning strikes within 1600km. It reprocesses and uploads imagery as well as weather conditions and lightning data to his website. The computer is home-built with an AMD Athlon 1.7GHz processor and 512MB RAM. It has two hard drives installed: a 13GB drive for the operating system and all software and a 40GB drive for data storage of images and archived weather data from the weather station.

I use a similar configuration - an 80MB partitioned drive with the OS and software separated from some of the data. This allows

easy disk de-fragmentation at intervals. Mike is using an ATI Radion 7500 Dual Headed Video Card that allows the use of two monitors to extend the desktop.

Mike uses Timestep's h.r.p.t. equipment including a 1m satellite dish with helical feed and pre-amp. The 1.7GHz signal requires amplification before being fed to the receiver. The dish is attached to a computer-driven motor that tracks the satellite across the sky. The AutoTrack-II interface box connects the computer to the rotor. The system includes a computer controlled h.r.p.t. receiver, two interface boxes (for h.r.p.t. and the Chinese format c.h.r.p.t.) are used to decode the 1.7GHz band signal. Mike uses a GPS unit to provide time and location data to the computer. Accurate time is important for accurate tracking of the dish during a pass. I use the *Tardis* freeware program to update the computer's clock. Finally, *WinHRPT* software manages the system and manipulates the images.

Mike uses a TimeStep ProScan receiver, a RIG/TimeStep turnstile antenna and preamp, i- interface and *ProSat-For-Windows* software. This allows for completely automated reception of images. A turnstile antenna is fine, but many hobbyists - including Mike - report that a QFH antenna is better. Mike also receives WEFAX using a 1m offset satellite dish, TimeStep active feed, down converter, i-interface and a MultiFax APT receiver. The images are processed by the i-interface and manipulated with TimeStep's Windows software.

For a full description of Mike's site, visit: www.amateurweather.com/station.htm

RIG & GEO

Last month I reported the launch of Group for Earth Observation (GEO). Readers are very much aware of Remote Imaging Group (RIG). It is my understanding that both groups have similar objectives - the encouragement of an interest in weather satellites - and this is also the aim of this column. As always, I see my role as reporting events that are brought to my notice (or that I discover!) as long as they are relevant to the topic of weather satellites. I plan to continue to report the progress of all relating work.

Frequencies

a.p.t.

NOAA-12 and *NOAA-15* transmit a.p.t. on 137.50MHz.
during overlap periods, *NOAA-12*'s a.p.t. may be switched off.
NOAA-17 transmit a.p.t. on 137.62MHz.

h.r.p.t.

NOAA-12 and *NOAA-16* transmit h.r.p.t. on 1698.0MHz.
NOAA-17 and *NOAA-14* transmit on 1707MHz.
NOAA-15 transmits on 1702.5MHz.
FENGYUN-1C and *-1D* transmit on 1700.5MHz.

WEFAX: *METEOSAT-7* (geostationary) transmits WEFAX on 1691 and 1694.5MHz and Primary Data on 1691.0MHz - for the two more years.
HRIT-LRIT-FSD from *METEOSAT-8* (*MSG-1*) via *HotBird-6*'s EUMETCast transmission.

DX

Television

● Keith Hamer & Garry Smith

17 Collingham Gardens, Derby DE22 4JS

November was another excellent month for Sporadic-E reception. A spell of settled weather earlier in the month produced a day of intense tropospheric reception stretching from Scandinavia through to France.

Band I Reception Reports

A Sporadic-E opening around midday on November 3 produced Spanish and Italian signals for **Simon Hockenull** (Bristol). Late on the November 11, **Stephen Michie** (Bristol) and **Tom Crane** (Hawkwell) experienced possible Auroral-E propagation from Norway with the subtitled news programme 'Dagsreven' visible on channels E2, E3 and E4. By 2200, co-channel signals were affecting E3, possibly from SVT-1 Sweden.

An opening to Italy and the Iberian Peninsula occurred on the 16th producing Italy Channel A, Portugal E4 and Spain E2. These channels were logged by **Peter Barber** (Coventry)

between 0900 and 0940. An intense opening materialised on the 18th with RAI UNO Channels A and B, the private station TVA between A and E3 and Canal Plus from Corsica on L2.

On the 19th, Peter Barber discovered Spanish signals on E3 at 1155 with views of USA President Bush's state visit to the UK with shots of the inside of Buckingham Palace. A similar programme emerged on E2 and by 1227 there were scenes of a chef in action probably chopping up tasty morsels for someone's lunch - no doubt it was for President Bush!

A shampoo advert seen by Simon Hockenull at 1330 on E3 was identified as RTP-1 Portugal. By 1324, Peter was watching Italy with RAI UNO Channel A and later, at 1354, the Italian private station TVA was visible between Channels A and E3.

Just before 1800 on the 23rd, Simon Hockenull caught the end of a feature film in widescreen format from RAI UNO on Channels A and B followed by the Italian 'tg1' news at 1919. Scanner-level Spanish E2 signals were also detected during the opening.

By 0820 on the 25th, Stephen Michie was aware of an opening to the Baltic area with

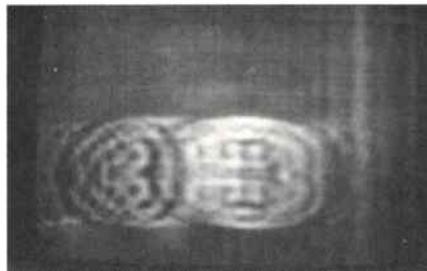


Fig. 2: The distinctive '3' logo of TV3 Thailand, received via TEP on Channel E2 by Rana Roy in Northern India.

the following loggings: DR-1 Denmark E3 and E4, L1 Lithuania R2 and SVT-1 Sweden E2.

Lt. Col Rana Roy (Northern India) reports TEP (Trans-Equatorial Propagation) from south-east Asia appearing on several days during the late afternoon. Fluttery pictures with audio on E3, possibly from Thailand, were received on the 2nd and 5th with E2 on the 8th. Since the 12th, 'rolling' images have been observed on R1, possibly 525-line (System M) signals from Vietnam.

Tropospheric DX

During foggy conditions at 0245 on November 7, Tom Crane discovered a host of French, Belgian and Dutch u.h.f. channels. The line-up of Dutch local stations included RTV Oost E22, TV Flevoland E26, TV Noord E36 and Omroep Zeeland E54. From late afternoon, **Peter Barclay** (Sunderland), tuned into Danish

and Norwegian signals, but oddly Band III produced the stronger signals with only weak pictures visible at u.h.f. from TV2 Denmark on E40 and TV2 Norway on E44. NRK-1 (Norway) was visible on E4 via tropospheric propagation and Peter hopes this must be a 'first' in the UK.

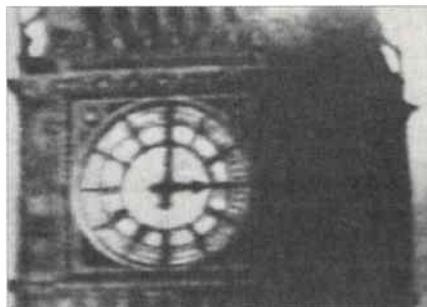


Fig. 3: We've delved deep into our archives to find this BBC Clock caption which was a working model of Big Ben and used as long ago as 1938.

George Garden (Edinburgh) received NRK-1 Norway in colour on E6 and E9 with TV2 on E44 and TV Norge on E52. At 1644, 'TV Norge' on E51 identified as TV VEST sporting a logo resembling a TV set with V-shaped antenna on top. At 1655 'Norge Oslo', a regional station, emerged in strong colour on E52. From 1816 the v.h.f. f.m. band really lived up with the Norwegian national services NRK P1, P2 and P3 heard on many frequencies.

Meteor-Shower DX

Simon Hockenull tells us that the Space weather site predicted two peaks for the *Leonids* meteor-shower event this year. The first on November 13 and 14 between 1300 and 1900 reaching 120 per hour with the second peak expected on November 19 at 0727 reaching perhaps 100 per hour. Despite prolonged monitoring, Simon and Peter Barber both reported disappointing results with only a few very brief weak pings between November 13 and 20. The *Leonids* shower is returning to a more normal state with the storms of recent years unlikely to be repeated within the next two decades.

Roger Bunney (Romsey) has forwarded some useful information for 2004 from Neil Bone, director of the Meteor Section, British Astronomical Association (BAA). The *Perseids* and *Geminids* should allow good visual sightings under dark skies, if clear! The main showers which are most likely to reflect TV and v.h.f. Band 2 signals are as follows:-

<i>Quadrantids</i>	January 1 to 6, peaking Jan 4 at 0400
<i>Perseids</i>	July 23 to August 20, peaking Aug 12
<i>Leonids</i>	November 15 to 20, peaking Nov 18
<i>Geminids</i>	December 7 to 15, peaking December 12 and 13

Colour Bars

Stephen Michie spotted an accidental showing of BBC colour bars with the identification 'DTA SPG1' between Bergerac and the News on November 10. Does anyone know what the identification means?

Spectrum Pests

Peter Barber has recently detected a mystery carrier over Channel E3 at 55.245MHz. Stephen Michie suspects there may be some toy walkie-talkies operating on this frequency because during the summer he heard parents screaming and shouting at children. Some of the newer toy walkie-talkies transmit outside Bands I and III but Boots are currently selling a toy radio transmitter called 'Pop Idol' which outputs around 174-175MHz.

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 and good-quality video recordings.

Our DXTV and Archive TV website can be found at: www.test-cards.fsnet.co.uk

Radiosport

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For more information see our website www.radiosport.co.uk
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- **Peter Bond** do Editorial Offices, Broadstone
- **E-mail** skyhigh@pwpublishing.ltd.uk

Following on from last month's Concorde retirement special, I am grateful to **James L** who works for British Airways, he has kindly sent me a copy of the last Concorde flight Plan, in AFTN format. AFTN is the Aeronautical Fixed Communications Network, this is a Global Network of teleprinter and telex lines used exclusively for the transmission of aviation messages.

Information is taken from the CA48 Flight Plan, (or similar) and input directly into the AFTN system. (It would be handy to have terminal at home with access into the London AFTN system as both civil and military flight plan information is carried). I don't think I have ever included a Flight Plan in this format in the column, so now is as good a time as any. Whilst some of the information is obvious, for those who are not familiar with the format I will give a quick run-through.

The first two lines list the registration, type of flight (I = IFR), aircraft type, (H = Heavy for wake turbulence and separation purposes), plus the equipment carried, for example C indicates that Mode C Transponder is carried. The aircraft departs Heathrow (EGLL) at 1055GMT/UTC and the next five lines give the route and speed and level changes. The initial speed and level is 560 knots, Flight Level 280 direct to NORRY, the airway GULF 1 and then to 5135 North, 00204 West.

From there it is direct to UPGAS where you can see Concorde goes supersonic for the last time and gives the speed as Mach 2, (M200), at Flight Level 450 on the supersonic route SL2 to MERLY. Further Lat/Long coordinates and reporting points are passed before it returns to subsonic flight at 4915 North 00600 West, dropping back to 560 knots at flight level 330. They then go for a bit of a jolly before estimating arrival back at Filton, (EGTG) after an elapsed time of 1 hours 26 minutes, with Manchester (EGCC) as the alternate airfield.

The next three lines of Selcall, Remarks and Registration are self explanatory. As I mentioned last month, all the Concorde positioning flights were allocated Speedbird flight numbers, (in this case BA9020C), but all seem to have operated using the registration as the callsign, i.e. Concorde Alpha Foxtrot, shown in **Table 1**.

As far as I am aware, the SL routes were used exclusively by Concorde so it will be interesting to see if the UK supersonic routes,

(SL2, SL3/5) are withdrawn or whether they are retained for some other purpose.

Tornado Base Station?

Over the years I have written this column, familiar subjects and questions re-appear on a regular basis, but it is not often that someone asks a question that I do not recall ever being asked before. **Robbie L** from Lincolnshire poses the following question. "In the search for the best v.h.f./u.h.f. airband radio, surely those fitted to military aircraft such as the Tornado must be amongst the best you could buy, so is it possible for members of the public such as myself to buy one of these radio's for personal use, (obviously with the transmit capability disabled)?"

Good question. Whilst ex Government and military h.f. receivers have become increasingly common over the past five years, v.h.f./u.h.f. versions are very much a rarity. In the thirty plus years I have been interested in the airbands, I have only ever come across a small number of ex-military receivers from aircraft (and they were back in the eighties). Two of the radios were known to be from dated aircraft, one from a Vampire and the other was thought to be from a Canberra.

Well, first of all I would think it highly unlikely that any of the companies that manufacture these radios would sell you one, even with the transmit disabled. Secondly, even if they would sell you one, I am certain that the price would be completely prohibitive and lastly would you actually want to buy one anyway.

These are very specialist built durable radios, not pretty to look at and designed for

rack or a similar mounting within an aircraft. The normal facilities an enthusiast would expect, (such as large and flexible memory storage), would be limited and much of the listening would be to spot frequencies.

I have to say I am not up to scratch with the capabilities of modern radios as very little information is available, if there are any RAF radio engineers reading this who can enlighten our readers of the capability of modern radio systems, I would be pleased to hear from them, a quick check proved that there is very little information on the Internet.

In the end, although technology has moved on, the aircraft radio is still pretty much the same basic unit as it was twenty years ago, a set that can select individual frequencies or a number of pre-sets, (studs), that are pre-programmed into the radio. Admittedly, a selection of modern encryption techniques can be employed, but the basic set remains the same.

As for performance, (sensitivity and selectivity), I would doubt whether the average aircraft transceiver would out perform some of the middle or top range scanners from either AOR or Icom, as ever if you know better, please let me know. The bottom line, well it would certainly be interesting to play around with one of these sets, but I don't think I will be asking for one for Christmas!

Before writing the above, I E-mailed a request for information, to an old colleague, (ex RAF), who I suspected still had a couple of old radios hidden away. He was away for two weeks, but has now been in contact. To give you an idea, he described a Plessey 1751 which he thinks originated from the early seventies. The radio could have frequencies selected manually or via 30 pre-set channels on of which was usually the guard channel. It could operate in the military airband between 225.0 and 399.975MHz which was split up into 7000 plus channels using 25kHz spacing.

The original radio could only select 50kHz

Table 1

```
(FPL-GBOAF-IS
-CONC/H-SXY/C
-EGLL1055
-N0560F280 N0560F280 DCT NORRY G1 5135N00204W
C/UPGAS/M200F450F460 SL2 MERLY DCT 5110N00645W DCT BARIX
4915N00600W/N0560F330 DCT LAGUL DCT 4924N00230W DCT JSY UN868 BARLU
UN861 FAWBO UB11 SAM UR41 PEPIS B321 CPT DCT 5131N00221W/N0460F020 DCT
5131N00234W DCT 5131N00236W DCT 5131N00244W DCT 5125N00259W DCT
5121N00259W DCT 5123N00243W DCT 5127N00237W DCT 5129N00236W DCT
-EGTG0126 EGCC
-SEL/AGEJ
RMK/BA9020C FINAL FLT EVER ALAN/MIKE/BARBARA
REG/GBOAF)
```



spacing, but a 25kHz option/modification was available, so with 50kHz spacing being the standard setup that date of the early seventies looks good. Having said that, I can remember Canadian Air Force C-130s using the Dover Sector *en-route* to Germany in 1985 still unable to select frequencies with three decimal places as their radios were only equipped for 50kHz spacing.

March 2004 Airspace Changes

The changes to UK airspace which started last March and continued recently with the Airway changes are still ongoing. Re-sectorisation at the London Centre continues with further recent boundary changes to Sector 4/Lakes sector. The problems I reported a couple of months back that were encountered with the introduction of digital transmitter equipment on the London Upper Sector, have continued. It now seems that this may not now be the first Sector to have an 8.33kHz Channel allocated to it.

There are now plans for the re-sectorisation of the Clacton Sector on the 18 March 2004. This will involve increasing Sector 12 (part of Clacton), airspace to the North and will extend as far as the reporting point NAVPI, (ex MC6 / MC16). It is now reported that the first UK 8.33kHz Channel will now be incorporated into the changes to the Clacton Sector and one source has suggested that this new Channel will be in the 128.*** range. (Assuming that the digital transmitters are working OK).

One assumes that once the transmitters at source are converted to digital that some or all the UK remote Transmitter sites will at

some stage also have to be converted as the move of specific Sectors to 8.33kHz spacing takes place?

As references to changes to the various London Sectors are often made by the sector number rather than the Sector title, I thought I would include a breakdown of these numerical tie-ups, see **Table 2**, as I don't think I have listed them in the 'Sky High' column before. The first column is by Sector from North to South across the London Control region and the second is in numerical Sector order.

NATS Radar

As part of the National Air Traffic Services nine year £127 million pound plan, the first of the new UK Air Traffic Radars has become operational at Burrington in North Devon. This Primary Surveillance Radar returned to full Primary and Secondary (SSR) status on the 19 December 2003. This new radar primarily built by Raytheon Systems replaces the old equipment which in some cases has been in operation for well over 20 years, it encompasses much advanced technology which theoretically will be much more reliable and includes the latest monopulse Mode S (MSSR) radar capability.

Basically, Mode S is a much advanced SSR system which allows for more information to be presented to the controller when the aircraft is interrogated by the Secondary Radar. It will also remove the limitation on available Mode A codes which

can be used up in very busy airspace and will therefore provide capacity in the system for the expected increases in

aircraft movements within the UK and Europe.

At present, the system can easily become saturated by the increasing level of signals on the 1.03 and 1.09GHz frequencies. This leads to interference and a degradation of the 'probability of detection' together with 'label swaps', where information, presented to the controller on flight A is erroneously attached to the position indicator of flight B.

This is the first of 20 sites that are to be renewed by the year 2012, with the plan being to complete two radar sites per year. The sites planned for the coming year are Cromer in Norfolk and Fitful Head, (Sumburgh), in the Shetland Islands.

Other UK radar sites which will be included in the nine year plan are: Alanshill in Aberdeenshire, Belfast, Claxby (Lincolnshire), Clee Hill near Ludlow, Debden in Essex, Gatwick, Glasgow, Great Dun Fell (Cumbria), Heathrow, Lowther Hill (Lanarkshire), Pease Pottage near Crawley, Perwinnes Hill (Aberdeen), Sandwick (Stornoway) St Anne's (Blackpool), Stansted, and Tiree. With thanks to **Brian L, Steve P** and the **NATS** and **Eurocontrol** websites.

For our photo, I have once again delved into the archives. In 1990, I was fortunate enough to visit VAQ-33 at Naval Air Station Key West in Florida, before the retirement of their A-3 Skywarriors. Our photo shows a line up of five of their aircraft, before three departed for missions with visiting F-14s.

Table 2

Geographical Order

Wirral	Sector 7
Lakes	Sector 3
	Sector 4
North Sea	Sector 10
	Sector 11
Strumble	Sector 8
Brecon	Sector 5
Bristol	Sector 23
Daventry	Sector 27
	Sector 28
	Sector 32
	Sector 34
Clacton	Sector 12
	Sector 13
	Sector 14
London	Sector 1
	Sector 2
	Sector 25
	Sector 26

Dover	Sector 15
	Sector 16
	Sector 17
Lands End	Sector 9
Berry Head	Sector 6
Worthing	Sector 18
	Sector 19
	Sector 20
	Sector 21
Sector Order	
London	Sector 1
	Sector 2
Lakes	Sector 3
	Sector 4
Brecon	Sector 5
Berry Head	Sector 6
Wirral	Sector 7
Strumble	Sector 8
Lands End	Sector 9
North Sea	Sector 10
	Sector 11

Clacton	Sector 12
	Sector 13
	Sector 14
Dover	Sector 15
	Sector 16
	Sector 17
Worthing	Sector 18
	Sector 19
	Sector 20
	Sector 21
Bristol	Sector 23
London	Sector 25
	Sector 26
Daventry	Sector 27
	Sector 28
	Sector 32
	Sector 34



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99 Channels.
Auto Gain Control.
Built in Attenuator.
Optional DSP



IC-R10
£265.00

Covers
50 kHz -
1.3 GHz.
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AM, USB,
LSB, CW.

Built in attenuator, and
noise blanker.
With Auto Frequency
Control Function.



IC-R5
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Covers
495 kHz -
1309.995 MHz.
AM, FM, WFM.
1250 Channels.
PC Programmable.
Worlds first handheld
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function.



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Computer Receiver.
Covers 0.1MHz - 1.3GHz.
FM, WFM, AM, SSB, CW.
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CTCSS Tone Squelch.
Optional DSP.



VR-5000
£549.00

Covers 0.1MHz - 2.6GHz.
CW, FM-N, WFM, AM,
AM-N, WAM, USB, LSB.
Dual receive.
World Clock. Built in
Bandscope 2000 Channels.
Optional DSP.



VR-500
£199.00

Covers 0.1MHz - 1.3GHz.
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Covers 100 kHz - 1.3GHz.
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DC Socket.



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First base station scanner with TRUNKTRACKER II System. CTCSS/DCS. PC Control, cloning, and record function.



UBC-3000XLT

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Covers 25-550MHz, 760-1300MHz.
AM, FM, WFM.
Includes: 6V NiCd Pack, Charger, Carry Case, Earpiece, Antenna.

MVT-9000mkII



£324.95

Covers 530kHz - 2039MHz.
NFM, WFM, NAM, WAM, USB, LSB, CW.
1000 Memory Channels.
25 Tuning steps.



MVT-7100
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Covers 100 kHz - 1650 MHz. NFM, WFM, AM, USB, LSB, CW.
1000 Memory Channels.
12 Tuning Steps.



MVT-7300
£249.00

Covers 521 kHz - 1320 MHz. NFM, WFM, NAM, WAM, USB, LSB, CW. 1000 Memories.
500 Pass Channels.
16 Tuning Steps.
8.33kHz Airband Spacing



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Covers 66-88MHz, 108-170MHz, 300-470MHz, 806-1000MHz.
NFM, AM.
5 Tuning Steps.
200 Memory Channels.



TRX-200
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Bandscope.
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Menu driven.
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Noise eliminating in-line module. DSP Through your own external speaker.

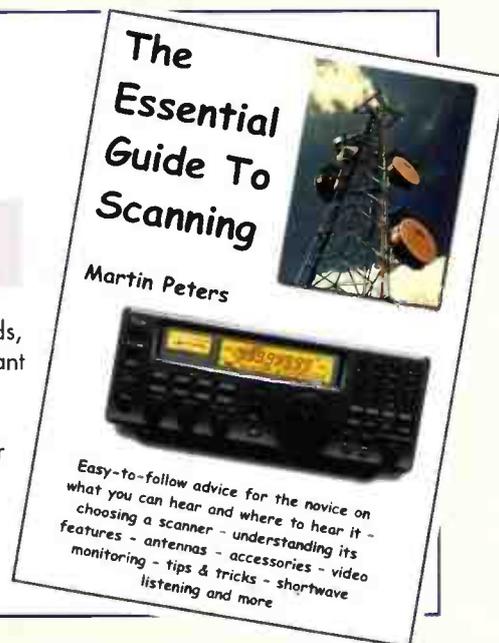
BOOK

new additions

The Essential Guide To Scanning

This little booklet has been written in the hope that it will be a useful aid for anyone new to scanning, with the aim of helping you to get the most from this interesting and very absorbing pastime. Within its pages, the author **Martin Peters**, takes a look at the diversity of services that depend on the radio spectrum for their work and how best to intercept their communications. There's also guidance on buying the scanner or

scanners to meet your particular needs, selecting and siting of that all-important antenna and a look at some of the accessories you can use to enhance your listening experience. Order your copy of the *Essential Guide To Scanning* for just **£6 plus P&P.**



LISTENING

Airband

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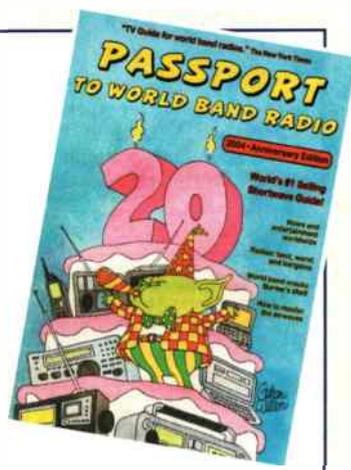
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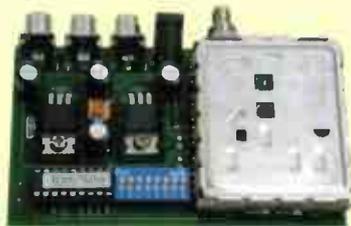


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CLEVELAND

EAST CLEVELAND ARC, G4CRD. Meets at the Committee Room Of The New, New Marske Institute Club, Gurney Street, Cleveland TS11 8EG. Details from Malcolm Brass G4YMB. Tel: (01287) 638119.

STOCKTON & DARG, G4XGX. 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 G0GFG. Tel: (01388) 745353.

DERWENTSIDE ARC, G4PFQ. Meets at the Steel Club, 36 Mordensley Road, Consett, Co. Durham. Details from Mr G. Darby G7GUJ. Tel: 0191-370 2032.

GREAT LUMLEY AR & ES, G4EUZ. Meets at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Details from Nancy Stone G7UUR. Tel: 0191-477 0036, mobile (07990) 760920.

PETERLEE RADIO CLUB, G0KVJ. Details from Andrew Pennell G0NSK.

HUMBERSIDE

EAST YORKSHIRE ARS, G0EGR. Meets at the Northern Fords Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4EBT. Tel: (01482) 676702.

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

GRIMSBY ARS, G3CNX. Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

HORNSEA ARS, G4EXT. Meets at The Mill, Alwck Road, Hornsea, North Humberside. Details from Jeff Southwell G4IGY. Tel: (01964) 535331.

HULL & DARS, G3AMW. Meets at the SWL Centre, Club Room, Goathland Close, Walton Street, Hull. Details from Mr R. Hutton.

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

SCUNTHORPE STEEL ARC, G4FUH. Details from Alistair Butler M1ECF.

NORTH YORKSHIRE

DARLEY ARC, G0FOS.

HAMBLETON ARS, G0JQA. Meets at the Mencap Centre, Northallerton, N. Yorks. Details from Ian Brickwood G0JQA. Tel: (01609) 775598.

QUEEN MARY ARC, G6QM. Meets at Blazefield, Pateley Bridge, Harrogate, North Yorks HG3 5DR. Details from Frank Harris 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 Mr D.P. Tipper G3JBR. Tel: (01723) 377296.

SCARBOROUGH SE GRP, G0XOO. 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) 422084.

YORK RADIO CLUB (AMATEUR) G4YRC. Meets at the Bishoptope Social Club, Bishoptope 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 Mr D. Stansfield G0EUV. Tel: (01670) 513026.

SOUTH YORKSHIRE

FINNINGLEY ARS, G7HAH. Details from John Fennell G4HOY. Tel: (01427) B75222.

MALTY & DARS, G4SKM. Meets at the Centenary Hall, Clifford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

MEKBOROUGH & DARS, G4BTS. Meets at the Harrop Hall, Mexborough, South Yorks. Details from Mr R.T. Sheppard G0KSK. Tel: (01709) 586329.

SHEFFIELD ARC, G0INF, NRAE/RAE (tubon provided). Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Giossop G0SFM.

TYNE & WEAR

HOUGHTON-LE-SPRING ARC, G3MMD. Meets at the Dumrie Royal British Legion, Dumrie, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Aungies G0ABF. Tel: 0191-584 4873.

SOUTH TYNEDISE ARS, G0XWQ. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWI. Tel: 0191-421 9921.

TYNEMOUTH ARC G0MMW. 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, G8KMK. Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4F5Q.

HALIFAX & DARS, G2UG. Details from Mr S.P. Ortmyer 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, Brownberrie Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0BUU.

NORTH WAKEFIELD RC, G4NOK. Meets at the East Ardsley Cricket Club, N. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 0113-253 9087.

OTLEY ARS, G3XNO. Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SVN. Tel: (01274) 636197.

PONTEFRACT & DARC, G3PYQ. 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) 675038.

WAKEFIELD & DARS, G3WRS. Meets at the Ossett Community Centre, Prospect Road, Ossett, W. Yorks. Details from Ian Roberts. Tel: (01924) 216502.

WAKEFIELD RPTB GP, G0KNR. Details from Mike Chaffton G6OZ.

WHITE ROSE ARS, G3XEP. Meets at the Moortown RUFJ, Moss Valley, Kings Lane, Leeds LS17 7NT. Details from Mr M. Wilson G7SDW. Tel: 0113-273 6039.

MIDLANDS

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, Amptwell, Shefford, Beds. Details from John West. Tel: (01462) 812739.

ST SWITHUN'S ARC, M0AJV. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelynn Danton G0WDD. Tel: (01767) 683179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2XV. Meets at the Coleridge Community College, Radeburg Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

DUXFORD ARS, G82IWM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.I. Pope. Tel: (01279) 656149.

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Farset Road, Fletton, Peterborough. Details from Alan D. Ralph G8XHL.

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Meadow Centre, Meadow Road, Huntingdon. Details from David Leach G7DUJ. Tel: (01480) 451333.

MARCH & DRAS, G3PMH. Meets at the British Legion Club, Rookwood Road, March, Cambs PE15 8DP. Details from Mr J. Bradthwaite G3PMK. 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 Indigeland M0DUQ. 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 G4IHO. Tel: (01298) 25506.

DERBY & DARS, G2DJ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details

from Martin Shardlow G3SZJ. Tel: (01332) 556875.

EREWASH VALLEY ARG, G0PCX. 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 G0DAG. Tel: (01246) 812230.

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marlpool United Reform Church, Chapel Street, Marlpool, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

NUNSFELD HOUSE ARC, G3EEO. Meets at the Nunsfield House, Boulton Lane, Avaston, Derby. Details from William F. Smith G7PJJ.

STH DERBYS & ASHBY W ARG, G0SRC. Meets at the Moira Replian Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 8DJ. Details from Mrs B. Wailey. Tel: (01283) 760822.

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Gething M0CLUQ. Tel: 0113-955 5766.

GLOUCESTERSHIRE

CHELTENHAM AR ASSN, G55BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ivan Wilson G4BGW. Tel: (01452) 731956.

CHELTENHAM CLUSTER SUPP GP, G8DXC. Details from Mr A.M. Daves G0HDB. Tel: (01684) 72178.

GLOUCESTER AR & ES, G4AYM. Meets at the Churchdown School, Churchdown. Details from Mr A.J. Martin. Tel: (01452) 618930.

SMTHS INDUSTRIES RS, G4MEN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G3JMF.

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 Dene G7KCG.

HEREFORD & WORCESTER

BROMSGROVE & DARC, G3VGG. Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4OAZ.

BROMSGROVE ARS, G4TUI. Meets at the Likey End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TGP. Tel: (01527) 542266.

DROTWHICH ARC, G4PVO. Meets in the Community Hall, Drotwhich Spa, Worcs. Details from Hector Wragg M1BUV. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gaoi Street, Hereford. Details from Tim Bridgland-Taylor G0JWJ. Tel: (01432) 279435.

KIDDERMINSTER & DARS, G0KRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders G0OZB. 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@alionson.fsnet.co.uk

REDDITCH RC, G4ACZ. Meets at the WRYVS 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. Adnan Utting G1WZQ.

BEAUMANOR ARC, G3BMR

DEMONTFORT UNIVERSITY, G3SDC. Open to past & present students. Details from Mr R.G. Tittington. Tel: 0116-257 7059.

HINCKLEY AR & ES, G3VLC. Meets at the United Services Club, St. Mary's Road, Hinckley. Details from Mr R.A. Bennett G8BFF. Tel: (01455) 846493.

LEICESTER RS, G3LRS. Meets at Gilroy 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, Shepshed, Loughborough, Leics. Details from Chns Walker G1ETZ. Tel: (01509) 504319.

MELTON MOWBRAY ARS, G4FOX. Meets at the St. John Ambulance Hall, Astford Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3NVK. Tel: (01664) 63369.

NATIONAL SPACE CENTRE ARS, M1NSC. Details from Mr J. Heath G7HIA.

TAMWORTH ARS, G8TRS. Details from Mr A.I. Dyon G0HUW. Tel: (01827) 830437.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The Secretary.

LINCOLNS

Fossebank, Saxby Road, Lincoln. Details from Robert Pickles G3VCA. Tel: (01522) 528708.

SPALDING & DARS, G4DSP. Meets at The Old Fire Station, Spalding, Lincs. Details from Raymond Pearson GBELV. Tel: (01775) 711953, Web: www.sdrs.org.uk

SPILSBY ARS, RS91468. Details from Clive Ironmonger G6HYF. Tel: (01790) 752712.

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Lilacs Public House, 39 Church Street, Isham, Kettering, Northants NN14 1HO. Details from Fay Barwell G6AKS. Tel: (01536) 390954.

MID NORTHANTS AR EXP, GOING. Details from Lionel Parker G5LP.

NORTHAMPTON RC, G3GWV. Meets at the British Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller G0GBZ. Tel: (01327) 349188.

NORTHAMPTON SCOUT ARG, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rvett G8WPU.

PARALLEL LINES CG, G4LIP. Details from Mr P.S. Lidsay G4CLA.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3EKN. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

DUKERIES ARS, G4XTL. Meets at Ambleside Community Centre, Ambleside, New Ollerton, Notts. Details from Colin Foster G7DX.

HUCKNALL ROLLS ROYCE ARC, G5RR. Meets at the Hucknall Rolls Royce Sports & Social Club, Watnail Road, Hucknall, Nottingham. Details from Mr P. Hart G4JSM.

MANSFIELD ARS, G3GQC. Meets at the Debatable Park Sports & Recreation Club, Debatable Lane, Mansfield Woodhouse, Notts. Details from David Peat G0RDP. Tel: (01623) 631931.

NORTH NOTTS DATA GROUP, G0WVN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8IQC. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chrs Archer G4VFK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0QAU. Meets at the Fairham Community College, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WUG. 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

OSWESTRY & DARC, G4GT, G1ORA. Meets at the Sweeney Hall Hotel, Sweeney, Oswestry. Details from Ant Astley GWOAJA. Tel: (01691) 860545.

SALOP ARS, G3SRT, M1AW. Meets at the Telepost Club, Railway Lane, Abbey Forge, Shrewsbury. Details from John Burnford G0GIN. Tel: (01743) 249943. E-mail: john.burnford@virgin.net

Telford & OARS, G3ZME. Meets at the Oawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UUV. 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 G8BFL. Tel: (01543) 268569.

LICHFIELD ARS, G3WAS. Meets at the Queens Head, Sandfield Street, Lichfield. Details from Roger Smathers G3NLY. Tel: (01543) 672762.

MOORLANDS & DARS, G4NHT, G1MAD. Meets at the Creta Works, Blythe Bridge, Stoke-on-Trent. Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKG. Tel: (01782) 395793.

NEWCASTLE-U-LYME SCOUT AR COM GR, G7UQG

STOKE-ON-TRENT ARS, G3GBU. Meets at the '45' Club, 92 Lancaster Road, Newcastle-under-Lyme, Staffs. Details from Albert Allen G4HDH. Tel: (01782) 638901.

SUTTON COLDFIELD RS, G3RSC. Meets at the Rugby Club, Walmley 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 G0WVJ. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St. John Ambulance HQ, 61 Enscote Road, Warwick. Details from Bernard Pittaway. Tel: (01926) 420913.

RUGBY ATS, G4APD. Details from Tony Humphries G0OLS. Tel: (01455) 552683.

STRATFORD-UPON-AVON & DRS, G0SOA. Meets at the Home Guard Club, Tiddingham, Stratford-upon-Avon, Warks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, GONEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mir C.J. Baker G0NOL. Tel: (01922) 636162.

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Brinklow Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 673999.

DUDLEY ARC, G4OAR. Meets at the Community Centre, Sedgley, 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.

KYNOCCH R & TYS, G3PPP. Meets at the Club Workshop, IMI Ltd, Sportsfield, Perry Bar, Birmingham. Details from Mr G. Nichols. 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, Warley, West Midlands B68 9DP. Details from Stuart Colins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARG, G0OBS. Details from Warwck M. Hall G4WMMH.

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 SBRS Secretary.

STOURBRIDGE & DRS, G6OI, G6SPS. 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 G0PNI. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, G0COP, G1WMP. Details from Steven Jones G6URL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, 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.

WOUNDSLEY RC, G4WRA. Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PKZ.

LONDON & CENTRAL

BERKSHIRE

ARBORFIELD ARC, G3IHH. Details from Mrs E.W. Harding Z1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Elerton G3NVC.

BURNHAM BEECHES RC, G3WR. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G6EIL. Tel: (01628) 625720.

MAIDENHEAD & DARC, G3WXC. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

NEWBURY & DARS, G5KV. Meets at the Rugby Club, Newbury Lane, Newbury. Details from Mark Slade M0CUK. Tel: (01488) 638995.

READING ARC, G3ULT. Meets at the Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. Details from Mammoth Standen G0JMS. Tel: 0118-972 3504.

BUCKINGHAMSHIRE

AYLESBURY VALE RS, G4VRS. Meets at the Harwick Village Hall, Aylesbury, Bucks. Details from Mr L.I. Croyley G0DFC.

CHESHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr J.J. Thurlwell G0VFW. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4YAN. Tel: (01494) 534216.

MILTON KEYNES ARS, G3HIU. Meets at Bletchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Bletchley, Milton Keynes. Details from Mrs J. Bettensby M1EPL (Secretary) on (01908) 565636 or Frank Collins M0RPM (Chairman) on (01234) 713148.

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quaries, M.K. Scout Campsite, Cosgrove. Details from Mr P.A. Orchard G0RYZ. Tel: (01908) 648186.

GREATER LONDON

ADDISCOMBE ARC, G4ALE. Meets at the Lion Inn, Pawns Road, Croydon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 6948.

BARKING R & ES, G3XBF. Meets at the Parkside Community Centre. Details from Bill Chewter G0IJK. Tel: (01708) 474443.

BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLK.

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Veaney G7BNH.

CRYSTAL PALACE & DRC, G3VCP. Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G30OU. Tel: (01737) 552170.

DARENTH VALLEY RADIO, G0KDV. Meets at the Crockenhill Village Hall, Swanley, Kent. Details from Mr K.W. Halls G8VJG. Tel: (01322) 663022.

ECHELFORD ARS, G3UES. Meets at The Community Centre, St. Marun'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, G3EFP. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Fnel G4AUF. Tel: (01895) 621310.

SILVERTHORNE RC, G3SRA, G2HR, G8CSA. Meets at the Chingford Adult Education and Community Centre, Friday Hill House, Simmonds Lane, Chingford, London E4 6JH. Details from Dave Christy G0KHC. Tel: 0208-504 2831.

MITCHAM & DISTRICT ARS. Meets at the ATC Hut, Commonside 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. Bery G4DFB.

ST. DUNSTONS COLLEGE ARS, G4SCD. Details from Sam Kennard G4OHX. Tel: 0181-690 1274.

SURREY RADIO CONTACT CLUB, G3SRC. Meets at the T.S. Terra Nova, 34 The Waldrons, Croydon, Surrey. Details from Maurice Fagg G4DDY. Tel: 0208-669 1480.

WEST LONDON ARS, RS9599. Details from Robin Clay G0VJI.

WHITTON ARG, G0MIN. Meets at the Whitton Community Centre, Peroy Road, Whitton. Details from Ian Clabon G00FN. Tel: 0208-894 9131.

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5ZG. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PQF. Tel: (01279) 506933.

DAORUM ARTS, G7RHH, 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, Hoddesdon, Herts. Details from Don Platt G3JNJ. Tel: 0208-292 3678.

MIMRAM CONTEST GP, M0ABC. Details from Alan Holdsworth G800. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G82RST. Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Livens G2CRG. Tel: (01992) 556493.

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Peter Bell Z1CRK. Tel: (01462) 674505.

VERULAM ARC, G3VER, G3VER. Meets at the RAF Association HQ, Greenlands Road, Purley, Surrey. Details from Walter Crane G3PMF. Tel: (01923) 262180.

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.

CATHERAM RG, G0SCR. Details from Mr P.N. Lewis G4APL.

COULSDON AMATEUR TRANS. SOC., G4FUR. Meets at St. Swithuns Church Hall, Greenlands Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & ORS, G4FRS. Meets at The Community Centre, Meadon Avenue, Farnborough, Hants. Details from Mr M. Hearsay G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G6GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitnour G0SWE.

KINGSTON & DARS, G3KIN. Details from Mrs Mary Ashdown G0BQV.

REIGATE ATS, G5LK, G7RAT. Details from Mr A.C. Embling G1LNT. 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 ARTS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Gigg Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBLEDON & DARS, G3WM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Mr Reg Blackwell M1EEK. Tel: 0208-696 9857.

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON & DRS, G4GOR. Meets at the Roast Beef Bar, Brighton Racecourse, Elm Grove, Brighton. Details from Mr P.J. Fellingham.

CROWBOROUGH DARS, G0CRW. Meets at the Plough & Horse, Walsley Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VX. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

SOUTHDOWN ARS, G3WQK. Details from Jim Hams G4DRV. Tel: (01323) 728479.

THE QRZ ARG OF SUSSEX, G83VX. Meets at the Coach Station, Wardling Road, Details from Stuart Constable M0CHW. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER RAC, G0AHC. Meets at the Village Hall, Withern, Andover, Hants. Details from Mr R.S. Coleman G0WVD.

BASINGSTOKE ARC, G3TOR, G8UYN. Meets at the GEMS Social 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: (01734) 225019.

HORNDEN & DARC, G4FBS. Meets at Lovedean Village Hall, Lovedean Lane, Lissington, Hants. Details from Stuart Swan G0FYX. Tel: (01705) 472846.

ITCHEM VALLEY ARC, G0VNR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

SONY BROADCAST ARS, G4SZC. Accredited C&G RAE Centre. Meets at Sony Sports Club, Priestley Road, Basingstoke. Details from Stephen Harding G4JGS.

Tel: (01256) 55011.

SOUTH HAMPSHIRE INT. TELE SOC., G3DIT. Meets at G3JZV's QTH, space is limited. Details from Rev. T.R. Mortimer G3JZV. 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 COUNTIES ARC, G4WWR. Meets at the Bramshott Parish Inst. St. Cuth, Headley Road, Uphook, Hants. Details from Darnan Kemm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LKG. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields Horse Country Centre, Newham Road, Binstead, Isle of Wight. Details from Mr Pebody.

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whiteciff Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZFQ. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, G0BBA. Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1YSY. Tel/Fax: (01295) 253509.

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5L0. Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALE OF WHITE HORSE ARS, G5RQ, G4WVH, G6WVH. Meets at The Fox, Stevenage, Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NMI. 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 Mr J.S. Spence G0PFI.

HORSHAM ARC, G4HRS. Meets at the Guide Hall, Danne Road, Horsham, West Sussex. Details from Alister Watt G3ZBU. Tel: (01403) 253432.

MID SUSSEX ARS, G3ZMS. Meets at Marle Place, Leylands Road, Burgess Hill, West Sussex. Details from Mr C. Chids Z1DCP. Tel: (01444) 244689.

T.S. VINDICATRIX ASN, G0WBW. Details from Don Still G0OOC.

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 Ange G4GLZ. Tel: (01249) 462610.

SWINDON & DARC, G3FEC. Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Den Forest M0ACM.

TROWBRIDGE & OARC, G2BOY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wilts. Details from Ian Carter G0GRI. Tel: (01225) 864696.

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTOL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Bendrey G7B7N.

GORDANO ARC, G6GGR. 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 G0GHH. Tel: (01275) 790448.

SEVERN-SIDE TV GROUP, G83ZZ. Meets at NBARC, Fitton, Bristol. Details from Paul Stevenson G8YMM. 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 6253.

(01297) 33756.

DARTMOOR RADIO CLUB, G1RCD, G0DRK. Meets at the Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Details from Ron Middleton G7LLG. Tel: (01822) 852586.

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter. Details from Ray Donno G3YBK.

EXMOUTH ARC, G0XRC. Meets at The Scout Hut, Marpool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARC, G0AXC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Hamson G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterleaf Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

SOUTH DEVON ARC, G4SSD. Meets at the Hillhead, Kingswear, Devon. Details from John May G0CDB. Tel: (01803) 522995.

TORBAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Olway G3RMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UOP. Details from Alan Santillo G0XAW.

DORSET

BLACHMORE VALE ARS, G4RBV. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 8PF. Details from Mr A. Mamot G0GFL. Tel: (01258) 860741.

BOURNMOUTH RS, G2BRS. Meets at the Kinson Community Centre, Kinson, Bournemouth, Dorset. Details from Chris R. Ellis M5AGS, Broken Ridge, Fir Tree Close, St. Leonards, Ringwood, Hants BH24 2QW. Tel: (01202) 893126.

CHRISTCHURCH ARS, G0MUD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerford, Christchurch, Dorset. Details from Mr K.P. Hams G7WSN. Tel: (01202) 484892.

FLIGHT REFUELLING ARS, G4RFR. Meets at the Flight Refuelling Social Club, Merley, Wimborne, Dorset. Details from Martin Axon 2E1DFZ. Tel: (01202) 693334.

POOLE RS, G4PRS. Meets at the Bournemouth & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0XKL. Tel: (01202) 700903.

PORTLAND ARC, G0V0P/G7V0P. Meets at Clifton Hotel, Grove Road, Portland. Details from Keny Morris G1WVK. Tel: (01305) 788591.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickerei, Weymouth, Dorset. Details from John Rose M0BQJ. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLJ. Meets at Kings Arms, Langton Matravers, Dorset. Details from Peter Wakefield M1WCH/M3WCH. Tel: (01929) 424413.

WESSEX AMATEUR WIRELESS CLUB, G1LAW. Details from Ken Powell G1NGC. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G3J3VC. Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade, Details from Mrs Anne Mourant MJOBU. Tel: (01534) 734948.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HJD. Tel: (01935) 71131.

TAUNTON & DARS, G3XZW. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewam M0CFF.

WEST SOMERSET ARC, G00WX. Meets at the West Somerset Community College, Minehead, Somerset. Details from Alan Elliott G7RSU. Tel: (01643) 707207.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506.

YEOVIL & DARC, G3CWH, G8YEO. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3ICO. Tel: (01935) 425669.

ESSEX

BRAINTREE & DISTRICT AMATEUR RADIO SOCIETY, G3XG. Meets at the Baintree Hockey Club, Church Street, Bocking, Baintree. Details from John M5AUB. Tel: (01787) 463947.

CHELMSFORD ARS, G0MWT. Meets at the Marconi Social Club, Beehive Lane, Chelmsford, Essex. Details from David Bradley M0BQC. Tel: (01245) 602838. E-mail: cars@gmwt.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCO. Meets at the Colchester Institute, Sheepen Road, Colchester. Details from Frank R. Howe G3FJL. Tel: (01206) 851189.

DENIE HUNDRED ARS, G0UIT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G6UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Brackstone G7UFF. Tel: (01279) 832700. FAX: (01279) 864973.

HARWICH ARS, G0GRH. Meets at the Park Pavilion, Barrack Lane, Harwich. Details from Eugene Kraft G4FTP.

LOUGHTON & EPPING FOREST ARS, G4ONP. Details from Marc Litchman G0TCC. Tel: 0208-502 1645/(07803) 023501.

SOUTH ESSEX ARS, G4RSE. Meets at the Paddocks, Long Road, Canvey Island, Essex. Details from Mrs Betty Maynard G6LUO. Tel: (01268) 695474.

SOUTHEND & DRC, G5QK. Meets at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TTM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Parish Rooms, Scratton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 671238.

VANGE ARS, G3YCW. Meets at the Barnstable Community

Centre, Basildon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606.

KENT

BREDHURST RX & TX SOC., G0BRC. Meets at Rock Avenue Working Mens Club, Rock Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7MIM.

CRAY VALLEY RS, G3RCV, G1RCV. Meets at the Progress Hall, Admiral Seymour Road, Eatham, London SE9. Details from Richard Perzyna G8ITB. Tel: (01689) 602948.

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Jim Cairns M1BKJ. Tel: (01304) 852773.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Herne Bay. Details from Paul Nicholson G3VJF. Tel: (01227) 743070, FAX: (01227) 742288.

HASTINGS ELEC. & RC, G6HH, G1HHH, G6LL. Meets at West Hill Community Centre, Croft Road, Hastings, East Sussex. Details from Mr J. Boothroyd G0MTJ. Tel: (01233) 732656.

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 G4WZ.

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Melrose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

MEDWAY ARTS, G5MM, G8MWA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham. Details from Mr J. Hale G3FTH.

NORTH KENT RS, G4CW. Meets at The Pop-in-Parlour, Graham Road, Bexleyheath, Kent. Details from Mr A.V. Fribens 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) 665559.

THE MORSE CLUB, G000X. Meets at The Five Wents Memorial Hall, Swanley/Hextable 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, G0TVX. 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. Bedford G3NHU.

GRESHAM'S SCHOOL ARC, G3XPXO. Details from Rev. R.N. Myerscough G3PKO.

KINGS LYNN ARC, G3XYZ. Details from Derek Franklin G0MQL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0VZD. Tel: (01953) 604769.

NORTH NORFOLK ARG, G82MC. Details from Tony Smith G4FAL. E-mail g4ai@connectfree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TO. Details from the Clifford School Clifford, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT.

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) 727232.

IPSWICH RADIO CLUB, G4IRC. Meets at the Golden Hind, Nacton Road (3rd Wednesday) at The Hollies, Bucklesham Straight Road, Ipswich. Details from Keith Gaunt G7CJY. Tel: (01394) 420226.

LEISTON ARC, G0TUQ. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattermole M3MVG. Tel: (01728) 746044.

LOWESTOFT DRS, 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 Darren Harter. Tel: (01473) 644475.

SUDBURY & DRA, G0SWI, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Sudbury, Suffolk. Details from Bryan Fenton G1TWW.

SUFFOLK DATA GROUP, G87MDM. Details from Peter Pryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYO

CONWAY VALLEY ARC, G6WTM. Meets at the Studio, Penrhos Road, Colwyn Bay, Cwyd. Details from Mr R.W. Evans G6PMC. Tel: (01745) 855068.

HALKYN & DARS, G63HRG. Details from Mr D. Austin G6LXH.

NORTH WALES RS, G6WNWR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Cwyd. Details from Ted Shpton G6WDSJ. Tel: (01745) 336939.

WREXHAM ARS, G6W4XW. Meets at the Community Centre, Maesgwyn Road, Wrexham. Details from Mr P. Moran G6W0ER.

GWYNEDD

MERION ARS, G6W4ZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gervase Chavasse G6W4URI. Tel: (01341) 421028.

PORTHMADOG & DARS, G6W0VI. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M61DFN.

THE DRAGON ARC, G6W4TTA. Meets at the Ebenezer Church Hall, Lon Foel Graig, Llanfawr, Isle of Anglesey. Details from Stewart Rolfe G6W0EY. Tel: (01248) 362229.

POWYS

POWYS ARC, G6W4HV. Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown 2W1CEZ. Tel: (01686) 640814.

SOUTH WALES

GYFOD

ABERPORTH YMCA, G6W4SZ. Meets at the Hut B17, The Airfield, Aberporth. Details from Mr G. Carruther G6W4HGJ. Tel: (01239) 811205.

ABERYSTWYTH & DARS, G6W0AR. Meets at the Scout Hut, Plasrugg Avenue, Aberystwyth. Details from John Woodward G6W6DK. Tel: (01970) 890657.

CARMARTHEN ARS, G6W4YT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynon Road, Llangunor, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G6W4ZL. Tel: (01267) 231359.

CLEDDAU ARS, G6W0YG. Details from Trevor Perry G6W4XQK. Tel: (01646) 600725.

LLANELLI ARS, G6W0EZ. Meets in the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones G6W0KZK. 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, G6W4GL. 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 G6WBIT. Tel: (01495) 225178.

EBBW VALE COLLEGE RS, G6W0IW. 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 Brynigas Community Centre, Brynigas Road, Newport, Gwent. Details from Paul Nicholls.

PONTYPOOL ARS, G6W3RNH. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G6W0OZL.

MID-GLAMORGAN

BRIDGEND & DARC, G6W4LN. Meets at the Club Brynmenyn, Brynmenyn, Bridgend. Details from Alan Hulmes. Tel: (01656) 721574.

HOOVER (MERTHYR) ARC, G6W3RDB. Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Mertyr Ydyfil, Mid Glamorgan. Details Robert Cummings G6W0RVG.

MID GLAMORGAN ARG, M6W0CNA. Meets at Aberkenfig Sports & Social Club. Details from Mervyn Carey G6W4VSE. Tel: (01956) 734668.

SOUTH GLAMORGAN

BARRY ARS, G6W3VKL. 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

PORTR TALBOT (BS PLC) ARS, G6W3EOP. Meets at the British Steel PLC Sports & Social Club, Margam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock M6W0AGE.

SWANSEA ARS, G6W4CC. Meets at the Applied Sciences Building, Swansea University. Details from David Williams G6W4BNJ. Tel: (01792) 519046.

SCOTLAND WEST & WESTERN ISLES

CENTRAL REGION

FALKIRK & DARS, G6M0FRC. Details from Scott Waterall G6M0KBU.

STIRLING & DARS, G6M6NX. Meets at Bandedeath Industrial Estate, Throsk, Nr. Stirling. Details from John Sherry G6M0AZC. Tel: (01324) 824709.

DUMFRIES & GALLOWAY

WIGTOWNSHIRE ARC, G6M4RIV. Meets at the Aird Unit, Stranraer Academy, Stranraer, (entrance from Cairnpot Road). Details from Neil Macdonald G6M4LQS.

STRATHCLOYDE

AYR ARC, G6M0AYR. Meets at the Ctidal Leisure Centre, Ayr. Details from Peter Sturgeon M6M0BQP.

CENTRAL SCOTLAND FM GROUP, R6S38728. Details from Thomas Stalker G6M77ZU. 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 G6M7OAF. Tel: (01436) 675922.

INVERCLYDE ARC, G6M0GNK. Meets at the Cardwell Bar, Cardwell Road, Gourcock, Strathclyde. Details from Andrew Gwens G6M3YOR. Tel: (01475) 638226.

KILMARNOCK & LOUDOUN ARC, G6M0ADX. Meets at the Hurford Community Centre, Cessnock Road, Hurford. Details from Steve Campbell G6M4OSS. Tel: (01560) 483800.

LARGS & DARS, G6M0VKG. Details from Mr J. Clough G6M0MDD. Tel: (01475) 568584.

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International Listeners' Association (RS88763)

Details from Trevor Morgan GW4OXB, 1 Jersey Street, Haford, Swansea SA1 2HF. E-mail: gw4oxb@net.nfl.com

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Information from Honorary Secretary John Raynes, G16436/G0BWG, 267 Pelham Road, Immingham, Lincs DN40 1JU. E-mail: iswl@ntlworld.com or visit www.iswl.org.uk

Military Wireless Amateur Radio Society (GOPTZ)

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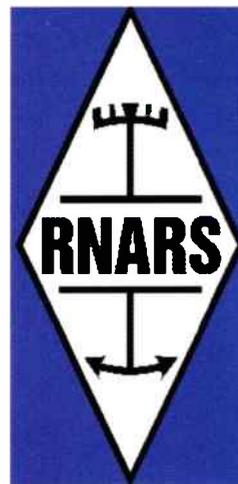
Further details from the Membership Secretary John Din, 59 Woodend Road, Coalpit Heath, Bristol BS36 2LH. FAX: (01454) 887880. E-mail: membership@rig.org.uk

Royal Air Force Amateur Radio Society (RAFARS - G8FC, G8RAF)

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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



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The Medium Wave Circle

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On Air A History of BBC Transmission

Kevin Nice has been burning the candle late into the night recently, reading this brilliant account of the behind the scenes activities that ensured the BBC programmes arrived with their eager audiences.

A fascinating account of the technical and human story of the transmission division of the BBC which delivered programmes to both listeners and viewers for 75 years up to being privatised in 1997.

On Air A History of BBC Transmission is written by Norman Shacklady and Martin Ellen who between them, have 68 years of experience working in BBC Transmission so are well qualified for the task. They have also drawn on the experiences and knowledge of 57 other contributors from the previous corporation transmission section, though this name was only used between 1987 and 1996, which employed thousands of people.

If you are even remotely interested in the development of transmission capabilities that surround us today, then this is a book

for you. There are many references made to the essential tome *BBC Engineering 1922-1972* by Edward Pawley which is sadly out-of-print. This book is both a celebration of the lifetime of achievement - including many

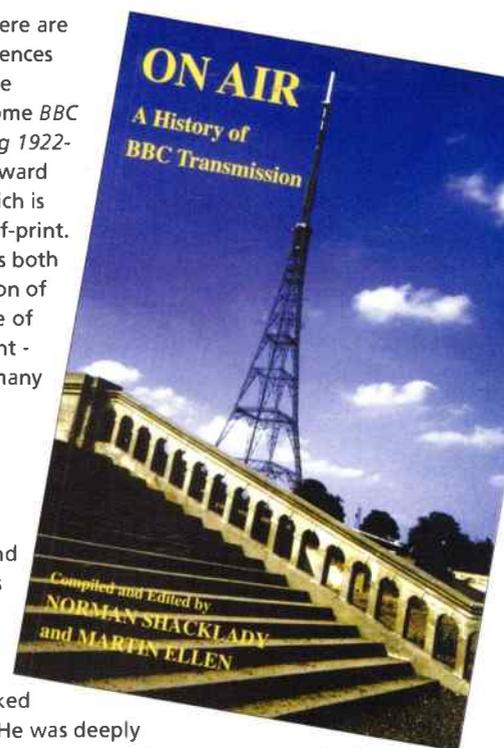
anecdotes from those involved in the complex process - and a history of BBC Transmission.

Norman Shacklady joined the BBC in 1950 and spent 38 years in all areas of Transmission Operations.

Martin Ellen joined the BBC in 1966 and worked for the BBC for 30 years. He was deeply involved in the privatisation process and move to Crown Castle becoming Director of Technical Development.

This is a book that I'm glad to have featured in my personal library as it provides a superb insight into the internal workings of BBC Transmission since 1922.

On Air A History of BBC Transmission ISBN 0 9544077 1-7 is available direct from the publishers via the website www.onairbook.co.uk or via the **SWM Book Store**. This 221 page paperback reference costs £12.50.



Scanning Scene

● **Dave Roerts** *do SWM Editorial Offices, Broadstone*
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I know, I've left it a bit late this year. Normally I bore everyone with talk of winter in the December issue but this time, well, I forgot. Here it is then, at the end of January when we may be yet to experience harsh weather, here are some frequencies and users that really should be in your machine for monitoring.

I know what you're thinking, "I live in High Wycombe. What's this got to do with me?". It has, because believe it or not almost every area of the country has some sort of volunteer rescue organisation and although they might not be called out too often to find lost souls in Hughenden Park, they are available for deployment, they do have radio kit (in the case of Bucks Search and Rescue the callsign is 'BSAR') and they are likely to be used in case of a major incident or disaster.

Even Milton Keynes have a Search and Rescue (SAR) Team (callsign Enigma – guess why?) and believe me, I nearly called them out when my mate Kev, the motor trader, and I were trying to find the Cornhill Vauxhall Garage eight weeks ago. We were lost for hours in identical housing estates.

Some police forces also have equipment to talk with groups who have h.f. radio available too. The Metropolitan Police use the call 'METPOL'. Not hard to figure out who they are then. The frequency **5.680MHz** u.s.b. is generally the primary h.f. frequency in use but there are a host of v.h.f. channels to monitor, albeit illegally. Here they are, pretty much as they appear on the official documentation.

Channel 62a **156.125** n.b.f.m. simplex is the emergency calling channel and it's mandatory and constantly monitored by all land Search and Rescue parties, mobiles, base stations and airborne units engaged on land SAR incidents.

Channel 42a **157.200** n.b.f.m. simplex air-to-ground communications. This channel will take over from Ch 73 in England and Wales once the RAF Sea King helicopters have new radios installed. No repeater sets are allowed to use this one!

Channel 63a **156.175** n.b.f.m. This and channels 64a, 24b, 62b, 63b and 64b are simplex channels allocated to land SAR units for their own communications.

Ch	MHz	Mode
64a	156.225	n.b.f.m.
24b	161.800	n.b.f.m.
62b	160.725	n.b.f.m.
63b	160.775	n.b.f.m.
64b	160.825	n.b.f.m.

Should there be a major incident then a major incident control would allocate these channels to specific users.

Channel 83a **157.175** f.m. and 83b **161.775** n.b.f.m. are to be used for infill repeater linking. May also be heard in use simplex.

Channel 53a **158.650** n.b.f.m. This is currently the primary simplex channel. Until the Sea Kings get their new radios this remains their primary air-to-ground channel. It will remain in use even after the new kit gets installed. On occasions this may be paired with Channel 93 with 53a being the mobile transmit channel and 93 being base transmit.

Channel 91 **155.350** n.b.f.m. is another simplex channel but will sometimes be paired with Channel 92 **147.475** n.b.f.m. If this occurs then they will be collectively known as Channel 94. Don't blame me – I didn't make this up! Both these two can be paired with other simplex channels if there is a local problem with using either frequency.

Channel 93 **152.850** n.b.f.m. Yes another simplex frequency. Channel 95 **86.3125** n.b.f.m. is a primary low band channel that may not be available for use after 2005.

Channel 96 **86.325** n.b.f.m. is a secondary low band channel. Again this one might not be available for use after 2005. Channel 0 **156.000** n.b.f.m. is allocated for coastguard and remote land SAR units. This is a widely used frequency. Channel 73 **156.675** n.b.f.m. can basically be used if other channels are busy.

Channel 99 **160.600** n.b.f.m. is for Coastguard use only it seems and Channels 24a and 83a may be used in conjunction with v.h.f. to u.h.f./mmO2 Airwave Gateways.

Many of the callsigns heard on these frequencies will enable the casual listener to work out who they are. Lochaber Mountain Rescue Team use the call NEVIS for instance while the Northern Constabulary are NORCON – you get the idea.

Some callsigns are more obscure though. The Sierra call series refer to the RAF air rescue assets, while ALPINE callsigns are the various RAF mountain rescue teams.

Full details of the callsigns and frequencies can be found on the Internet at www.sar-uk.org I found some mountain rescue Land Rovers



hanging out in Scotland two days ago and took a couple of pictures. The radios fitted in them were Icom M55 marine band sets. I attempted a photograph of these transceivers but it was difficult getting a view without reflection from the car's window and anyway a traffic warden/special constable/community patrol neighbourhood warden (or whatever they're called this week) was taking a close interest in my activities by then. So I shoved off!

TETRA Rumours

There are more rumours about the TETRA/Airwave rollout than there are about 'Posh Becks' (is that her name?). Some police areas are having difficulties with locals who are getting uppity about having an Airwave mast in their villages. Whatever the facts of the matter (and believe me I've heard all of them from every interest group) the truth is that there are significant groups of people who are seriously concerned about health risks associated with the system.

The actress Sarah Miles is very much opposed to the installation of Airwave masts near her home. This is the woman who drank her own urine, not at parties but because she thought it was good for her health. Now if she's worried

about some 'ickle' antenna, who am I to disagree!

The latest rumour is that the Home Office have decided not to allow any further auctions of any English/Welsh emergency service radio equipment that has transmission capability. The story is that the stuff should be sent to Lambeth,

London to be stored until post 2007 when TETRA/Airwave is expected to be fully operational and when the analogue systems will have been fully decommissioned. Services are, however, permitted to retain harnesses, batteries, antennas and control equipment, etc.

This all sounds a bit like the story of a strategic reserve of steam locomotives to be hauled out in case of a failure of oil supplies. Perhaps these radios are going to be kept in the same tunnel! I never knew Lambeth was so big!

Radio Jammer Bounty

Operators of black cabs in Glasgow are reported to have placed a bounty of £10000 on a radio jammer who has been blocking transmissions to their vehicles. Although the report is technically deficient, I guess that someone has been jamming the data channels that send jobs to the black taxis. This has severely 'hacked off' the drivers, who are losing a large amount of trade by not being informed of fares. Not a bunch of lads to be messed with by all accounts and the £10000 has been put up to detect the offender.

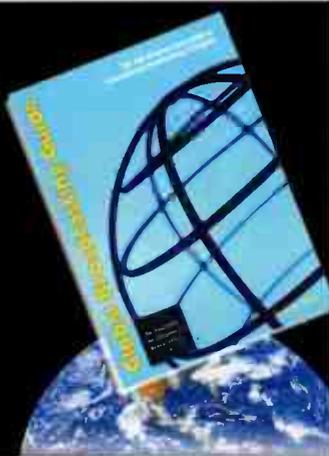
The police reckon that the jammers operations may be to the advantage of mini cab firms by having the black cab's system ineffective in order to boost their own profits and there are ugly rumours regarding the involvement of organised crime. Sounds like a job for Taggart!

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NEW SDU5600 FFT SPECTRUM DISPLAY UNIT

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Companion receiver models supported include the AR5000, AR-ONE, AR8600MK2, AR3000A (modification to radio required) and ICOM R8500 & R7100 (CT17 required for R7100).

The SDU5600 is powered from 12V DC and is supplied with a 230V AC power unit, BNC patch lead, 9-pin data connecting lead and comprehensive illustrated operating manual.

£1099.00 inc VAT



NEW ARD9800 DIGITAL VOICE OVER HF SSB!

The ARD9800 is a modem unit that connects to the microphone input of virtually any transceiver. The user simply wires a connector for his particular transceiver, connects the speaker output of his transceiver to the modem and then connects the modem to a 12V DC power source... no modification is required.

The ARD9800 provides NEAR FM QUALITY audio using SSB. Even better, the digital signals require no more bandwidth than analogue signals.

Normal analogue operation is possible (because the transceiver has not been modified). To use digital voice, simply select the DIGITAL MODE on the ARD9800, incoming signals are automatically decoded, no selection necessary. So, if an analogue signal is encountered, the transceiver operates conventionally, however if a digital signal is encountered, the ARD9800 automatically selects the digital mode so that high quality interference free audio is produced.

The ARD9800 can be used in any mode, SSB, AM and FM, however FM mobile operation could be prone to 'picket fencing' (fast flutter) which could result in the loss of data. With the **optional memory board**, images can be easily transferred, similar to SSTV. Currently SSTV images are in NTSC, a PAL version is near completion.

£499.00 inc VAT



AR200MK3 HAND PORTABLE RECEIVER

Evolution had led to the **AR200MK3** and provides excellent full coverage all mode receive including USB, LSB, AM, NFM, WFM with multiple IF bandwidths. Frequency coverage is **530kHz - 3GHz** with minimum acceptable input of 100kHz. Supplied with NiMH rechargeable batteries, charger, car lead, whip aerial, MW aerial and comprehensive illustrated operating manual.

£439.00 inc VAT

AR8600MK2 TRANSPORTABLE RECEIVER

The **AR8600MK2** is an amazingly versatile receiver which can be used mobile, base or trans-portable... powered from an external 12V d.c. power supply, 12V vehicle or from an optional internally fitted NiCad battery pack. The upper **frequency range has been extended to 3000MHz (3.0GHz)**, lower band sensitivity has been increased (now officially covering to 100kHz) with an **enhancement to short wave performance** by the addition of further bandpass filters and revision to IF filters.

£719.00 inc VAT



SLOT CARDS FOR AR200/8600

Many options are available including SLOT CARDS for CTCSS, analogue voice inverting, external memory, recording / playback, tone eliminator, computer interface lead, reaction tune lead, soft case, free PC software from the AOR web site.



AR5000A & AR5000A+3 WIDE BAND RECEIVER

AR5000A, revised version, now with frequency coverage from 10kHz to 3GHz all modes in 1Hz steps
£1799.00 inc VAT
AR5000+3, as above with synchronous AM, noise blanker and AFC
£1999.00 inc VAT



Evolution in Action

AR7030 QUALITY SHORT WAVE RECEIVER

The **AR7030 / AR7030 PLUS** is a very popular short wave all mode receiver (0 - 32MHz). Excellent strong signal handling, low noise local oscillator (producing extremely low reciprocal mixing figures) and excellent audio fidelity.

Many innovative features such as self-calibrating IF filter routine, self-tuning Synchronous AM detector, auto-attenuator and much more. Supplied with infrared remote hand control, mains power supply & comprehensive operating manual.

AR7030 £799.00

AR7030 PLUS £949.00



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- Microphone socket
- Digital timer with LCD display
- Tape counter
- Headphone socket
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