

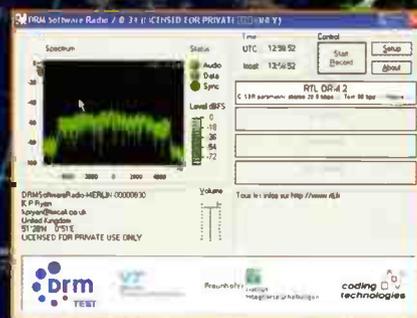
SWM

November 2004
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& Scanning Scene

Info In Orbit Special

Lawrence looks at WXSAT Software



Converting to DRM Continued

Getting Started Your Intro To Listening

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Short Wave Magazine, PW Publishing Limited, Arrowsmith Court, Station Approach, Boscawen, Dorset, BH18 8PW

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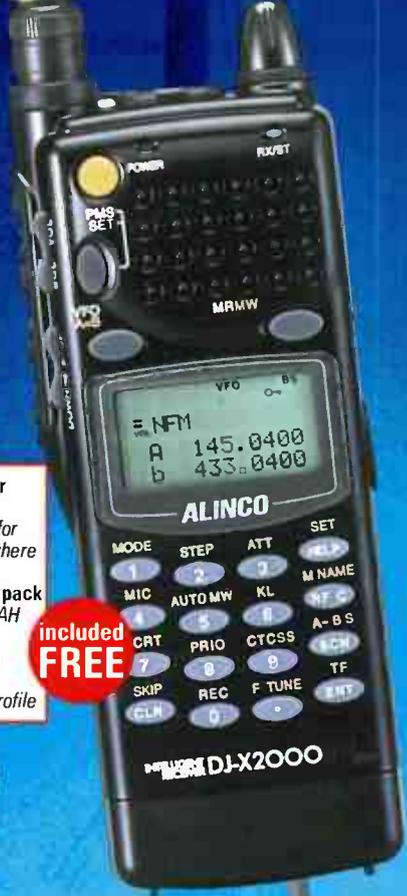
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No Hassle Radio Software. This month we are offering a time saving first from *Short Wave Magazine*. You can obtain lots of radio related software for just the cost of P&P!
- 45 **Starting Out - Part 6**
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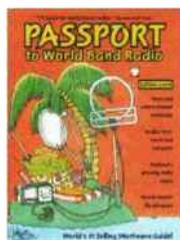
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We're taking orders for *Passport to World Band Radio 2005!*



cover subject: A fitting picture for our 'Info Special', NOAA-12 1558 on 5 August from George Newport.



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Coming Up Next Month

in December 2004 SWM

- WINRADIO G313i - Reviewed
- In The Ed's Shack - TVC101 Microwave Video RX/TX Controller - Built & Tested
- Roberts Gemini 1 DAB Radio with record - Reviewed
- Trying to find that particular article? See our 2004 Index
- Beginners Series - Getting Started continues
- Keep on top of the world of monitoring with SWM
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ED'S



comments

10 YEARS of WUN

It's hard to believe ten years have gone by since WUN was formed. Back in the 1980s and early 1990s utility station monitoring was mostly a solitary hobby. However, in the mid-1990s, several radio hobby clubs, such as the old Speedx Club, the Benelux DX-Club and others world-wide, began to have regular utility related columns.

With access to the internet growing, and the continued loss of clubs such as Speedx, the idea was hatched that a 'paperless' internet club dedicated to h.f. utility stations in all modes would promote the rapid exchange of information.

The Worldwide UTE News Club 'WUN' was born in January 1995. They produced their first newsletter in February 1995. I joined the group not long after. Originally WUN also produced a paper edition newsletter. Initially WUN had six editors; Rick 'RD' Baker who edited the 'Logs' Column; Tony Orr wrote the 'International Civil Aero' column; Jim Navary edited the Nautical News and 'QSL Report' columns; Mike Wolfson took care of 'Government & Other SSB News'; Jim Pogue was editor of the WUN 'Military Column' while Netherlander Ary Boender wrote the 'Digital Review' and 'Numbers & Oddities'. Jason Berri was and still is WUN's Webmaster while Tim Braun was responsible for the paper edition of the *WUN newsletter*. Canadian, Joel Bedard, became the first Listserv Administrator. During the past 10 years over 50 people have been active as editors or co-editors of the various columns.

WUN has achieved many world's firsts. WUN was the first 'electronic' club. It was also the first club devoted to utility monitoring. They were also the first to set up a list server where members could post logs and questions. I am proud to tell you that WUN is very much alive and kicking after 10 years. With over 1300 members in 35+ countries and well over 3000 people who are reading the newsletter each month, WUN still is the number one Utility club in the world and they intend to continue for many years to come!

Do you want to join WUN? Don't hesitate; go to the following website and fill in the form <http://mailman.qth.net/mailman/listinfo/wun> As part of the 10th anniversary celebration, WUN will be releasing its third CDROM before the end of 2004. The CD covers 10 years of utility station information from all over the world. Included are all the WUN newsletters and WUN's *Special Topics Reports*, many info files, sound samples and pictures as well as several radio related programs. Check the WUN website for the latest information www.wunclub.com

PLC Interference

Earlier this year, we featured an article that raised concerns over the use of the National Grid to distribute Internet data around the country. This activity has huge potential for severe disruption to the use of the short wave spectrum for broadcasting and other radio uses. If Power Line Communications (PLC) emissions are too high, existing analogue and digital radio broadcasts are in many cases suddenly wiped out, meaning that listeners hear either electrical interference, or nothing at all, instead of the radio programming they have tuned into.

Over the past two years SWM has given over a considerable

amount of coverage to the exploits of Digital Radio Mondiale (DRM) who's technology is looking to revolutionise the h.f. broadcasting scene. Take a look at page 37 of this issue to see the concluding part of how to simply receive the mode.

DRM is a consortium of 85 members of the global media industry, representing 27 countries in Europe, North America, Asia and beyond.

Among DRM's members are well-known commercial, public, international, national and local broadcasters. They provide indispensable news, analysis, information and entertainment to local communities and remote populations across the globe via existing short wave, medium wave and long wave radio bands. The DRM consortium also includes leading network operators, broadcast electronics manufacturers and high-tech research institutions. DRM also includes among its members international NGOs that provide essential emergency services.

DRM's members, and the listening audiences they serve, depend on the integrity and security of the world-wide radio spectrum below 30MHz - now and in the future.

With a collective wish to provide enhanced media services to future generations, DRM's members joined forces to create a new, digital radio system (also called DRM). DRM's development was supported by the European Commission, with funding provided within the Radiate, QOSAM and DIAM projects.

Digital Radio Mondiale themselves say, an electrical radiation hazard that threatens today's analogue radio services, as well as radio's bright digital future. DRM's members are deeply concerned about interference to the radio spectrum caused by harmful emissions from PLC, a controversial new method of delivering Internet service to, and distributing data services within, households using a.c. power lines. PLC emission levels are currently under consideration by governmental bodies in several countries.

Over the past two years, DRM's members have measured the effect of PLC emissions on analogue and digital broadcasts in both laboratory and field tests. The test results, which have been reported to the European Broadcasting Union (EBU), show that PLC radiation obliterates radio broadcasts.

DRM's members believe that further, independent testing of PLC emissions' effect on radio broadcasts will reveal pertinent information for manufacturers and consumers alike. DRM's members are concerned that consumers may be unaware of the hazards of PLC interference to the radio broadcasts they rely on today, as well as future broadcasts.

DRM's members strongly urge those governmental bodies that are exploring PLC implementation to safeguard the broadcasting bands from PLC emissions' interference. In order to preserve the stability of the world-wide radio spectrum now and into the future, it is vital that governmental officials and regulatory bodies take appropriate protective measures today.

Software Compilation - Vol. 1

As promised in last month's issue, we are offering a 'Free CD' crammed with software for your convenience. Please see both the Flap on the cover and page 42 for more details.

WUN 73 de Kevin

QSL

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

Dear Sir

As a subscriber to *SWM* for several years, I am expecting the arrival of my favourite magazine every month with great excitement. As a former telecom engineer, it's a real pleasure for me to read each and every single article, although I am mostly interested in satellite matters.

Living now in Spain, where I retired to, I feel a little frustrated at not being able anymore to share my feelings with other people who like me have the same interest in short wave telecommunications. I am pretty sure that among your readers other enthusiasts have the same feeling.

Thus why not use *SWM* as a share-experiences platform. I mean that readers would be invited to describe for publication their s.w. activity, their technical installation, their frustrations and their success, all kinds of information that could be shared as general interest and that could help other enthusiasts in our hobby.

Pictures of installation, block-diagrams, description of receiving antennas, all kinds of material related to this activity could improve the article. One or two pages maximum would be enough. As the point of view of the Editor, he will select every month for publishing, the article that seems to correspond the best to the expected goals.

I can see two major advantages to this proposal: first the Editor can easily get new material to publish and secondly *SWM* will be more a product of collaboration close to the readers. Thanks for the quality of the magazine, keep going on.

Jean-L. Querton
Spain

Thanks for the suggestion Jean-L. I offered this a few years ago and we have featured quite a few 'Other Man's Shack' episodes. The supply has dried up now. So, if anyone wants to contribute, I welcome all submissions. - Ed.

Dear Sir

Your 'Top QSL' in your September issue brought back some memories as I have only just got interested in Amateur Radio again. Things have changed in the last thirty years. Your magazine is very interesting, but in those days there used to be pages of second-hand radio equipment for sale.

In the 1960s I worked for Standard Telephone & Cables in New Southgate, North London as an installation and commissioning engineer, mostly on h.f. high power (100kW) transmitters, but remember visiting Portland Bill Wireless Station to modify some very old R20 long wave transmitter (100-500kHz) to frequency shift keying so I may have met Terry Chapman. In fact, I wonder if he knew my father, John Balmain Griffiths (Jack) who was Chief Railway Signal Engineer at STC until his death in 1970.

I was first licensed in the late 1950s using a home-built a.m. transmitter with a single 807 in the p.a. This was followed by my first s.s.b. transmitter, which was a KW Electronics Viceroy, all valved. I have now dug out from the loft my TS-120S h.f. transceiver and its home-built power supply, switched it on and it still works well.

I am now retired and have moved into a bungalow with a very small garden on the South Coast, so I think h.f. is probably out, unless they have recently invented small high gain h.f. antennas? But I may be able to operate on the v.h.f. bands. Sorry about the rambling on, but I guess it's old age! Good luck and continuing success to your magazine.

Terry Griffiths G3NPZ/ZB2AH
Hampshire

Terry, have you considered using a vertical antenna for h.f.? These are very space efficient. - Ed.

Dear Sir

Once again a superb issue of *SWM* (September) and also special mention of *SSE*. An absolute mine

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

In deference to my blood pressure, please do me a favour...stop wasting valuable printing space by publishing letters from the likes of B.A. Reed (July *SWM*) who seems to think that he's doing us all a favour by renewing his subscription!

I don't want to prolong this inane line of discussion, but feel that he should have read his own letter before sending it in. He states that his Grundig '800 radio with its internal antenna gave reasonable service, but admits that an external antenna would have improved his listening. If he knew this, why didn't he do just that - put up an external antenna, instead of wittering on about how much better 'net radio' is? Even if he isn't a 'radio ham', there has been more than enough advice printed about improving reception, so he really has no excuse for his radio not performing to its optimum.

Whilst acknowledging that many radio enthusiasts, myself included, use computers for logging and controlling their radio equipment, etc., the likes of *SWM* and *PW* are magazines for radio enthusiasts. If people wish to read a magazine about 'net radio', then they should buy one of the proliferations of computer magazines, instead of wasting everyone's time by writing 'threatening letters' to a radio enthusiast's magazine.

For the record, I am not an 'oldie' reminiscing about cat's whiskers or valves (very fascinating subjects in their own right), but a relative youngster licensed in 1986, who happens to believe that radio communications means just that - communication by radio, not by wire. Mr Grainger's letter (Top QSL, *SWM* July '04) puts this subject into perspective very neatly.

So...(taking up threatening posture, with tongue firmly in cheek), if you don't stop wasting space by publishing stupid letters (some may say like this one), I will be forced to stop reading your excellent magazines! Yeah, right!

Vy 73 de J. Grundy G7ESM
Wirral

of information as usual, but I must make special mention of the *SSE* website guide - amazing - so much free/useful/interesting information. I am still typing in web addresses after a week!

Thanks to all at *PW* Publishing Ltd. and I must also thank publicly all the people who put the websites together...immense gratitude from all who read *SWM*. Grateful thanks to all for a superb magazine.

Barrie G4YJS
Widnes

Thanks for the feedback Barrie, I'm glad you enjoyed the guide. - Ed.

Dear Sir

I read Ronald Evans' letter in the Feb '04 *SWM* and as a novice s.w.l. I hope I'm not missing the point of this fascinating and rewarding hobby. I've been buying *SWM* for nearly a year now and have always found plenty to interest me in every issue and I

intend to continue doing so.

Whilst I must defend Mr. Evans' right to voice his opinion I feel that the diversity of your articles is what keeps people interested, variety being the spice of life and all that.

Personally, I would not be turned on by reading about Internet radio anymore than I would by reading about watching the television. I don't own any elaborate kit, but I get great satisfaction from pitting my second-hand DX-394 and AN1 antenna, plus my limited skills against all the interference, noise and atmospheric conditions to bring an audible signal through. I get much more pleasure from a hard won, albeit appalling, reception from some far-flung corner of the world than perfect stereo sound at the touch of a button, but then each to his own.

Wouldn't it be boring if we were all the same? Keep up the good work.

Pete Hodgkinson
Eastbourne

Busy Year for GEO

It is almost a year ago that GEO was formed. GEO say that the rationale for the group was the advent of the new generation of weather satellites in orbit; with other second generation satellites almost ready to launch, others being planned. They wished to share their experiences and skills at receiving live signals from these new satellites together with the continued direct reception of the existing weather satellites.

Professional advice indicated the best structure for the group was to form a company limited by guarantee but having no shares. This is the same structure utilised by the RSGB and the NSC. This does impose a business-like structure but allows the membership to determine its day-to-day rules and offers a legal protection to the members and management alike. The initial management team all have experience in amateur radio and weather satellite reception.

As a group, GEO does have a formal mission statement, but this can be summarised by saying the group promote the live reception of weather satellites for amateur and educational users and represents these interests to national and international agencies who control policy and operate weather satellites. GEO have already produced three stunning A4 coloured publications full of information about hardware, software and examples of members' images and experiences. The group run a website and this can be found at geo-web.org.uk

Observation satellite monitoring is a fast moving hobby and it is important to keep in touch with fellow enthusiasts and agencies for the latest information. With this in mind, GEO had a one day symposium in Leicester last May and plan another for 30 April 2005 (a date for your diary!).

Some of the GEO members attended EUMETSAT's conference in Prague this year. GEO had a display area and gave two presentations at AMSAT's colloquium in Guildford. GEO have been invited by the Dutch group to attend their conference in Utrecht September 2004. They have also recently been invited to provide a display of their activities and make a presentation at NOAA *Direct Readout* conference in Miami in December 2004.

GEO say that it is imperative they attend these events both to gather the latest weather satellite news and to let these agencies know of the international interests they represent. Indeed they are an international group, but also a group of friends willing to exchange E-mails, talk on the telephone, help each other and share experiences.

GEO is a vibrant new group only established to support, listen to and respond to the interests of their membership. To join GEO - £12 UK during 2004 - visit their website at geo-web.org.uk or by post to **GEO Coturnix House, Rake Lane, Milford, Godalming, Surrey GU8 5AB.**

It's A Wind-up!

As an all-in-one true portable unit that can operate without batteries, the FR200 radio from Nevada has functionality and versatility and is ideal for fun, travel and emergency applications. From its heavy-duty, splash-proof case to its long-lasting rechargeable battery pack, this radio is designed to withstand and operate in emergency conditions.

With access to a.m., f.m. and 11 short wave bands, the radio receives hundreds of channels world-wide. By having access to local and international news directly, the FR200 portable radio helps people stay informed at all times, under all conditions. This tough looking little radio is so versatile it is a number one seller in America. The battery free option means if you crank-up the radio for one minute, you'll be able to listen for up to an hour!

The FR200 can be used as a bedside radio with light for the younger members of the house and it will switch off automatically as it winds down. Its compact size means whether you're out fishing, in the shed, the caravan or abroad it's not going to take up much room.

The Eton FR200 comes in Blue, Pearl, Bronze, Yellow & Red and costs £24.95. Visit www.nevada-radios.co.uk or telephone: **02392 313090** for more information.



AOR Relocate

After nine years at Belper, overlooking the River Derwent, AOR have moved business location to Matlock, in the picturesque Derbyshire Dales. The new location will provide secure ground floor access with external antenna provision for improved reception and display facilities. The address, 'phone and FAX numbers have changed, but the Internet address remains the same. The new details are: **AOR UK Ltd./TenTec Direct UK, Unit 9, Dimple Road Business Centre, Dimple Road, Matlock, Derbyshire DE4 3JX, Tel: (01629) 581222, FAX: (01629) 580070, E-mail: info@aoruk.com or visit www.aoruk.com**



...America's Best!



SWR To Halt SW Broadcasts

German public broadcaster SWR has announced that it will terminate short wave relays of its programmes as from 19 October 2004. SWR 3 and SWR Cont.Ra are broadcast on 6.030 and 7.265MHz. The decision to stop short wave distribution is for cost reasons, and also because SWR has introduced satellite and Internet distribution of its programmes.

With the closure of these services, more than 50 years of short wave transmissions from south west Germany come to an end.

In September 1947 an 800W short wave transmitter was taken into service in Muehlacker. On 6.030MHz, that's still used today, Radio Stuttgart could be received starting in 1949 for 10 hours a day. From 1951 this was increased to a full-time relay. Over the years the transmitter technology and the antenna were constantly improved and optimised. Currently the station uses a horizontal dipole antenna, directional north and south, with a 20kW transmitter.

From 1945 to 1964 both the frequency and the location of the transmitter now on 7.265MHz were changed several times. Since 1964 the transmitter has been located at Rohrdorf (Bodenseesender). The power of the transmitter has increased from 1.5kW at the beginning to the current 20kW. Various changes in the antenna also took place over the years, as did the programme carried. At the beginning a programme of the French military government was radiated, later SWF 1, SWF 3 and most recently SWR Cont.Ra.

55% Of UK Households Receive Digital TV

Ofcom chose 17 September 2004 to publish its *Digital Television Update* for the second quarter of 2004. The report examines the latest subscriber figures provided by the main platform operators.

The update shows that by 30 June 2004, digital television penetration had increased to 55% of UK households, up from 53% from the previous quarter. A further 4% of households subscribed to analogue cable during the quarter, bringing the total number of households receiving some form of multi-channel television to over 59%.

The full Ofcom Digital Television Update - 2004 - Q2 is available at:

www.ofcom.org.uk/research/industry_market_research/m_i_index/dtvu/dtu_2004_q2/

Key Trends Include:

- * By 30 June 2004, digital television penetration increased to 13 704 459. This represents an increase in overall penetration of 2.4%, with an additional 630 000 households adopting digital television during the quarter.
- * Freeview (Digital Terrestrial Television) uptake increased by 12.1%, with the total number of households receiving Freeview at the end of June estimated to be nearly four million (3 889 000) households. Source: Freeview Q2 sales figures.
- * Sky's UK subscriber base continued to grow, adding 76 000 subscribers during the quarter, bringing its total number of subscribers to over seven million (7 032 000). Source: Sky results, Q2 2004.
- * The total number of subscribers to cable television (both digital and analogue) has increased by 24 000 and is now around 3.36 million, of which digital cable accounts for almost 2.47 million. Source: NTL and Telewest Broadband Q2 results.
- * The total number of free-to-view digital homes is now almost 4.2 million, an increase of 13.4% from the previous quarter. This figure comprises the number of viewers using Freeview, those using satellite 'Solus' cards and ex-Sky subscribers, who continue to use their satellite box for viewing free-to-view channels. Source: Freeview Q2 sales figures, Sky Q2 results, Channel 4 data, and Ofcom market estimates.

rallies

November 6/7: The 18th North Wales Radio, Electronics & Computer Show will be held at the North Wales Conference Centre in Llandudno. Doors open at 1000 on both days. More information at www.nwrrcw.org.uk

November 14: The South Yorkshire Repeater Group will be holding the Great Northern Hamfest at the Metrodome Leisure Centre, Queens Road, Barnsley, South Yorkshire. Doors open at 1000. The leisure complex is in the town centre and is less than 3km from J37 on the M1 motorway, just five minutes walk from the train and bus station (follow the brown Metrodome signs from all directions). The venue is all on one level with excellent disabled facilities. Featured will be all the usual trade stands, component and specialist interest groups, along with a large Bring & Buy. Admission is £2.50. More information from **Ernie Bailey G4LUE, 8 Hilld Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN**

on (01226) 716339/(07984) 191873 between 1800 and 2000.

November 21: The third Mayo Rally will take place at the usual venue - the Belmont Hotel, Knock. Already the rally has attracted much attention from traders, with a number of bookings from UK based firms joining the large number of exhibitors from Ireland. The rally will follow the proven successful format of previous Mayo shows, with a large Bring & Buy section, a number of demonstrations and presentations as well as the large number of traders, making the Rally one of the best in Ireland - doors open at 1130. The club will host a dinner on the night before the rally, and a prominent guest speaker has been lined up by the Mayo REN for the occasion. All bookings enquiries to Rally Director **Padraic Baynes EI9JA on 087 695 7154**.

December 5: The Bishop Auckland Radio Amateurs Club (BARAC) will take place at Spennymore Leisure

Centre. Please note that this venue is ideally suited for both trader and disabled visitors as it boasts good parking and access to a large ground floor hall. There will be the usual radio, computer and electronics, plus a Bring & Buy stall as well as catering and car facilities. More tests are available on demand. As you can imagine, there is a lot to do for all the family within the confines of the Leisure Centre for those of the family not interested in radio. Doors open 1100 (1030 for disabled visitors) and admission is just £1 (under 14 free of charge with adult). Talk-in on S22. More details from Rally Organiser **Mark G0GFG on (01388) 745353** or Deputy Rally Organiser **Brian G7OCK on (01388) 762678**.

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

Mayo Rally

The third Mayo Rally will take place on **Sunday 21 November** in the usual venue - The Belmont Hotel, Knock. The rally has already attracted much attention from traders, with a number of bookings from UK based firms joining the large number of exhibitors from Ireland. The rally will follow the proven successful format of previous Mayo shows, with a large Bring & Buy section, a number of demonstrations and presentations, as well as the large number of traders, making the Rally one of the best in Ireland. Doors open at 1130.

The club will host a dinner on the night before the rally and a prominent guest speaker has been lined up by the Mayo REN for the occasion. A special rate for accommodation has been negotiated with the Hotel for the Saturday night. All booking enquiries should be made with the Rally Director, **Padraic Baynes EI9JA on 087 6957154**.

Havering & DRC

Here at *SWM* we have recently heard from newly appointed Public Relations Officer **Martin G3VOF/W0DOC** of the **Havering & District Radio Club**. Martin would like to express that the club is still very active and meets once a week on Wednesdays at 2000 at Fairkytes Centre, Billet Lane, Hornchurch (opposite the Queens Theatre). Anybody wishing to become a new member should contact the Hon. Sec. **Oliver Tillet G3TPJ** on (01708) 746677.

Back on the August Bank Holiday weekend, the Club attended the Havering Town Show, with the aim of displaying amateur radio to the public and to hopefully generate some interest towards the club. The club were allocated a 6m by 6m marquee, which although smaller than previous years, was ideal for their needs.

Two operational stations were set-up, one for 80-10m (s.s.b. 'phone) and the other a QRP PSK31 station on 20m. The club rig, an FT-990,

was used for 'phone, running 100W into a 9m vertical. The p.s.k. station (MOJKA home-brew) was running a max of 4W into a pro-am mobile whip on the roof of one of the cars.

John G0PIA put on a display of amateur television, showing various pieces of equipment and demonstrating amateurs operating on the TV sets. A grand selection of equipment was brought along by **Oliver G3TPJ** giving a good visual show. He also provided a selection of Morse keys with a buzzer and electronic reader for the public to have a go at sending their names. This seemed to attract a lot of interest.

The item of most interest was the Van der Graaf generator, brought along by **Neil 2E0NEV**. This was very kindly loaned to the club by the school where Neil teaches. Everyone had a lot of enjoyment making sparks leap from the charged dome!

The weather over the two days was generally ok, but there were the odd rain showers. There seemed to be a good attendance from the public, which was good for all concerned. A parachute drop was

cancelled, due to high winds, but this had little effect on what can only be described as a good weekend's entertainment.

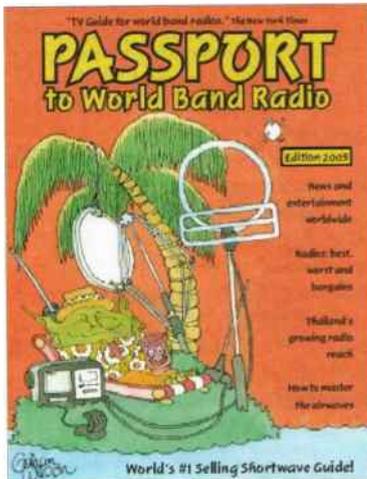
Young member Michael M3DOV operating at the Havering Town Show with father Mick



M3DOQ looking on.
Photo by 2E0EBV.

Hon. Sec. Oliver G3TPJ behind the table at the Havering Town Show, with Sec. Chris M0JKV and Chairman Jim M0MAC in the background.





2005 *Passport to World-Band Radio*

pre-order
your copy
today!

The latest issue of 'Passport' is due in stock at the SWM Book Store at the end of November. This broadcast listener's 'bible' provides essential schedule programme and frequency information in the friendly and easy-to-read style synonymous with the tome.

With almost 600 pages *Passport to World Band Radio* provides coverage from 2 to 26MHz and a wealth of equipment guides and reviews. Order yours now and beat the rush. *Passport to World Band Radio* is still priced at £17.50 and will be available soon. Call Clive on 0870 224 7830.

Winter Schedules

International short wave broadcasters start their winter frequency schedules on October 31. The **World DX Club** publishes a 12 page pamphlet listing the times and frequencies of English broadcasts in country order. Over 100 broadcasters are listed and the pamphlet is constantly updated so that the information is as up-to-date as possible when you order. A revised edition covering the new schedules will be issued in mid-November. Copies are available for 50p or two IRC's from: **Arthur Ward, 17 Mootspur Drive, Northampton NN2 6LY.**

More From The 'Less Noise Co.'

SP specialists **bhi**, are pleased to announce the launch of their new improved NES10-2 MkII noise eliminating speaker. Due to customers' enthusiastic feedback, the noise reducing loudspeaker now incorporates the additional feature of an 'on/off/by-pass' switch.

In spite of this improvement, the retail price of the revised NES10-2 remains the same at £99.95. Included in the package are the 1030-FPL fused d.c. power lead and full operating instructions. Details of the improved product can be found on the bhi website www.bhi-ltd.co.uk or call bhi for more information. The NES10-2 MkII is available direct from bhi on 0870 240 7258 or from any of their approved dealers who can be found advertising in this magazine.

The NES10-2 - now new and improved with an additional feature of an on/off/by-pass switch.



New Corporate Identity



The London-based international transmission and broadcast specialist, WRN, has unveiled its new corporate identity with a new name, new brand and a new claim to support its expansion plans into new areas of media activity.

The company, formerly known as World Radio Network, engaged Brandhouse WTS to create its new brand and supporting collateral. **Karl Miosga**, WRN's Managing Director, explains that the new look underlines WRN's expansion from its roots in radio to other broadcast media, "this change allows us to extend the brand across any media platform; TV, Internet, radio or mobile telephony. WRN becomes a brand with multimedia potential".

The brief to Brandhouse WTS was to bring together the many unique services the company provides to broadcasters from around the world under one identity, which in itself could be adapted flexibly as the company enters a sustained period of growth. **Mark Wickens**, Creative Partner at Brandhouse WTS, explains "at the core of the brand is the idea that WRN brings together and channels different media into a defined, quality offering. The graphic identity tells this story through the depiction of streaming, digital information on a global scale".

Simultaneously WRN is introducing a new brand claim - "Transmitting Success", **Tim Ayris**, WRN's Marketing Manager, says "is a positive, forward-looking support message that allows people to fully access the brand and expresses the company's values and aims".

WRN works with a number of top radio and TV brands, distributing their output domestically and international. Clients include FCUK FM, talkSPORT, top French station NRJ, America's flagship speech station NPR and VOA TV. In addition, WRN is well known for its own-branded international news and current affairs networks, broadcasting radio programmes from around the world, which are available on market-leading distribution platforms including Sky digital, France's Canal Satellite, Sirius Satellite Radio in the US, the WorldSpace satellite radio service across Africa and Asia, mobile telephony portal MBN and mp3 download site AudioFeast. The company is actively developing a number of new project offerings including a TV channel.

Site Relunched



Ardio Communications Ltd., owners of the Radio-Electronics.Com website - www.radio-electronics.com - have re-launched the site as resource of free information, data and tutorials for those in the radio and electronics industries.

The site covers a variety of topics which currently includes: cellular telecommunications, private mobile radio (p.m.r.), wireless connectivity, radio receivers, radio propagation, test and measurement techniques and electronics components. There is up-to-the-minute technology news, with associated explanations of some of the technologies and 'laws' associated with the latest developments. Further areas of coverage are planned for the future and new information is being continually added in the existing areas. In all instances the aim is to provide useful high quality technical information.

The front page links to useful articles both on-site and elsewhere and there is a small section that is frequently updated providing interesting quotes, dates and facts associated with radio and electronics. The aim of the site is to provide information about the various technologies in an easy to understand and interesting style.

In this way it will be a valuable resource for those in the engineering and marketing arenas as well as anyone wanting technical radio and electronics information. To make the site easy to use, time has been spent to ensure that it is easy to navigate and to further aid any visitors, a site search facility is included.

Diary Note

We have been informed by **John Periam**, Shoreham Air Show Press Officer, that the date for the **2005 RAFA Shoreham Air Show** is **3/4th September 2005**. For more information, call **(01273) 441545** or visit their website at www.shorehamairshow.com

Silent Key - James Mealey GOLBF

It is with considerable sadness that here at SWM we have had notification from Don Atkins M1BUL, Hon. Sec. of the Southport & DARS who informs us of the death of Jim Mealey GOLFC - a loyal member of the club. Don reports...

Jim Mealey died in Southport District General Hospital on 27 August 2004. Originally from Liverpool, Jim and his family settled in Southport some five years ago, following a number of operations, which left him permanently confined to a wheelchair.

Jim was an enthusiastic amateur radio operator, always willing to help newcomers to the hobby and the more experienced amateur alike. He contributed regularly at club meetings and supported all our special event stations where frequently, he was the 'club voice' newcomers, particularly children, heard when they made their first QSL card.

Jim was a good man, giving generously of his time and advice in his effort to attract new members to the Southport Club and to the hobby in general. He seldom complained of his own physical disabilities and was quick to reach to the plight of others. He will be sadly missed by the club and the numerous friends he made both in this country and overseas. To his wife Janet and the family we extend our deepest sympathy.

The End Is Nigh

On 14 September 2004, Ofcom published a consultation document on the digital replacement licences (DRLs) that will take the UK's commercial terrestrial broadcasters through to a fully digital future.

Under the *Communications Act 2003*, Ofcom must offer DRLs to the current Channel 3 analogue licensees, Channel 5 and Public Teletext, to replace the current analogue licences. If accepted, the replacement licences must be issued before 29 December this year.

The procedure for replacing Channel 4's existing licence is different, reflecting its position as a statutory corporation. Ofcom is also consulting on a draft of Channel 4's DRL and the Channel 4 DRL will be issued before the end of the year.

The initial expiry date for each DRL is 31 December 2014. The broadcasters currently hold analogue licences which allow them to broadcast their services in analogue format with an additional ability to broadcast on Digital Terrestrial Television. Conversely, DRLs are primarily digital licences with an ability to broadcast in analogue.

The proposals are intended to bring more certainty to the process that will enable the UK to achieve switch over from analogue to digital technologies in television broadcasting.

In April this year, Ofcom submitted its report, *Driving Digital Switchover*, to the Secretary of State for Culture, Media and Sport. The report set out a number of recommendations, including the creation of 'SwitchCo', a body responsible for ensuring switch over by a specified date, and the provision of consumer information and advice.

In July, the Secretary of State announced that progress had been made in discussion between the Government, Ofcom and the public service broadcasters on the timing for digital switch over and that 2012 may be the most appropriate date for switch-over completion. This could mean beginning the switching sequence as early as 2007.

Ofcom has carried out an extensive series of

pre-consultation discussions with analogue and digital terrestrial licensees. The licensees were able to provide Ofcom with comments on some of its initial proposals for possible obligations relating to digital switch over to be included in the DRLs. Ofcom has taken account of these comments in preparing the DRL consultation document and draft DRLs.

Ofcom proposes to oblige holders of the Channel 3, Channel 4 and Channel 5 DRLs to achieve coverage that is at least substantially the same as existing analogue coverage. All licensees would also be required to:

- * Roll-out Digital Terrestrial Television to 1154 transmission sites
- * Co-operate with those organisations involved in the administration, organisation or implementation of digital switch-over;
- * Comply with 31 December 2012 as a backstop date by which all licensees shall be obliged to cease broadcasting their analogue service.

The draft DRLs also include conditions implementing the new provisions in the *Communications Act* relating to the public service broadcasting remits of licensees and statements of programme policy.

The new remits and statements are not required as part of the replacement licensing process, but will follow upon completion of Ofcom's review into Public Service Broadcasting. This autumn, Ofcom is also publishing a number of proposals that will have further implications for digital switch over:

- * The phase two report of its review into Public Service Broadcasting
- * Methodology for calculating licence fees for Channel 3, Channel 5 and Public Teletext;
- * A consultation on spectrum pricing

Meanwhile, Ofcom is working with broadcasters, Government, consumer groups and others to develop 'SwitchCo'. The closing date for responses to the consultation on DRLs was 25 October. The full consultation document is available at: www.ofcom.org.uk

LM&S

Long, Medium & Short Wave Bands

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

- DXers:-
- A Thomas Williams, Truro
 - B Vic Prier, Seaton
 - C Bernard Curtis, Stalbridge
 - D Bill Griffith, Alaska
 - E Michael Casey, Manchester
 - F Simon Hockenhill, Bristol

Another brace of new contributors to the column, I'm very pleased to say. Thanks first to **Reginald Shannon** in Dublin who took time out to send in his first contribution. Reginald has just got back into short wave listening following a long absence owing to work and other commitments. He has various portable receivers at his disposal, including a Philips, Grundig and a Sangean ATS909.

Reginald rounds off by asking if I can include a number of stations' mailing addresses.

This is something I can explore, space permitting. In the meantime, I see you have

E-mail. If this implies access to the Internet, then log into <http://dxing.de/> where you will find hundreds of contact addresses.

Bill Griffith has not written in for a while. A visit to Vancouver and a subsequent cruise to Alaska (lucky fellah) prompted him to submit his list of catches.

- Listeners:-
- A Thomas Williams, Truro
 - B Phil Townsend, London
 - C Sheila Hughes, Morden
 - D Alexander Yegorov, Kiev
 - E Simon Hockenhill, Bristol

Long Wave Table

kHz	Service	TX Location	Country	Power (kW)	Listener
153	Deutschlandfunk	Donebach	D	500/250	A B E
162	France Inter	Allouis	F	2000/1000	A B
171	Medi 1	Nador	MRC	2000	C*
171	Radio Rossii	Bolsakovo	RUS	600	E
177	Deutschlandradio Berlin	Zehlendorf	D	500	B E*
183	Europe 1	Saarlouise	D	2000	A B
189	Ríkisutvarpið	Gufuskalar	ISL	150	E*
198	BBC Radio 4	Droitwich	G	500	B C
207	Deutschlandfunk	Aholming	D	500	B E
207	RTM A	Azilal	MRC	400	E*
207	Ríkisutvarpið	Eidar	ISL	100	E*
216	Radio Monte Carlo	Roumoules	F	1400	A B E
225	Polish Radio 1	Solec Kujawski	POL	1000	C* E*
234	RTL	Buidweiler	LUX	2000	A B C
243	Denmark Radio 1	Kalundborg	DNK	300	B C* E
252	Algiers Radio 3	Tipaza	ALG	1500/750	C* E*
252	RTE Radio 1	Clarkstown	IRL	500/150	A B C* D* E
261	Radio Rossii	Taldom	RUS	2500	C* E*
270	Czech Radio 1	Uherske-Hradiste	CZE	650	E*
279	Belarussian Radio 1	Sasnovy	BLR	500	E*

* = dark

Tropical Band Table

MHz	UTC	Service	Country	Listener
3.210	0430	WWCR, Nashville	USA	B
3.255	2130	BBC World Service	G/AFS	B
3.915	2317	BBC World Service	G/SNG	A B C F
3.955	2115	Radio Korea International	KOR/G	E F
3.965	1850	Radio Taiwan	TWN/F	C
3.975	1915	Radio Budapest	HNG	F
3.985	1932	V of Islamic Rep of Iran	IRN	F
4.005	2115	Vatican Radio	CVA	B E F
4.635	2255	Radio Tajikistan	TJK	E F
4.765	0214	Radio Emissora Rural	B	E
4.770	2120	FRCN Kaduna	NIG	B
4.800	2030	CPBS 2 Beijing	CHN	E F
4.820	2031	Xizang Lhasa	CHN	E F
4.835	2125	RTM Bamoko	MLI	B
4.845	2130	DRTM Nouakchott	MTN	B E F
4.875	0220	Radio Dif Roraima	B	E
4.885	0450	Radio Clube Do Para	B	B E
4.890	0445	Radio France Int'l	F/GAB	B
4.895	2135	All India Radio, Kurseong	IND	B
4.895	2137	Radio Ulan Bator	MNG	E F
4.895	0510	Radio Brazil Central	B	B
4.895	0900	Nat B.casting, Port Moresby	PNG	D
4.905	2251	Xizang Lhasa	CHN	E F
4.910	2142	ZNBC Radio 1	ZMB	E
4.915	0220	Radio Anhanguera	B	E
4.915	0500	GBC 1 Accra	GHA	B
4.920	2235	Xizang Lhasa	CHN	E F
4.930	2238	All India Radio, Shimla	IND	E
4.965	2208	Christian Voice Radio	ZMB	E
5.025	0245	Radio Uganda, Kampala	UGA	E
5.030	2226	Radio Burkina	BFA	E F
5.050	0224	WWRB, Manchester	USA	E
5.070	0515	WWCR, Nashville	USA	B C E
5.085	0500	WWRB, Manchester	USA	B
5.105	0006	WBCQ, Maine	USA	E
5.240	2240	Xizang Lhasa	CHN	E

Bill comments on the lamentable audibility of BBC World Service whilst there. Since no short wave transmissions are targeted to North America, this was always going to be the inevitable result. In contrast, RFI, Deutsche Welle and the other usual suspects were all heard with good signals.

Mr R. Frost in Felixstowe was lucky enough to catch Radio Veronica, an RSL-esque station on from Holland over August. Playing all those golden oldies, the output was reminiscent of some of the offshore stations broadcasting to Europe during the sixties.

As you'll read elsewhere, I was in attendance at this year's International Broadcasting Conference (IBC) in Amsterdam. Headline news for us is the affordable - and available - DRM receiver box that plugs into a laptop or PC. It doubles as a conventional a.m. and f.m. receiver and comes in at around £160. This may prove tempting for those of you who have been put off by the price of DRM kit. I will attempt to get one of these for evaluation and let you know the score.

Talking of DRM, an increasing number of dedicated analogue fans are complaining about a transmissions' ability to jam several short wave channels. One or two of you

have spoken about this to me already. On the WorldWide DX Club's website - www.wwdx.de - opinion seems quite vociferous. There's even talk of sending a DX-community petition to the HFCC.

If you've never been affected by adjacent-channel interference from DRM, the likelihood is that you soon will be. The sound is unmistakable - try 3.995, 5.990 and 6.140MHz at various times to experience it for yourself. On medium wave, 1611kHz from the Vatican and 1296kHz BBC via Orfordness can often be heard, buzzing away. The full DRM schedule is available on the WWDXC site.

Return To Darkness

By the time you read this, the dreaded clock-change will be upon us. Not only will the longer nights and winter conditions look favourably upon the medium wave (and low short wave bands) DXers among you, on 31 October many programmes to Europe will be scheduled for one hour later, according to GMT. In addition, external broadcasters tend to shunt their output down a band or two, rendering the higher bands relatively quiet until the summer months. I'll include some English-to-Europe schedules for you next time.

Never heard a Scottish radio station on short wave? Well, now you can, albeit via USA or Italy. Radio Six International is, according to their website, a "private (not for profit) experimental Internet station operating from Scotland and playing an interesting

Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	C D
603	Capital Gold	Littlebourne	0.1	C B D
630	BBC 3CR	Luton	0.2	C D
657	BBC Radio Cornwall	Bodmin	0.5	D*
666	Classic Gold	Exeter	0.34	D
729	BBC Essex	Manningtree	0.2	C
738	BBC Hereford & Worcester	Worcester	0.037	D
756	Magic Maldwyn	Newtown	0.63	D
765	BBC Essex	Chelmsford	0.5	C D
774	BBC Radio Kent	Littlebourne	0.7	C B
792	Classic Gold	Bedford	0.275	C
801	BBC Radio Devon	Barnstaple	2	D
828	Classic Gold	Bournemouth	0.27	D
828	Classic Gold	Luton	0.2	C D
828	BBC Asian Network	Wolverhampton	0.2	D
837	BBC Asian Network	Leicester	0.5	C B D
855	BBC Radio Norfolk	Norwich	1.5	C
855	BBC Radio Devon	Plymouth	1	D*
855	Sunshine 855	Ludlow	0.15	D
873	BBC Radio Norfolk	West Lynn	0.3	C
945	Capital Gold	Brixhill	0.7	C B
954	Classic Gold	Torbay	0.4	D
954	Classic Gold	Hereford	0.16	D
963	Asian Club	Hackney	0.95	C B D
972	Asian Club	Southall	1	C B D
990	BBC Radio Devon	Exeter	1	D

mixture of easy listening, lounge, exotica, oldies and contemporary music with a little light music, classical, country, and jazz... Quite a mix. The station broadcasts daily from 2300-0100UTC on 5.105MHz from Maine; 1900-2000UTC on the second Thursday of each month on 5.775MHz from Milan and on 13.840MHz (also from Milan) on the second weekend of each month between 0830-0930UTC on Saturdays and 0700-0800UTC on Sunday.

With so many broadcast facilities up for

Medium Wave Table

kHz	Service	Location	Country	kW	Listener
531	RTA 1	Ain-El-Beida	ALG	600/300	D* E*
531	Swiss Radio (German)	Basel	SUI	600	E*
540	Radio Tivee	Wavre	BEL	150	C D* E
549	Deutschlandfunk (DLF)	Nordkirchen	D	100	C
549	Deutschlandfunk (DLF)	Thumau	D	100	E*
549	UCB Europe	Dundalk	IRL	70	D* E
558	YLE Radio	Helsinki	FIN	50	D*
567	RNE 5	Murcia	E	50	D* E*
576	Sudwestrundfunk (SWR)	Mühlacker	D	100	D* E*
576	RNE 5	Barcelona	E	100	E*
585	RNE 1	Madrid	E	600	D* E*
585	FP	Paris	F	8	C D* E*
585	BBC Radio Scotland	Dumfries	G	2	D*
584	HR Skyline	Frankfurt	D	250	D* E*
603	France Info	Lyon	F	300	D* E*
603	BBC Radio 4	Newcastle	G	2	E*
612	RNE 1	Vitoria	E	10	D* E*
621	RTBF 1	Wavre	BEL	300	C D* E
630	NRK Europakanalen	Vjega	NOR	100	D*
630	Tunis Radio	Djedida	TUN	600	E
639	RNE 1	Many	E	10-300	D* E*
639	Czech Radio 2	Prague	TCH	1500	D* E*
648	BBC World Service	Orfordness	G	500	C D* E
648	RNE 1	Badajoz	E	10	D*
657	RNE 5	Madrid	E	50	E*
657	BBC Radio Wales	Wrexham	G	2	C D* E
666	RDP Antena 1	Vila Real	POR	10	D*
666	SWR	Bohdorf	D	150	D* E*
675	Arrow Classic Rock	Lopik	HOL	120	C D* E
684	RNE 1	Seville	E	600	D* E*
683	BBC Radio 5 Live	Many	G	1-150	C
711	Radio Bleu	Bennes	F	300	C D* E

kHz	Service	Svc area/TX site	kW	SWL
990	Classic Gold	Wolverhampton	0.09	D
999	BBC Radio Solent	Fareham	1	C D
999	Valleys Radio	Ebbw Vale	0.3	D
1017	Classic Gold	Shropshire	0.63	C D
1026	BBC Radio Jersey	Trinity	1	D
1026	BBC Radio Cambridgeshire	Cambridge	0.5	C D
1035	Easy Radio London	Crystal Palace	1	C D
1116	Valleys Radio	Ebbw Vale	1	D
1116	BBC Radio Guernsey	Rohais	0.5	D
1152	LBC	London	23.5	D
1152	Capital Gold	Birmingham	3	D
1152	Clyde 2	Glasgow	0.07	A
1161	Radio Tay	Dundee	1.4	A*
1161	BBC 3CR	Bedford	0.1	C
1170	Swansea Sound	Swansea	0.58	D
1170	Classic Gold Amber	Ipswich	0.28	C
1170	Capital Gold	Portsmouth	0.12	B
1242	Capital Gold	Maidstone	0.32	C B
1251	Classic Gold Amber	Bury St Edmunds	0.76	C D
1278	Radio Caroline (RSL)	Ross Revenge, Tilbury	0.001	B
1296	Radio XL	Birmingham	10	D
1305	Capital Gold	Newport	0.2	A*
1323	Capital Gold	Brighton	0.5	A* B
1332	Premier	London	1	D
1359	Classic Gold	Chelmsford	0.28	C
1368	BBC Southern Counties Radio	Duxhurst	0.5	C
1413	BBC Radio Gloucestershire	SW/E Gloucestershire	0.5	A*
1431	Classic Gold Breeze	Southend	0.35	C
1431	Classic Gold	Reading	0.14	D
1449	URB - Bath University RSL	Bath	0.001	D

kHz	Service	Svc area/TX site	kW	SWL
1449	The Hub - Bristol University RSL	Bristol	0.001	D
1458	Sunrise	London	125	C B D
1458	BBC Asian Network	Birmingham	5	D
1458	BBC Radio Devon	Torquay	2	D
1485	BBC Southern Counties Radio	Brighton	1	C
1485	Classic Gold	Newbury	1	D
1503	BBC Radio Stoke	Staffordshire	1	D*
1503	Sound Radio	London	0.1	C
1521	Classic Gold	Reigate	0.64	A* C
1521	Forest of Dean Community Radio	Coleford	0.1	D
1530	Classic Gold	Huddersfield	0.74	A*
1530	Capital Gold	Worcester	0.52	D
1530	BBC Radio Essex	Southend	0.15	C
1548	Capital Gold	London	97.5	B
1566	County Sound	Guildford	0.8	C D*
1566	BBC Somerset Sound	Taunton	0.6	A* D
1584	BBC Radio Nottingham	Clipstone	1	D
1584	BBC Hereford & Worcester	Woofferton	0.3	D
1584	Radio Tay	Perth	0.21	A*
1584	Turkish Radio	London	0.2	C D
1602	BBC Radio Kent	Rustall	0.25	C B
1602	Desi Radio	Southall	0.07	C B

* = dark

Listeners:-

- A Geraint Gill, Llanfairfechan
- B Sheila Hughes, Morden
- C Phil Townsend, London
- D Simon Hockenhill, Bristol

hire, there's a steady growth in the number of part-time broadcasters similar to the above, springing up on the air. One of the most active frequencies to listen out on is 9.290MHz. The frequency is used by a facility in Latvia and is currently hired by Radio Joystick (0900-1000UTC on the first Saturday of each month) and Europa Radio International, amongst others.

Over to France, where, hot on the heels of Radio Orient (see last month's 'LM&S') Ciel AM launched late September. Broadcast

via a chain of transmitters 981 and 1161kHz, programmes will concentrate on matters in the Middle East.

The station's staff comprises Jewish pacifists who aim to promote dialogue with the Palestinians. Programmes will be 65/35% music/news mix with financing by means of advertising.

Meanwhile, if you're into all things clandestine, look out for the Voice of Sudan, observed recently by staff at BBC Monitoring on 7.9993MHz between 1530-1600UTC.

kHz	Service	Location	Country	kW	Listener
900	COPE	Many	E	5-25	D*
918	Radio Slovenia	Domzale	SVN	600/100	D* E*
927	Radio Eury/527 Live	Wolvenram	BEL	300	C D*
936	Radio Bremen Eins	Bremen	D	50/10	D*
945	France Blue	Toulouse	F	300	D* E*
954	CR2	Bmo	CZE	200	D*
963	YLE Radio	Pori	FIN	600	D* E*
972	Nord Deutscher Rundfunk (NDR)	Hamburg	D	100	D* E*
981	RTA 2	Algeirs	ALG	600/300	D* E
990	Deutschlandfunk (DLF)	Berlin	D	100	D* E*
990	Radio Bilbao	Bilbao	E	10	E*
999	COPE	Madrid	E	50	D* E*
1008	Radio 10 Gold	Revoland	HOL	400	B* C D* E*
1017	Sudwestrundfunk (SWR)	Wolfshelm	D	100	E*
1035	Radio Nacional	Porto Alto	POR	100	D* E*
1044	MDR Info	Dresden	D	20	D* E*
1044	Radio San Sebastian	San Sebastian	E	10	D* E*
1053	Talksport	Droitwich	G	500	D*
1062	Denmark Radio P3	Kalunborg	DNK	250	D* E*
1071	Euskadi Irratia	Bilbao	E	50	D*
1071	Talksport	Clipstone	G	1	D*
1080	SER	Many	E	5-10	D* E*
1089	Talksport	Brookmans Park	G	400	D
1089	Radio Rossii	Tbilisskaya	RUS	1200	D
1098	Radio Slovensko	Nitra	SVK	50	D*
1107	Talksport	Lydd	G	0.5-2	D*
1107	American Forces Network	Bavaria	USA/D	10	D* E*
1116	Radio Pontevedra	Pontevedra	E	5	D*
1125	Croatian Radio HR1	Deanovic	HRV	100	D*
1125	Radio 21	Houdeng	BEL	10	C D* E
1125	BBC Radio Wales	Llandrindod Wells	G	1	D* E
1134	Croatian Radio HR1	Zadar	HRV	600	D* E
1134	COPE	Many	E	2-5	D*
1143	American Forces Network	Many	USA/D	0.3-10	D* E*

Medium Wave Table Continued

kHz	Service	Location	Country	kW	Listener
1179	Swedish Radio 1	Solvestorg	S	600/300	D* E*
1179	SEF	Valencia	E	50	E
1188	_YQA/RFE	Marcali	USA/HNG	500	D*
1188	Radio Twee	Kuurne	BEL	5	C D* E*
1197	_YQA/RFE	Munich	USA/D	300/150	D* E*
1197	Virgin Radio	Many	G	0.2-2	C D*
1206	France Info	Bordeaux	F	300	D* E
1215	Virgin Radio	Many	G	0.32-200	D*
1224	Radio Horizont	Vidin	BUL	500	D*
1224	COPE	Many	E	2-10	D* E*
1233	Virgin Radio	Many	G	0.1-0.5	D*
1233	Cro 6	Praha	CZE	40	D*
1242	France Info	Marseille	F	150	D* E*
1242	Virgin Radio	Many	G	0.5-2	D*
1251	Radio 747	Hulsberg	HOL	10	D* E*
1260	Virgin Radio	Many	G	0.5-1	C D*
1260	SEF	Many	E	5	D*
1269	Deutschlandfunk (DLF)	Neumunster	D	300	D* E*
1278	France Bleu	Strasbourg	F	300	E*
1278	RTE Radio 2	Cork/Dublin	IRL	10	D*
1287	_Radio Lieida	Lieida	E	10	D*
1296	BBC World Service	Orfordness	G	500	D* E
1305	_RNE 5	Many	E	10-25	D*

The radio station speaks on behalf of the Sudanese opposition, the National Democratic Alliance (NDA) and has been on the air intermittently since 1995, from a transmitter believed to be in neighbouring Eritrea.

Hurricane *Charley* and its successors took their toll on many radio stations throughout the Caribbean and the gulf this summer. Broadcasters were forced off the air simply through lack of power or the need to stow satellite dishes during the storms. Others lost

kHz	Service	Location	Country	kW	Listener
1314	NRK Europakanalen	Kvitsoy	NOR	1200	D* E
1323	Voice of Russia	Wachenbrunn	RUS/D	800/150	D*
1323	DLR?	Berlin	D	?	E
1332	RAI Uno	Rome	I	300	D*
1341	BBC Radio Ulster	Lisnagarvey	G	100	E
1360	Radio Orient	Nancy	LBN/E	300	B* D* E
1369	RNE 3	Madrid	E	600	D* E*
1369	Marx Radio	Douglas, IOM	G	20	D E
1377	France Info	Lille	F	300	C D* E
1386	Voice of Russia	Bolshakovo	RUS	1200	D*
1395	Radio 10 FM	Trintalhaven	HOL	120	D*
1395	TransWorld Radio	Flake	MCO/ALB	500	D*
1404	France Info	Brest	F	20	D* E
1413	RNE 5	Many	E	5-10	D*
1422	Deutschlandfunk (DLF)	Heusweiler	D	1200/600	D* E
1440	China Radio International/RTL	Mamach	CHN/LUX	1200/300	D*
1440	Saudi General Programme	Dammam	AFS	1600	D*
1449	Libyan Radio	Misrata	LBY	20	D*
1449	BBC Radio 4	Aberdeen	G	2	D*
1467	TransWorld Radio	Romoules	F	1000	D*
1476	Radio 1476	Vienna	AUT	60	B* E*
1494	France Info	Clemont-Ferrand	F	20	D* E
1494	Voice of Russia	Krasnyy	RUS	600	D*
1503	VIRI Sarayre	Ardabil/Bushehr	IRN	500	D*
1512	Radio EenVandaag	Wolvertem	BEL	300/25	D*

kHz	Service	Location	Country	kW	Listener
1530	Vatican Radio	Vatican City	CVA	150/450	D* E*
1539	Evangelium Rundfunk	Mainflingen	D	700/120	D* E
1557	France Info	Nice	F	300	E*
1575	RAI Uno	Genova	I	50	D* E*
1575	SEF	Many	E	5	D*
1583	Radio Caroline (unofficial relay)	Cork?	G/IRL	?	D*
1593	Voice of America	Kuwait	USA/KWT	150	D* E*
1602	Radio Vitoria	Vitoria	E	25	D* E*
1611	Vatican Radio	Vatican City	CVA	100	D*

* = dark

Listeners:

- A R Frost, Felixstowe
- B Geraint Gill, Llanfairfechan
- C Phil Townsend, London
- D Eddie McKeown, Newry
- E Simon Hockenull, Bristol

their antennas. Radio Havana Cuba was knocked out in August, returning a few days later on just a few frequencies and with low modulation.

Too late for inclusion in the listings, Simon Hockenull observed that Radio France International appears to have reactivated their 25.820kHz outlet. Simon caught their transmission from tune-in at 1255UTC until closedown five minutes later, leading him to speculate that the transmission span is the old 1200-1300UTC

slot. Thanks for the heads-up, Simon. I'll take a listen.

That'll do it for this time. Until next time, have a good month.

Sorry to hear about the caterpillars, Bernard.

Short Wave Table

MHz	UTC	Service	Country	Lang	SINPO	SWL
0000-0100						
5.825	0000	WEWN, Birmingham, AL	USA	eng	44344	BC
5.890	0035	Radio Thailand	THA/USA	eng	35423	SH
7.545	0040	Radio Ukraine Int.	UKR	eng	45444	SH
9.545	0010	Deutsche Welle	D	ger	22421	SH
9.580	0015	Radio Yugoslavia (IRSM)	YUG	eng	44544	SH
11.620	0031	All India Radio	IND	eng	35443	MC
11.690	0036	Radio Vilnius	LTU	eng	34443	MC
11.725	0001	Radio Cairo	EGY	eng	25432	MC
13.710	0047	Radio Canada Int.	CAN	eng	35433	MC
15.360	0000	BBC World Service	G	eng	33333	BG
17.795	0005	Radio Australia	AUS	eng	54445	BG
0100-0200						
6.000	0142	Radio Havana Cuba	CUB	eng	33333	FH
6.025	0100	Radio Japan	J	eng	34444	RS
7.345	0118	Radio Prague	CZE	eng	55555	RS
9.550	0140	Radio Havana Cuba	CUB	fre	44444	BG
9.665	0132	Voice of Russia	RUS	eng	55555	RS
13.810	0145	University Network	USA	eng	44444	BG
17.715	0140	Radio Australia	AUS	eng	44444	BG
0300-0400						
5.975	0320	BBC World Service	G/ATG	eng	35433	SH
6.140	0333	Voice of Turkey	TUR	eng	35533	SH
7.270	0331	Voice of Turkey	TUR	eng	25422	SH
9.665	0325	Voice of Russia	RUS	eng	55545	SH
9.695	0327	Voice of America	USA/?	eng	35533	SH
9.880	0329	Voice of Russia	RUS	eng	34533	SH
11.835	0326	BBC World Service	G	eng	33333	BG
0400-0500						
7.235	0445	RAI Int.	I	eng	43333	SHH
7.355	0415	WYFR, Okeechobee, FL	USA	eng	44333	SHH
9.815	0430	BBC World Service	G	eng	43333	SHH
9.875	0410	Voice of Russia	RUS	eng	43333	SHH
11.840	0406	Radio Romania Int.	ROU	eng	45454	MC
15.320	0440	Voice of Hope	MDG	eng	34333	SHH

MHz	UTC	Service	Country	Lang	SINPO	SWL
0500-0600						
6.165	0558	Radio Nederland	HOL	dut	44444	BG
6.855	0540	WYFR, Okeechobee, FL	USA	eng	44333	SHH
7.535	0550	WHRI, South Bend, IN	USA	eng	35544	FW
9.410	0530	BBC World Service	G	eng	32223	BG
9.560	0500	China Radio Int.	CHN	eng	44333	SHH
9.650	0530	Radio Havana Cuba	CUB	eng	44444	BG
9.725	0530	University Network	USA	eng	44444	SHH
11.690	0542	Scandinavian Weekend Radio	FIN	eng	25433	MC
11.760	0500	Radio Havana Cuba	CUB	eng	43443	BG
12.045	0500	Deutsche Welle	D	eng	34333	SHH
15.240	0546	Radio Australia	AUS	eng	43443	BG
15.375	0540	Voz Cristiana	CHL	spa	44444	BG
15.515	0545	Radio Australia	AUS	eng	43443	BG
17.750	0545	Radio Australia	AUS	eng	44444	BG
0600-0700						
6.110	0600	Radio Japan	J	eng	44444	BG
6.160	0600	CBC 1 Vancouver	CAN	eng	54445	BG
7.230	0600	Radio Japan	J	eng	33333	SHH
9.615	0600	Radio New Zealand Int.	NZL	eng	54445	BG
12.080	0600	Voice of America	USA	eng	44333	SHH
0700-0800						
5.905	0735	Bible Voice Broadcasting	G/D	eng	44444	RI
5.955	0746	Radio Nederland	HOL	eng	44444	RI
6.005	0749	DLR Berlin	D	dut	34443	RI
6.025	0751	Radio Budapest	HNG	ger	32332	RI
6.030	0754	SudWestRundfunk	D	hun	44343	RI
6.075	0756	Deutsche Welle	D	ger	44434	RI
6.085	0758	B5 aktuell	D	ger	44333	RI
6.120	0759	YLE Radio Finland	FIN	fin	34333	RI
9.410	0715	BBC World Service	G/CYP	eng	55544	FW
9.870	0750	Christian Science Monitor	USA	eng	44444	RS
9.885	0730	Radio New Zealand Int.	NZL	eng	44444	BG
11.830	0708	Radio Romania Int.	ROU	eng	55555	FW
13.650	0740	Swiss Radio Int.	SUI	eng	55555	RS
13.720	0715	Radio Exterior Espana	E	spa	55344	VP
13.780	0720	Deutsche Welle	D	ger	55344	VP

MHz	UTC	Service	Country	Lang	SINPO	SWL
15.105	0705	BBC World Service	G/ASC	fre	44434	RI
15.120	0745	Voice of Nigeria	NIG	eng	44423	VP
15.135	0715	YLE Radio Finland	FIN	fin	44444	RI
15.140	0718	Voice of Turkey	TUR	tur	21331	RI
15.150	0700	Radio Romania Int.	ROU	eng	54344	VP
15.160	0722	Radio New Zealand Int.	NZL	eng	34333	SHH
15.170	0728	Radio France Int.	F	fre	44434	RI
15.180	0730	BBC World Service	G	ara	34333	RI
15.245	0747	Voice of Korea	KRE	rus	24332	RI
15.260	0749	Radio Free Europe/Liberty	MRC	?	44444	RI
15.290	0756	Radio Farda	USA/GRC	far	44434	RI
15.300	0758	Radio France Int.	F	fre	34333	RI
15.315	0759	Radio France Int.	F	fre	24333	RI
15.400	0735	BBC World Service	G/ASC	eng	35343	VP
15.460	0720	Radio Slovakia Int.	SVK	eng	45544	FW
15.565	0745	BBC World Service	G	eng	32343	VP
17.490	0730	China Radio Int.	CHN	eng	45555	RS
17.535	0749	Kol Israel	ISR	heb	45333	VP
17.610	0733	BBC World Service	G	ara	24432	RI
17.650	0745	China Radio Int.	CHN	chi	23222	VP
17.695	0710	BBC World Service	G/AFS	fre	44434	RI
17.770	0750	Radio Exterior Espana	E	spa	44434	VP
21.530	0715	Voice of Greece	GRC	gre	54434	VP
21.605	0720	UAE Radio	UAE	ara	44243	VP
21.770	0725	Swiss Radio Int.	SUI	eng	24322	VP
0800-0900						
6.140	0800	Deutsche Welle	D	eng	44444	RI
6.155	0801	ORF Radio Austria Int.	AUT	ger	44434	RI
6.190	0804	DLR Berlin	D	ger	34333	RI
7.535	0815	W/S/B, Boston MA	USA	eng	45444	BC
7.580	0820	WEWN, Birmingham, AL	USA	eng	55444	BC
9.370	0840	WTJC, Newport NC	USA	eng	54444	BC
9.710	0830	Radio Vilnius	LTU	eng	35533	SH
9.885	0810	Radio New Zealand Int.	NZL	eng	44333	BC
11.730	0825	WHRA, South Bend, IN	USA	eng	54444	BC
11.765	0810	KNLS	USA	eng	43334	BC
11.865	0805	TransWorld Radio	?/ALB	eng	55445	BC
13.640	0810	Radio Oman	OMA	ara	24332	RI

MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL
15.270	0810	Voice of Armenia	ARM	eng	41432	EM	15.185	1134	All India Radio	INO	eng	24122	EM	15.785	1450	Galei Zahal	ISR	heb	44333	RI
15.350	0801	Voice of Turkey	TUR	tur	44334	RI	15.415	1110	Radio Ukraine Int.	UKR	eng	55445	BC	15.825	1452	WWCR, Nashville, TN	USA	eng	34333	RI
15.380	0805	Saudi Radio	ARS	ara	44434	RI	15.575	1144	BBC World Service	G	eng	24232	EM	17.490	1454	China Radio Int.	CHN	eng	44444	RI
15.400	0808	BBC World Service	G/ASC	eng	44333	RI	15.600	1102	V of Islamic Rep of Iran	IRN	eng	22222	EM	17.560	1452	WHRA, South Bend, IN	USA	eng	33333	PP
15.415	0811	Radio Ukraine Int.	G	ukr	44333	RI	15.700	1100	Radio Bulgaria	BUL	eng	44444	GG	17.645	1458	Voice of Russia	RUS	eng	43544	PP
15.485	0815	BBC World Service	UKR	eng	44333	RI	17.830	1145	BBC World Service	G	eng	24222	EM	17.650	1405	China Radio Int.	CHN	eng	54444	SHH
17.490	0810	China Radio Int.	CHN	eng	45555	RS	17.835	1100	Radio Pakistan	PAK	eng	34232	EM	21.605	1404	UAE Radio	UAE	ara	43444	RI
0900-1000							21.470	1141	BBC World Service	G	eng	14221	EM	1500-1600						
6.020	0910	Radio Australia	AUS	pid	44444	BG	21.800	1132	YLE Radio Finland	FIN	fin	55545	SH	5.955	1533	Radio Nederland	HOL	dut	44444	PP
6.140	0918	Deutsche Welle	O	eng	35444	SH	21.830	1135	RDP Portugal	POR	por	35433	SH	6.075	1535	Deutsche Welle	O	ger	44444	PP
9.420	0934	Voice of Greece	GRC	gre	33333	TW	21.850	1130	Vatican Radio	CVA	ita	55445	BC	6.110	1528	The Overcomer Ministry	USA	eng	33333	TW
9.850	0958	WHRI, South Bend, IN	USA	eng	44444	TW	1200-1300							6.140	1514	Deutsche Welle	O	eng	44444	TW
9.885	0945	Radio New Zealand Int.	NZL	eng	43243	EM	9.525	1252	Radio Polonia	POL	eng	35333	SH	7.250	1540	SudWestRundfunk	D	ger	44444	PP
? 0950	AFRTS	USA/ISL	eng	25544	FW	9.885	1245	Radio New Zealand Int.	NZL	eng	15421	SH	7.330	1545	Voice of Russia	RUS	ger	34343	PP	
11.730	0915	WHRA, South Bend, IN	USA	eng	33333	TW	13.580	1244	Radio Sweden	S	eng	44444	EM	9.805	1558	Radio Australia	AUS	eng	34444	RI
11.740	0920	Vatican Radio	CVA	eng	32222	TW	13.730	1245	ORF Radio Austria Int.	AUT	eng	55555	TW	11.650	1542	V of Islamic Rep of Iran	IRN	eng	33422	SH
11.880	0955	Radio Australia	AUS	eng	43334	BC	13.845	1225	WWCR, Nashville, TN	USA	eng	44434	TW	11.660	1540	Radio Australia	AUS	eng	34433	SH
12.020	0938	RDP Portugal	POR	por	44444	TW	15.225	1240	Voice of Turkey	TUR	eng	55454	EM	12.075	1510	Radio Nederland	HOL	eng	43333	SHH
12.020	0947	RDP Portugal	POR	por	55555	EM	15.240	1248	Radio Sweden	S	eng	43433	SH	13.640	1506	China Radio Int.	CHN	eng	44334	RI
12.085	0948	Voice of Mongolia	MING	eng	22222	TW	15.255	1246	Voice of Turkey	TUR	eng	45444	SH	15.180	1525	BBC World Service	G	ara	34333	RI
13.685	0940	Voice Int.	AUS	eng	32222	TW	15.400	1215	YLE Radio Finland	FIN	fin	44444	TW	15.315	1500	V of Islamic Rep of Iran	IRN	ara	33333	PP
13.700	0938	Radio Nederland	HOL	dut	44444	TW	15.535	1241	Voice of Turkey	TUR	eng	34122	EM	15.375	1503	Radio Exterior Espana	E	spa	55555	PP
13.720	0942	Radio Exterior Espana	E	spa	44444	TW	15.565	1248	BBC World Service	G	eng	35423	SH	15.450	1505	Tunisian Radio	TUN	ara	53435	PP
13.730	0936	ORF Radio Austria Int.	AUT	eng	44444	TW	15.735	1246	Radio Sweden	S	eng	55534	EM	15.540	1535	BBC World Service	G/SNG	eng	35544	FW
13.780	0950	Deutsche Welle	O	ger	44444	TW	15.760	1215	Kol Israel	ISR	heb	54445	BC	15.555	1521	BBC World Service	G/CYP	ara	34333	RI
13.820	0952	Croatian Radio	HRV	ger	44444	TW	17.670	1246	Radio Cairo	EGY	eng	34232	EM	17.490	1514	China Radio Int.	CHN	eng	55555	PP
13.830	0953	Croatian Radio	HRV	ger	32222	TW	17.715	1245	ORF Radio Austria Int.	AUT	eng	24122	EM	17.535	1507	Kol Israel	ISR	far?	44344	RI
13.840	0946	IRRS	I	eng	44333	TW	17.775	1200	Radio Tashkent Int.	UZB	eng	22222	EM	17.570	1512	Voice of Russia	RUS	?	43443	RI
15.120	0915	Voice of Nigeria	NIG	eng	34444	RS	17.815	1210	Radio France Int.	F	eng	44334	BC	17.585	1519	BBC World Service	G	ara	24432	RI
15.400	0938	BBC World Service	G	eng	34444	RS	19.010	1228	Voice of America	USA	?	32322	TW	17.620	1530	Radio France Int.	F	fre	24332	RI
15.495	0934	Radio Kuwait	KWT	ara	44333	RI	1300-1400							17.630	1534	Africa No. 1	GAB	fre	44444	RI
15.520	0939	Voice of Turkey	TUR	ara	43333	RI	6.110	1320	The Overcomer Ministry	USA/D	eng	34434	GG	17.715	1547	Deutsche Welle	D	fre	33333	RI
15.525	0941	CBS	TWN	chi	44232	RI	6.140	1356	Deutsche Welle	D	eng	35354	MC	17.720	1552	Radio Canada Int.	CAN/CHN	eng	33343	RI
15.565	0943	BBC World Service	G	eng	24332	RI	11.820	1348	BBC World Service	G/CYP	ara	23422	RI	17.735	1554	Tunisian Radio	TUN	ara	44444	RI
15.575	0944	BBC World Service	G/CYP	eng	24333	RI	11.955	1341	Voice of Turkey	TUR	tur	23332	RI	17.770	1510	Channel Africa	AFS	eng	44334	PP
15.585	0946	Radio Exterior Espana	E	spa	43444	RI	13.980	1325	Radio Prague	CZE	eng	45444	SH	17.845	1517	Deutsche Welle	D	ger	33333	PP
15.595	0948	Vatican Radio	CVA	eng	44444	TW	13.640	1332	RDP Portugal	POR	por	44434	RI	21.470	1519	BBC World Service	G/CYP?	eng	24222	PP
15.630	0947	Voice of Greece	GRC	eng	45344	EM	13.855	1339	Voice of Turkey	TUR	tur	23432	RI	21.570	1516	Radio Exterior Espana	E	spa	45534	SH
15.640	0956	Kol Israel	ISR	heb	44434	RI	13.660	1344	BBC World Service	G/CYP	ara	33433	RI	21.610	1518	Radio Exterior Espana	E	spa	45534	SH
15.655	0948	Voice of Greece	GRC	eng	44232	EM	13.665	1320	Voice of Russia	RUS	rus	54445	BC	21.700	1520	Radio Exterior Espana	E	spa	34233	PP
15.665	0959	Voice of America	USA/MRA	chi	24422	RI	13.685	1330	Voice Int.	AUS	eng	44333	SHH	21.820	1528	Deutsche Welle	O	fre	34343	PP
17.490	0928	China Radio Int.	CHN	eng	44444	TW	15.105	1338	Radio Romania Int.	ROU	eng	35433	SH	1600-1700						
17.510	0930	All India Radio	INO	eng	22222	TW	15.180	1346	BBC World Service	G/CYP	ara	44434	RI	5.930	1613	Radio Prague	CZE	eng	35444	MC
17.515	0919	Vatican Radio	CVA	eng	32222	TW	15.295	1332	Radio Tashkent Int.	UZB	eng	33422	SH	9.475	1601	Radio Australia	AUS	eng	23433	RI
17.835	0950	Radio Pakistan	PAK	urd	55434	BC	15.350	1342	Voice of Turkey	TUR	tur	44433	RI	9.645	1610	Vatican Radio	CVA	eng	44334	GG
21.610	0950	Radio Exterior Espana	E	spa	55243	EM	15.555	1351	BBC World Service	G/CYP	ara	24232	RI	11.660	1600	Radio Australia	AUS	eng	44434	RI
21.715	0951	Voice of Turkey	TUR	tur	35232	EM	15.745	1345	Swiss Radio Int.	CLN	eng	32223	BC	11.690	1602	Radio Jordan	JOR	eng	43333	SH
21.745	0900	Radio Prague	CZE	eng	55555	RS	17.490	1345	China Radio Int.	CHN	eng	55445	BC	11.940	1625	BBC World Service	G	eng	55444	EM
21.780	0957	Deutsche Welle	O	ger	54444	TW	17.560	1320	WHRA, South Bend, IN	USA	eng	55445	BC	13.740	1625	Voice of Vietnam	VTN	eng	43334	BC
21.830	0915	RDP Portugal	POR	por	33333	TW	17.775	1330	Radio Tashkent Int.	UZB	eng	32422	SH	15.310	1605	BBC World Service	G/THA	eng	34333	SH
21.850	0916	Vatican Radio	CVA	44444	TW	17.800	1315	Radio Canada Int.	CAN	eng	43333	SHH	15.325	1620	Radio Canada Int.	CAN/G	rus	55555	BC	
1000-1100							21.855	1336	RDP Portugal	POR	por	24322	RI	17.680	1600	Voz Cristiana	CHL	spa	54445	BG
9.785	1000	Radio Nederland	HOL/ATN	eng	25343	GG	21.830	1335	RDP Portugal	POR	por	34422	RI	21.470	1615	BBC World Service	G/ASC	eng	25533	SH
9.880	1030	Radio Prague	CZE	eng	34232	EM	1400-1500							21.490	1610	BBC World Service	G/AFS	eng	25422	SH
11.615	1050	Radio Prague	CZE	eng	45544	SH	6.110	1449	The Overcomer Ministry	USA	eng	33233	PP	21.660	1618	BBC World Service	G/CYP	eng	25433	SH
11.700	1009	Radio Bulgaria	BUL	bul	44333	RI	6.120	1416	YLE Radio Finland	FIN	fin	22222	TW	1700-1800						
12.010	1002	Voice of America	USA/PHL	chi	22222	RI	6.140	1425	Deutsche Welle	O	eng	55455	PP	5.930	1708	Radio Prague	CZE	eng	45444	SH
12.065	1002	Radio Nederland	HOL	eng	24112	EM	6.165	1444	Croatian Radio	HRV	cro	24332	RI	7.160	1721	BBC World Service	G	eng	22232	EM
12.085	1005	Voice of Mongolia	MING	eng	22222	TW	9.795	1428	China Radio Int.	CHN	eng	44444	PP	7.285	1730	Radio Polonia	POL	eng	43333	SHH
13.600	1007	Radio Bulgaria	BUL	bul	24332	RI	9.830	1440	Croatian Radio	HRV	cro	34433	RI	9.385	1735	Adventist World Radio	USA	eng	44142	EM
13.820	1000	Radio Nederland	HOL	eng	24122	EM	9.895	1413	Radio Nederland	HOL	dut	44333	RI	9.410	1750	BBC World Service	G/CYP	eng	54445	BC
15.415	1000	Radio Ukraine Int.	UKR	eng	34434	GG	11.600	1430	Radio Slovakia Int.	SVK	spa	25322	PP	9.475	1717	Radio Australia	AUS	eng	32232	EM
15.700	1005	Radio Bulgaria	BUL	bul	44344	RI	11.610	1400	Radio France Int.	F/GAB	eng	44333	SHH	9.500	1737	Radio Bulgaria	BUL	eng	55444	EM
15.760	1012	Kol Israel	ISR	heb	34333	RI	11.660	1435	Radio Australia	AUS	eng	34232	PP	9.760	1750	Voice of America	USA/MRC	eng	53334	BC
17.510	1020	All India Radio	INO	eng	54444	BC	11.730	1438	Tunisian Radio	TUN	ara	45434	PP	9.890	1748	Voice of Russia	RUS	eng	44544	SH
17.535	1012	Kol Israel	ISR	eng	44434	TW	12.075	1441	Radio Nederland	HOL	eng	34233	PP	9.925	1730	Radio Vlaanderen Int.	BEL	eng	55354	EM
17.585	1052	Radio Japan	J/UAJ	eng	35533	SH	13.630	1405	UAE Radio	UAE	ara	22432	RI	11.500	1736	Radio Bulgaria	BUL	eng	55555	EM
18.960	1035	Radio Sweden	S	swe?	45544	SH	13.665	1400	Radio Rossii	RUS	rus	33433	RI	11.510	1751	Voice of Russia	RUS	eng	23422	SH
19.010	1040	Radio Free Afghanistan	USA/?	dar	25532	SH	13.675	1401	UAE Radio	UAE	ara	34433	RI	11.640	1730	Radio Vlaanderen Int.	BEL	eng	44444	EM
21.730	1004	Swiss Radio Int.	SUI	fre	44444	TW	13.700	1410	Radio Nederland	HOL	dut	44333	RI	13.635	1718	Voice Int.	AUS	eng	44344	EM
21.740	1006	BBC World Service	G	eng	43333	TW	13.730	1415	ORF Radio Austria Int.	AUT	ger	44434	RI	15.235	1726	Bible Voice Broadcasting	G/D	eng	35232	EM
21.820	1009	YLE Radio Finland	FIN	fin	34434	TW	13.765	1416	Vatican Radio	CVA	?	22321	RI	15.265	1711	Channel Africa	AFS	eng	34543	EM
21.820	1047	Radio Japan	J																	

Scanner Base Verticals

SUPERSCAN STICK I (WIDEBAND)£29.95 PLUS £6.00p+p
*FREQ:0-2000 MHZ *LENGTH:100cm *SOCKET:SO239 *RADIALS: 3X17cm

SUPERSCAN STICK II (WIDEBAND)£39.95 PLUS £6.00p+p
*FREQ:0-2000 MHZ *GAIN:3.00dB OVER SSSI *LENGTH:150cm
*SOCKET:SO239 *RADIALS: 3X50cm

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

AR-30 (AIR BAND)£39.95 PLUS £6.00p+p
*FREQ:CIVIL & MILITARY AIR *GAIN:3.0/6.0dB *LENGTH:100cm
*SOCKET:SO239 *RADIALS:3X17cm

AR-50 (AIR BAND)£49.95 PLUS £6.00p+p
*FREQ:CIVIL & MILITARY AIR *GAIN:4.5/7.0dB *LENGTH:150cm
*SOCKET:SO239 *RADIALS: 3X50cm

These dedicated fibreglass external antennas are pre-tuned for both air band frequencies.

Get the gain and don't miss take off !!

X1-HF VERTICAL (DEDICATED HF)£49.95 PLUS £6.00p+p
*FREQ:1-50 MHZ *LENGTH:200cm *SOCKET:SO239 *RADIALS:NONE

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



Going Mobile

G-SCAN II MOBILE (WIDEBAND).....£24.95 PLUS £6.00P+P
*TYPE:TWIN COIL *FREQ:25-2000 MHZ *LENGTH: 65cm
*BASE:MAGNETIC *CABLE: 4m WITH BNC



SKYSCAN MOBILE (WIDEBAND) ..£19.95 PLUS £6.00 p+p
*TYPE:4 WHIPS *FREQ:25-2000 MHZ *LENGTH:65cm *BASE:MAGNETIC
*CABLE:4m WITH BNC

Don't lose those signals while on the move, get high performance reception where ever whenever.

Portable Antennas

SKYSCAN DESKTOP (INTERNAL/WIDEBAND)£49.95 PLUS £6.00 p+p
*TYPE:DISCONE STYLE *FREQ:25-2000 MHZ *LENGTH:90cm *CABLE:4m WITH BNC

TRI-SCAN III DESKTOP (INTERNAL/WIDEBAND)£39.95 PLUS £6.00 p+p
*TYPE:TWIN COIL *FREQ:25-2000 MHZ *LENGTH: 90cm *CABLE:4m WITH BNC

SWP-2000 (GLASS MOUNT/WIDEBAND)£29.95 PLUS £6.00 p+p
*TYPE: SUCTION MOUNT *FREQ:25-2000 MHZ *LENGTH:55cm *CABLE:4m WITH BNC

SWP-HF30 (GLASS MOUNT/DEDICATED HF)£39.95 PLUS £6.00 p+p
*TYPE:SUCTION MOUNT *FREQ:HF 0.05-30 MHZ *LENGTH: 80cm *CABLE:4m WITH BNC

MAX-5 ACTIVE (INTERNAL/EXTERNAL/WIDEBAND)£49.95 PLUS £6.00 p+p
*TYPE: ACTIVE PRE-AMP *FREQ:25-1800 MHZ *GAIN: 14dB *LENGTH: 140cm *CABLE: 4m WITH BNC



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

Discone Base Antennas

STANDARD DISCONE (WIDEBAND).....£29.95 PLUS £6.00p+p
*FREQ:25-1300 MHZ *LENGTH:100cm *SOCKET:SO239 *RADIALS: 16

SUPER DISCONE (WIDEBAND).....£39.95 PLUS £6.00p+p
*FREQ:25-2000 MHZ *GAIN:3.00dB OVER STANDARD *LENGTH:140cm
*SOCKET:SO239 *RADIALS:16

HF DISCONE (WIDEBAND/HF SENSITIVE).....£49.95 PLUS £6.00p+p
*FREQ:0.05-2000 MHZ *LENGTH:185cm *SOCKET: SO239 *RADIALS: 16

ROYAL DISCONE 2000 (WIDEBAND/STAINLESS) ..£49.95 PLUS £6.00p+p
*FREQ RX:25-2000 MHZ FREQ TX: 50-52 144-146 430-440 900-986 1240-1325 MHZ *LENGTH:155cm GAIN:4.5dB OVER STANDARD *SOCKET:N-TYPE
*RADIALS:16

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

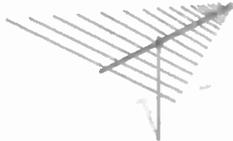


Beam Antennas

MLP-32 (LOG PERIODIC)£99.95 plus £6.00p+p
*FREQ:100-1300 MHZ TX & RX *GAIN:11-13dB *LENGTH:140cm *SOCKET: N-TYPE

MLP-62 (LOG PERIODIC).....£169.95 plus £6.00p+p
*FREQ:50-1300 MHZ TX & RX *GAIN:10-12dB *LENGTH: 300cm

These two beam antennas are sold mainly to our military & SWR 2:1 or better over the whole frequency, for performance **AR300XL** rotor for both antennas £49.95 plus £6.00 P+p



Getting Rigged Up

5' SWAGED POLES

Heavy Duty Ali (1.2mm wall)

SINGLE 11/4"£7.00

SET OF FOUR 11/4"£24.95

SINGLE 11/2"£10.00

SET OF FOUR 11/2"£34.95

SINGLE 2"£15.00

SET OF FOUR 2"£49.95

CONNECTORS

PL259/9£0.75 each

PL259/6£0.75 each

PL259/7 for mini 8£1.00 each

BNC (Screw Type)£1.00 each

BNC (Solder Type)£1.00 each

N TYPE for RG58£2.50 each

N TYPE for RG213£2.50 each

SO239 to BNC£1.50 each

PL259 to BNC£2.00 each

N TYPE to SO239£3.00 each

HI-SPEC COAX CABLE

RG58 6mm standard£0.35 per mtr

RG58 6mm mil spec£0.60 per mtr

RF mini 8 7mm mil spec£0.85 per mtr

RG213 9mm mil spec£0.85 per mtr

RH200 9mm mil spec£1.10 per mtr

(Phone for 100 mtr discount price)

Shortwave Wire Antennas

MWA-HF MKII (EXTERNAL DELUXE HF ANTENNA)

.....£49.95 PLUS £6.00 p+p

*TYPE:WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH: 25M

*CABLE: 10m WITH PL259



MD37-SKYWIRE (EXTERNAL STANDARD HF ANTENNA)

.....£39.95 PLUS £6.00 p+p

*TYPE: WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH:25M

*CABLE:10m WITH PL259



LONG WIRE BALUN (ON ITS OWN)£19.95 PLUS £2.00 p+p

Get the best from your HF receiver and get a long wire. Our own ferrite baluns give up to 2 "S" points greater signal than other similar baluns, with a smooth match over 40mhz.



Hand-held Antennas



MRW-100 (SUPER GAINER BNC)£19.95 PLUS £2.00 p+p

*FREQ: 25-1800 MHZ *LENGTH:40cm *FITTING:BNC

MRW-210 (SUPER GAINER SMA)£22.95 PLUS £2.00 p+p

*FREQ: 25-1800MHZ *LENGTH:40cm *FITTING:SMA

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

Something Extra

MRP-2000 (ACTIVE WIDEBAND PRE-AMPLIFIER) £49.95 PLUS £6.00 p+p
*FREQ:25-2000 MHZ *GAIN:14.0dB *POWER:9-15v *CABLE:1m BNC-BNC

MRP-137 (ACTIVE WEATHER SAT PRE-AMPLIFIER) £44.95 PLUS £6.00 p+p
*FREQ:137.5 MHZ *GAIN:25.0dB *POWER:9-15v *CABLE:1m BNC-BNC

UK SCANNING OIRECTORY (8TH EDITION) £19.50 PLUS £6.00 p+p

TURNSTILE 137 (DEDICATED WEATHER SATELLITE) £39.95 PLUS £6.00p+p

*FREQ:137.5 MHX *LENGTH:100cm *SOCKET:SO239 *RADIALS:4

For use with receiving weather satellite pictures.



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WOBURN SANDS, BUCKS MK17 8UR.



MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL
6.055	1832	Radio Slovakia Int.	SVK	eng	55555	EM	17.650	1909	WHRA, South Bend, IN	USA	eng	44222	EM	15.375	2114	Radio Cairo	EGY	eng	34232	EM
6.075	1812	Deutsche Welle	D	ger	43333	PP	17.735	1903	Radio Nederland	HOL	eng	34222	EM	15.400	2108	BBC World Service	G	eng	55555	EM
6.100	1846	Radio Yugoslavia (IRSM)	YUG	eng	44533	SH	17.750	1914	WYFR, Okeechobee, FL	USA	eng	24222	EM	18.930	2125	WYFR, Okeechobee, FL	USA	eng	55444	BC
6.175	1814	Radio Japan	J	jap	55555	PP	17.810	1904	Radio Nederland	HOL	eng	34233	EM	18.980	2130	WYFR, Okeechobee, FL	USA	eng	45444	BC
6.195	1825	BBC World Service	G	eng	55555	VP	17.860	1900	Deutsche Welle	D	ger	43243	VP	2200-2300						
7.185	1816	Radio Bangladesh	BGO	eng	33433	SH	17.895	1910	Voice of America	USA/MRC	eng	44434	VP	6.195	2210	BBC World Service	G	eng	55555	RS
7.410	1810	All India Radio	IND	eng	44334	BC	2000-2100							7.410	2211	All India Radio	IND	eng	44444	FH
9.290	1820	Offshore Music Radio	LAT	eng	54444	BC	5.815	2017	World Music Radio	ONK	eng	35433	SH	9.415	2233	Radio Prague	CZE	eng	44444	FH
9.475	1821	Radio Australia	AUS	eng	32433	PP	5.850	2046	Radio Canada Int.	CAN	eng	44444	FH	9.445	2228	All India Radio	IND	eng	44444	FH
9.480	1845	Voice of Russia	RUS	eng	45433	SH	5.945	2042	ORF Radio Austria Int.	AUT	ger	33333	TW	9.475	2240	WWCR, Nashville, TN	USA	eng	43333	BC
9.660	1823	Radio Exterior Espana	E	fre	44444	PP	6.065	2044	Radio Sweden	S	swe	33333	TW	9.720	2220	Deutsche Welle	D	eng	55555	RS
9.730	1835	Voice of Vietnam	VTN	fre	44344	PP	6.195	2001	BBC World Service	G	eng	44433	SH	9.880	2238	China Radio Int.	CHN	eng	44434	TW
9.740	1839	Deutsche Welle	D	ger	33333	PP	7.105	2040	Radio Minsk	BLR	eng	45334	VP	9.885	2200	Swiss Radio Int.	SUI	eng	54444	BC
9.760	1830	Voice of America	USA/MOR	eng	35544	FW	7.140	2016	China Radio Int.	CHN	eng	33333	FH	12.160	2250	WYFR, Okeechobee, FL	USA	eng	55445	BC
9.785	1820	Voice of Turkey	TUR	eng	55545	VP	7.185	2050	Radio Bangladesh	BGD	ben	54423	VP	13.620	2217	Radio Australia	AUS	eng	25444	FW
9.890	1810	Voice of Russia	RUS	eng	54444	BC	7.190	2000	China Radio Int.	CHN	eng	53444	EM	15.290	2202	Voice of America	USA	eng	44444	FH
9.960	1825	Voice of Armenia	ARM	eng	44444	EM	7.210	2045	Radio Minsk	BLR	eng	43443	VP	15.600	2210	Radio Taiwan Int.	TWN/USA	eng	25444	FW
11.500	1845	Radio Bulgaria	BUL	eng	55545	VP	7.235	2010	China Radio Int.	CAN	eng	45544	FW	2300-0000						
11.550	1820	Radio Ukraine Int.	UKR	ukr	44333	VP	7.295	2000	China Radio Int.	CHN	eng	45434	VP	7.280	2309	Radio Romania Int.	ROU	eng	31231	SH
11.625	1840	Vatican Radio	CVA	lat	35544	FW	7.350	2020	WYFR, Okeechobee, FL	USA/MOA	eng	55555	VP	9.590	2311	Radio Romania Int.	ROU	eng	45444	SH
11.630	1800	Voice of Russia	RUS	eng	55344	VP	7.450	2035	ERT 3	GRC	gre	55534	VP	9.645	2313	Radio Romania Int.	ROU	eng	35433	SH
11.720	1835	Radio Pilipinas	PHL	eng	33232	EM	7.475	2050	Voice of Greece	GRC	gre	55545	VP	9.700	2319	Radio Bulgaria	BUL	eng	45544	SH
12.105	1835	Voice of Greece	GRC	gre	45433	SH	7.590	2010	AFRTS	USA/ISL	eng	25544	FW	11.700	2353	Radio Bulgaria	BUL	eng	55555	MC
13.740	1811	Voice of Vietnam	VTN	eng	33333	SH	7.935	2020	CNR 1	CHN	chi	44323	VP	11.940	2315	Radio Romania Int.	ROU	eng	45434	SH
13.770	1835	RDP Portugal	POR	por	55545	VP	9.325	2035	Voice of Korea	KRE	kor	33333	GeG	13.620	2322	Radio Australia	AUS	eng	15421	SH
13.830	1845	China Radio Int.	CHN	eng	55545	VP	9.500	2055	Radio Australia	AUS	eng	32222	GeG	13.680	2300	China Radio Int.	CHN	eng	54445	BG
15.190	1836	Radio Pilipinas	PHL	eng	44243	EM	9.570	2000	Radio Exterior Espana	E	eng	44444	GG	13.785	2320	Radio Canada Int.	CAN	eng	35433	SH
15.310	1820	BBC World Service	G/THA	eng	32323	VP	9.605	2035	RAI Int.	I	eng	53554	VP	Dxers:-						
15.380	1819	Radio Romania Int.	ROU	? eng	45344	EM	9.645	2030	Vatican Radio	CVA	fre	54434	VP	BC	Bernard Curtis	NC	Noel Cosgrave	PP	Peter Pollard	
15.395	1820	UAE Radio	UAE	ara	32433	VP	9.660	2020	Vatican Radio	CVA	eng	55545	VP	EM	Eddie McKeown	RH	Robert Hughes	RH	Rhoderick Illman	
15.760	1800	Kol Israel	ISR	heb	44434	VP	9.770	2049	Voice of America	USA	eng	44444	FH	FH	Francis Hearne	RI	Rhoderick Illman	SH	Sheila Hughes	
17.720	1835	Radio Pilipinas	PHL	eng	24222	EM	9.890	2055	Radio Nederland	HOL/MDG	eng	25544	FW	FW	Fred Wilmschurst	SH	Simon Hockenull	SHH	Simon Hockenull	
21.455	1820	WYFR, Okeechobee, FL	USA	ger	44334	BC	9.990	2000	Radio Cairo	EGY	ger	54534	VP	JP	John Parry	TB	Tony Barrett	TW	Thomas Williams	
21.470	1815	BBC World Service	G/ASC	eng	44334	BC	11.600	2003	Radio Prague	CZE	eng	35544	FW	MB	Mike Barraclough	VP	Vic Prier	VP	Vic Prier	
1900-2000																				
5.775	1907	IRRS	I	eng	34132	EM	11.690	2000	Radio Canada Int.	CAN	eng	33323	GG	Equipment Used						
5.890	1959	Vatican Radio	CVA	eng	34433	SH	11.750	2000	V of Islamic Rep of Iran	IRN	eng	25544	FW	Bernard Curtis - Realistic DX-400 + outdoor wire						
5.945	1940	ORF Radio Austria Int.	AUT	ger	34433	SH	11.905	2030	Radio Tashkent Int.	UZB	eng	35544	FW	Eddie McKeown - Grundig YB400 + whip						
5.970	1937	RAI Int.	I	eng	44332	SH	11.955	2000	Radio France Int.	F/GAB	fre	42243	VP	Francis Hearne - Sharp WQT370 or Yaesu FRG-7 + wire or Vega Selena + whip						
6.025	1902	Radio Budapest	HNG	eng	44232	EM	12.040	2000	Voice of Russia	RUS	ser	45534	VP	Fred Wilmschurst - JRC NR0-525 + indoor wire or Sony ICF-20010						
6.065	1954	Radio Sweden	S	eng	44444	FH	12.070	2003	Voice of Russia	RUS	eng	44444	BC	Geraint Gill - Grundig YB400 + whip						
6.165	1928	BBC World Service	G	eng	55445	MC	13.605	2020	All India Radio	IND	eng	44434	FH	Gerald Guest - Roberts RC818 + 10m wire						
7.155	1900	Radio Thailand	THA	eng	43344	VP	13.700	2050	Radio Canada Int.	CAN	eng	45544	FW	John Parry - Yaesu FT-767 + dipole						
7.210	1956	Radio Minsk	BLR	eng	33333	FH	15.290	2000	Radio Exterior Espana	E	eng	45544	EM	Pete Hodgkinson - no information						
7.250	1950	Vatican Radio	CVA	eng	55545	VP	15.455	2015	Voice of Russia	RUS	eng	32222	TW	Peter Pollard - Sony ICF-2001D + whip						
7.295	1900	China Radio Int.	CHN	eng	43324	GG	15.630	2020	Voice of Greece	GRC	gre	45534	VP	Phil Townsend - ADR AR7030 + amplified frame						
7.410	1943	All India Radio	IND	eng	35444	FW	17.650	2030	WHRA, South Bend, IN	USA	eng	44444	BG	R Frost - Roberts digital radio						
7.440	1915	Voice of Russia	RUS	eng	55545	VP	17.810	2031	Radio Nederland	HOL/ATN	eng	45433	SH	Rhoderick Illman - Kenwood R-5000 + wire or Sony AN1						
9.290	1915	Offshore Music Radio	LVA	eng	54434	VP	17.830	2033	BBC World Service	G/ASC	eng	35433	SH	Robert Hughes - ADR AR7030 + RF Systems Magnetic Transfer Antenna						
9.325	1908	Voice of Korea	KRE	eng	33233	EM	18.980	2025	WYFR, Okeechobee, FL	USA	eng	25544	FW	Scott McMurray - Realistic DX-394 + wire						
9.410	1920	BBC World Service	G/CYP	eng	55534	VP	2100-2200							Sheila Hughes - Panasonic DR48 or Sony ICF-7600DS + 16m outdoor wire or home-brew loop						
9.420	1910	Voice of Greece	GRC	gre	45434	SH	5.800	2150	Radio Bulgaria	BUL	eng	45544	FW	Simon Hockenull - Roberts R876, R617, R817 + whip or AKO Target HF3 + 4m indoor wire						
9.445	1900	All India Radio	IND	eng	53444	VP	6.005	2130	OLR Berlin	D	ger	55545	VP	Thomas Williams - Grundig YB400 or YB200						
9.500	1900	Radio Australia	AUS	eng	33323	GG	6.025	2130	Radio Budapest	HNG	eng	44444	SHH	Vic Prier - Fairhaven RD5000X + Datong AD-270 or vertical						
9.585	1905	China Radio Int.	CHN	eng	34433	SH	6.065	2140	Radio Sweden	S	eng	55555	VP							
9.605	1939	RAI Int.	I	eng	43533	SH	6.100	2102	Radio Yugoslavia (IRSM)	YUG	eng	35333	SH							
9.785	1918	Voice of Turkey	TUR	eng	33333	FH	7.130	2133	Radio Tirana	ALB	eng	45444	GeG							
9.890	1900	Voice of Russia	RUS	eng	54534	VP	7.190	2156	China Radio Int.	CHN	eng	34444	FW							
9.895	1905	Radio Nederland	HOL	eng	42332	EM	7.210	2145	Radio Minsk	BLR	eng	44434	VP							
9.950	1900	All India Radio	IND	eng	55555	VP	7.225	2136	Tunisian Radio	TUN	ara	45444	GeG							
11.510	1900	Voice of Russia	RUS	eng	45434	VP	7.285	2138	Radio Romania Int.	ROU	eng	45544	EM							
11.520	1944	Unidentified	?	eng	22222	TW	7.410	2118	All India Radio	IND	eng	44222	EM							
11.550	1902	Radio Ukraine Int.	UKR	? eng	33333	PP	7.420	2115	Radio Ukraine Int.	UKR	eng	44444	SHH							
11.620	1900	All India Radio	IND	eng	52233	VP	7.500	2127	Radio Bulgaria	BUL	eng	55434	SH							
11.715	1907	Radio Budapest	HNG	eng	43444	PP	7.590	2110	AFRTS (u.s.b.)	USA	eng	34434	VP							
11.720	1922	Radio Budapest	HNG	eng	43323	SH	9.325	2140	Voice of Korea	KRE	kor	44434	VP							
11.775	1910	China Radio Int.	CHN	ger	44444	PP	9.440	2130	Deutsche Welle	D	eng	35333	GeG							
11.795	1914	Deutsche Welle	D	ger	44444	PP	9.470	2135	All India Radio	IND	eng	34232	EM							
11.815	1937	Swiss Radio Int.	SUI/D	eng	35333	SH	9.570	2110	Radio Exterior Espana	E	eng	54545	VP							
12.000	1940	Voice of Russia	RUS	fre	45434	VP	9.600	2106	China Radio Int.	CHN	eng	44444	FH							
12.070	1914	Voice of Russia	RUS	eng	45544	SH	9.725	2151	Radio Romania Int.	ROU	eng	44444	FH							
12.080	1954	China Radio Int.	CHN	eng	35333	SH	9.840	2105	Radio Exterior Espana	E	eng	44343	EM							
12.105	1950	Voice of Greece	GRC	gre	45323	VP	9.950	2105	All India Radio	IND	eng	34333	TW							

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A superb top of the range HF receiver. This product has certainly proved itself in both the commercial and domestic markets.

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Optional DSP including fitting£149.99

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OUR PRICE **£159.95** P&P £10

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IDEAL FOR NAVTEX RECEPTION



A superb performance all mode synthesized world receiver with true SSB and 40Hz tuning for ultra clean reception. The same radio is sold under the Roberts name at nearly twice the price. Other features include RDS facility, 306 memories and WFM. Incl's case/earphones/wind-out antenna.

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hf accessory items to enhance your listening

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Ant B (30-2000MHz) } insertion loss

Can be used in reverse

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BNC SO239 adapter£3.95

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The MLB contains a special impedance matching transformer which converts any

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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

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Q-TEK STEALTH SR-60

Covers 0.2-50MHz. 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).

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DX-10 (R.F. SYSTEMS)

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).

£189.95 DEL £11.00

DX-1 PRO (R.F. SYSTEMS)

Professional active S/W antenna constructed for commercial use. Includes indoor (low noise controller). Ideal for the serious enthusiast. This antenna is currently in use by many embassies as well as military & governments monitoring stations.

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Q-TEK APOLLO 3000

A brilliant new compact indoor antenna that covers 0.1-3GHz and is just 24" when collapsed. Features "horizontal or vertical" adjustable elements. Ideal for table top mounting or by the window. Patch lead with BNC plug fitted. (Frequency range: 0.1-3GHz).

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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 (most clamps supplied). 50MHz-2.6GHz and under 1.3m long

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Superb micro magnetic mount antenna. (≈19" long), covers 0.5-2GHz and is supplied with miniature coax lead and BNC fitted. A must for the car!

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DB-2000

A superb "BNC" black telescopic whip. Ideal for scanners. Folds neatly away. (0.1-2GHz).

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Superb SMA antenna at under 3 1/2" long. (Less than 90mm). This antenna is ideal for use at airshows or undercover surveillance work.

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Bandscan

America

● **Gerry Dexter** do SWM Editorial Offices, Arrowsmith Court, Broadstone, Dorset BH18 8PW
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Something strange and wonderful happened in late August. Short wave reception conditions in North America took a sudden turn for the better. Even daytime reception in the middle of the country (where your scribe is located) improved, even if only marginally. Perhaps this change is just a happy 'blip' in the long dry spell that has lasted for the past two years. Or dare we hope it's the beginning of a genuine upturn in reception fortunes? That can't be known one way or the other until it either happens, or doesn't happen. We can only wait and see what the propagation 'gods' have in store for us over the winter DXing 'season'.

Herald Broadcasting (the Christian Science Church) has sold its WSHB station in Cypress Creek, SC to World Harvest Radio (WHRI, etc.), which quickly began programming on WSHB. Oddly, WHRI's four 100kW transmitters were taken off the air at the time of the change and, as far as can be determined, now sit idle and silent. This seems an odd bit of fallout after having spent \$2 million for the Herald facility.

The US Armed Forces Network/AFRTS short wave station line-up no longer counts the site at Diego Garcia as an active participant. This removes a very juicy DX target, which was the focus of many listener hours, fruitlessly spent. Only a very few lucky ones managed to find something on 4.319 or 12.579. We hope this outlet gets active again.

Meanwhile, the AFN outlet at Grindavik, Iceland has begun using 9.980 u.s.b., apparently replacing 13.855. Later there came word that both of these frequencies had gone silent. Only temporarily, we hope!

As far as we know those 'Coalition Forces' broadcasts, also known as Radio One and sometimes Information Radio are still being broadcast from 250W shipboard transmitters. A few in Europe have picked up the signal on 6.125 or 15.500 upper sideband. Supposedly these broadcasts will eventually be shifted to one or more of the Merlin transmitter sites.

Commando Solo - the airborne broadcast platform that has been used by the US military for broadcasts to Afghanistan and later Iraq during times when regular broadcasts haven't been possible, is now being used for Radio Marti, carrying those broadcasts to Cuba on 530kHz medium wave and TV channel 13. There are reports that short wave will be added to this facility in the near future.

Sudden Appearance

Another surprise was the sudden appearance of a new US - International Broadcasting Bureau

transmitter site. No one seemed to know a short wave site was being constructed in Kuwait! At the time of writing, the facility is being used for Radio Free Afghanistan and VOA broadcasts to Afghanistan on this schedule:

17.605 at 1330-1430 for RFA in Dari
13.690 at 1430-1530 for VOA in Dari
13.690 at 1530-1630 for VOA in Pashto
11.760 at 1630-1730 for VOA in Dari
11.730 at 1730-1830 for VOA in Pashto
11.730 at 1800-1830 for VOA in Dari
11.750 at 1830-1930 for VOA in Pashto
11.835 at 1930-2230 for VOA in English
11.935 at 2230-0030 for VOA in English
11.995 at 0030-0230 for VOA in Pashto
11.845 at 0230-0330 for RFA in Pashto



Adventist World Radio issues this yellow and black card from its UK HQ.

By now, though, these may have been modified to some degree, what with the move into the B04 broadcast schedule.

Although it is almost never reported in North America, it seems the Colombian clandestine station La Voz de la Resistencia, operated by the FARC guerrillas is still active. It is using 6.120 and 6.239 and has been heard in Ecuador around 0030. This is almost certainly a very low power operation. Various reports over the years have indicated that the transmitter is of a type that can be moved quickly if and when that becomes necessary, which would explain the power problem and thus the difficulty in hearing the station.

On the other hand, FARC now controls a large part of Colombia so, one would think a relatively safe haven for operation could be found somewhere. Certainly FARC has the money (thanks to drug trafficking) so they can afford to install a better facility.

Also in Colombia, La Voz de tu Concencia (6.010) has been having equipment problems, but is still managing to stay on the air, although at a somewhat reduced power. They are also planning on opening a second frequency, 5.910 or 5.915, which should do better than the very

congested 6.010. This could well be on the air by now. And, Colombian, Radio Macarena has been reactivated and is now using 6.090 from Villavicencio.

New Station

A fairly new short wave station in Bolivia is Radio Virgende Remedios in Tupiza, Potosi Department, part of a Catholic radio network in Bolivia. The station is using 5.500 and runs until 2230 sign off.

Also in Bolivia we welcome the return of Radio Illimani on 6.025 now using a new 10kW transmitter. Normally this one operates from 1000 to 0400 in Spanish and local Indian languages. Another one, Radio Santa Cruz (6.135v) is also being heard well of late.

Also back after an absence forced by technical problems is little Radio Verdad (4.0525) in Guatemala, which is often heard quite well during North American evenings (0000-0300 or later).

Another station, which has been doing much better lately, is Radio Transamericana, XERTA, in Mexico City using 4.810. Normally the strong unidentified noise source on 4.810 obliterates XERTA's signal, but recently the Mexican's signal has been strong enough to at least make a statement.

Religious broadcaster Radio Amanecer in the Dominican Republic is being heard again on its normal 6.025 spot.

Their ID often includes the phrase 'La Voz de la Esperanza'. This Santo Domingo station normally operates from 1000 to 0400.

HRMI - Radio Misiones Internacional - on 3.340 and 5.010 may also have resumed operations after a brief absence. We noted something on 5.010 recently, which sounded

like their part English, part Spanish programme format.

Still another 'long lost' 60m Latin has reappeared. La Voz de Saquisilí, 4.899v in the town of Saquisilí is active again. In their IDs they use the phrase 'Radio El Libertador' just before the station name. In Chile, Voz Cristiana has discontinued its Portuguese language broadcasts from 2000 to 2300, as well as transmissions in English from 2000 to 0000.

Further south, Radio Nacional Arcangel, San Gabriel, at Base Esperanza, Argentine Antarctica has resumed activity for the season. A few receptions have been reported on the station's usual 15.476 spot, running to sign off as late as 2100 (usually a bit before that). Signals, however, are never very strong so it takes a little digging and more than a little luck to snare this one.

Radio Miami International (WRMI) has added a new frequency - 6.870 is active from 1400 to 1600 and again from 2300 to 1200. The Cubans began jamming almost as soon as the change was made. The frequency 6.870 replaces 7.385.

That covers things for this time. I'll be back with more from The Americas in the February SWM. Until then, good listening!



We've heard that Radio Slovakia International is in trouble. Could it be their that their building is upside down?

WXSAT special

WXtoIMG

Part 1

Lawrence Harris starts off the WXSAT Special with a review of Weather Satellite APT Audio Signal Decoding Software. Take it away Lawrence...

One of the earliest of the soundcard APT recording and decoding programs was called *wxsat*. With a weather satellite receiver providing a demodulated signal into the input of the soundcard, the program could analyse the signal and record it as a sound file. This could be processed after the pass was complete. A rather more advanced program - *SatSignal* - arrived on the scene a few years later. This review is about a program written by New Zealand author **Craig Anderson** of **Abstract Technologies New Zealand Ltd.** called *WXtoIMG* - as in 'weather satellite to images'.

What Does It Do?

WXtoIMG can perform a number of tasks associated with WXSAT monitoring; its prime capability is recording incoming a.p.t./WEFAX data fed from a WXSAT receiver into the soundcard of your computer. This is decoded in real-time while being saved as a sound file.

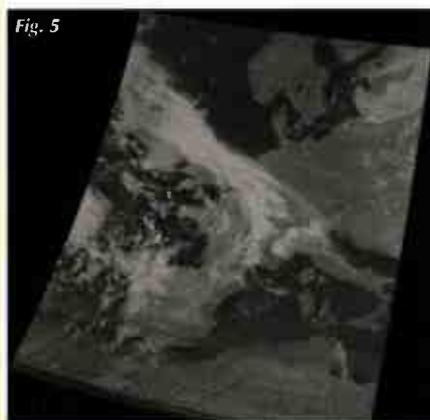
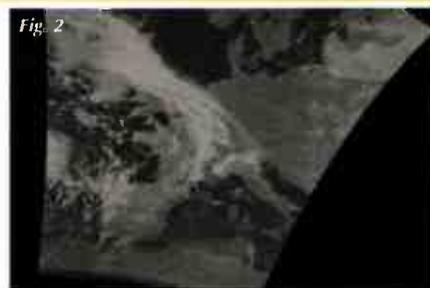
If your computer is a little older and slower than recent machines, real-time decoding can be disabled. The program knows which satellites are active and their current orbital positions, and therefore pass times, as long as you update the Kepler elements regularly. If the computer is online, this is a one-click job. After the pass, the data is automatically processed in various ways, and a set of images produced, including artificially enhanced ones.

WXtoimg supports map overlays, animations, advanced colour enhancements, 3-D images, multi-pass composite images, projection transformation, text overlays, automated web page creation, temperature display and even control for WXSAT and many communications receivers and scanners. The software has built-in image processing functions.

NOAA a.p.t. telemetry carries calibration information (the grey scales and time markers along the sides), and this data is used to accurately calibrate the image, correct for non-linearities in signal strength and also make adjustments for gain changes across the pass. Calibration is also used to provide accurate temperature readings.

The program is fully functional with WEFAX, but I have not tested this facility because WEFAX transmissions from *METEOSAT-7* are being terminated in a matter of months. In the presence of noise during a NOAA pass, the

phase-lock loop facility maintains a straight edge on most passes. Other facilities, where tested, are referred to in this review. Being a highly functional program, it has several facilities that I did not test, but I believe that I have sampled most of the common applications. The program can be downloaded from the Internet www.wxtoimg.com



The program is then installed to your computer's hard drive; for best results, do ensure that you use a suitable WXSAT receiver, although the software appears to work quite well with non-WXSAT receivers, judging from the pictures that readers have previously sent to me. Your receiver should be connected via an audio cable into the 'line' input connection of your soundcard.

I use my portable computer for a.p.t. The free version of *WXtoIMG* has a built-in 10-second delay (a 'nag' screen) before moving to

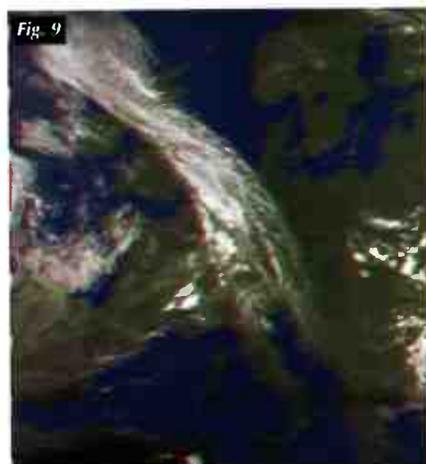
the main screen. I was able to register the software after running the basic version for a few weeks in order to experience the program as new users would see it.

Setting Up & Calibration

The first screen requires setting up the hardware and performing associated calibration procedures. The program does not fail if you are not connected up, or are not online; calibration can be done later.



● Fig. 8 Radar image. Crown Copyright Met. Office.



● Figures 1 to 7, and 9 show various image formats and projections derived by WXtoIMG.

The initial tests require the soundcard to be configured so that the sound level received from a satellite during a good pass is optimised. The card's line-input is used and a suitable level set. The extensive instructions cover most eventualities. Ensure that the line-input is enabled on the soundcard volume control properties. Ground station location can be entered; the default is London. This entry is found under Options and for most larger towns you can enter the name and use the look-up facility to obtain the data. If you are online, you can update the Keplers now.

For my tests, I had my Proscan receiver fed by a roof-top crossed-dipole antenna, and the resulting signal was cabled into my computer via the soundcard's line input. I used a standard DIN-to-audio cable having three coloured leads. I had no other adjustments to make because the volume level proved suitable, as seen on the main display - showing up to 80% or so, as recommended in the instructions.

After updating the Keplers, the program knew what NOAA satellites were operational and set itself to record the next pass. I let the

program record, process and then stopped it. Having a good sound file allows you to optimise other settings. The first pass required slant correction. This was expected, and the procedure to correct it is simple. Following that procedure, the process was not required again.

A few sessions after I first started running the program, I discovered many basic settings that needed to be made for the best performance. You would find these by careful reading of the extensive help manual - an included PDF file - but these settings might take some time to be spotted!

Options, recording options: for best performance, you should check these parameters. For a.p.t. recording, check receiver type: There is a list here of many receivers, including low-bandwidth utility receivers. WXtoIMG can control the receiver - hence this setting - though if the computer is not connected to the receiver via a control cable, this won't have any effect.

The registered version of the software has the option to partially compensate for narrow bandwidth receivers. The sample bits and sample rate should be set to 16 and 11025 for optimal recording. Finally, fill in your preferred settings for satellite data: passes with maximum elevation above (I use 10°, though I can hear lower elevation signals), and recording above a minimum elevation (I use 6°). These settings should eliminate most poor quality signals, and the setting allows detection of the 2400Hz sub-carrier, or squelch or nothing.

Screen Commands

When the program is running, but not actually decoding data, the display offers both menu and tab options. Depending on the operation underway, some may be greyed out. During a decoded pass, only the file and help options are available; this is because others could interfere with the decoding process and cause missing data.

Settings within the program, such as enhancements, are applied to every subsequent image. In this way, a consistent set of images is produced. The exception is the Image option that allows you to enhance the current image, rather than make permanent settings. This aspect is referred to later.

The menu options include: File, Satellite, Enhancements, Options, Projection, Image and Help.

Each option provides a choice of associated options, too many to simply list. I am summarising the options that I believe are most significant for most requirements.

File: options lets you open both original audio files and raw images. You can save the current image in the format specified elsewhere. Note that this was one of the more complicated aspects of WXtoIMG, in that several options require related options elsewhere being set. Once you have things set to your preferences, it becomes easy to use. You can save your image in any format by entering: `myimage.bmp`.

Alternatively, enter `myimage` and it is saved under the format specified under Options,

Image and movie options. Composite Image offers the combining of two or more images to produce a single (composite) image covering a larger area - see later.

You can transfer images via the save raw image as option to produce png format images. This (raw) format includes several parameters recorded from the original recording, and can therefore be used for archive purposes, or for transferring between computers for other processing. Mixer control is used for the basic setting of input signals and volume levels, essential for optimum recording quality.

Record - is a fundamental command to start the process of recording incoming data. Use this option to set parameters such as how long you wish to retain audio files, raw and processed images and maps. Without setting, these may accumulate on your computer. The production of images, movies, composites and even a web page is selected here. The latter permits the automated updating of images on your website, after setting the parameters for the various processes - for example your web server details and the image names. Once you start the program in record mode, the process of waiting for the pass, recording it, processing the result to display in real-time, post-processing the set image formats, and continued pause for the next pass is only stopped by using file, stop.

If you set the programme to record only, the files can be processed later. This lowers the CPU workload, particularly significant for lower specification computers. My 1500MHz AMD processor was able to process several image formats following each pass, within a couple of minutes of the end of a pass. Update Keplers does an instant update via the Internet. Satellite pass list provides your list of operational passes for the period that you select.

The Satellite option distinguishes between polar and the various geostationary satellites. Enhancements provides the longest list - 28 - of options of all the menus. When I started studying these numerous options it struck me just how far we have journeyed with WXSAT image processing since the mid-1980s. The telemetry has contained much the same data for decades. What has changed is the ability to use the data and interpret it in greater depth. The options available are mostly applicable to NOAA, though some are designed for GOES images. Not all are available all the time. A few require a different channel configuration, based on the occasional changes from the normal channel 2-4 transmissions. I tested some of these options.

Normal produces a standard a.p.t. image using only the basic settings. Pristine provides the "best representation of the original digital data", and excludes enhancements other than normalisation. The MCIR map colour and MSA (multispectral) enhancements are highly effective. The MCIR option uses a calculated map to colour the sea, land and clouds, with shades on the infra-red image. The MSA option uses both channels to determine the most likely areas of sky, land and sea - and produces a vividly coloured image from this analysis. My impression was that this produced one of the

most effective artificially coloured images. There are several other enhancements available.

Precipitation (rain) can be indicated using the MSA with precipitation option. The multi-spectral interpretation for colour is modified for high, cold cloud tops to give an approximate indication of the probability and intensity of rain. On the sample that I used, it compared quite well with the Meteorological Office's rain radar map - see Fig. 8.

Options: some 21 options, of which at least a few should be set by the end of taking your first couple of passes, as described earlier in this review. Disable map overlay was my first option! I don't like country outlines, though I can see why others do like them. Picture quality parameters such as contrast (various types), gamma correction and sharpen are available, though some require the registered version.

Images can be annotated using the registered version via the text option. Another registered version enhancement is the projection options facility in which you can enter reference points at which to centre your projected image. The image and movie options was mentioned briefly before. It is used to set the formats (png, etc.) of the various images. Lossless formats are recommended for composites to prevent image degradation. Some expert adjustments are available - such as

MSA Land to Cloud, the transition level between cloud and land - if careful analysis shows that they have too much of the wrong colour.

Composites

The upgrade version includes the option to produce a composite containing two or more separate satellite passes covering adjacent, often overlapping areas. After checking contrast settings as per the help file, we open file, record, create composite image. Then under composite image settings, set your required enhancements and your image boundaries. Such composites can be done automatically or manually, as required. Spend some time trying the options and you can produce some very effective images.

Anaglyphs

One enhancement for upgraded versions is the production of anaglyphs. These are simulated 3-dimensional images that have to be viewed with special glasses (fitted with one red and one blue lens). For those with 'normal' eyesight, you should see an effective 3-D simulation. It doesn't work for me, but it worked perfectly for Marion! I have a dominant right eye and cannot view both images simultaneously. Marion told me that it

was an effective picture and could even see the whiter clouds above the darker clouds. Naaah - I don't believe it!

Projection

Although I studied geography at school, I wonder whether some of these image projections have been invented since those days! Have you ever heard of Mollwiede? The more common Mercator (commonly used for maps) and Orthographic are just some of the selection of projections available. It is worth noting that projection selection applies to every subsequent decoding, so remember to re-set to normal if that is your preference - although you can re-convert later. The original audio file is not affected by your decoding options.

Registration

The basic version of *WXtoIMG* is free. This may provide all you need initially. It records and decodes sound files and produces many of the colour image formats. I used this version for several days without any problems. There are two levels of registration: standard (about £50) and professional (about £81). Both upgrade options provide many enhancements. For review purposes I have used the professional version, but have pointed out where this applies.

MSG SYS DVB Trial

WXSAT special Part 2

Lawrence Harris reviews the MSG SYS DVB Trial - METEOSAT-8 Image Management From Italy.

Luca De Angelis is the Marketing Manager of C.C.E. Bologna, Italy, and he invited me to download and review *MSG SYS DVB Trial* - their program for processing *METEOSAT-8* data. This is a software review, but a suitable satellite television broadcast system is required for its use. For completion, therefore, I have included a brief description of a typical system and the additional (*Tellique*) software that must be installed before this review software can be used.

It was not the easiest of programs to review; I was only able to obtain the DEMO version

within a reasonable time, and this is difficult to use for review purposes because of text displayed over most images, and the saving of images is prevented. To partly overcome these obstacles, I did screen grabs to illustrate the overall look-and-feel of the software.

First - The Essentials

Many people already have a satellite television receiving system, either for Sky television or one of the standard satellite direct broadcasters. We can buy a basic unit comprising dish, ground stand or mast, LNB (low noise amplifier block) and various forms of receiver.

The normal equipment for watching satellite television is of course a standard television - but a computer-installed television card can now be bought amazingly cheaply, and these even include recording facilities, so you can watch programmes on your computer. If you are

proposing to set up a system specifically for receiving *METEOSAT-8* signals via *HotBird-6*, there are recommendations made by EUMETSAT in order to ensure that your system will be fully compatible. Their publication *td15.pdf* is available free of charge from their website www.eumetsat.de (select publications, technical and scientific) and provides all the technical details that you need.

Potential users need to understand that the software processes data already received and decoded using EUMETSAT's *Tellique* software, so this is a pre-requisite before considering this (or any comparable) program. The program and manual is available as a download from: www.cce-bologna.com

Note that this version of the software does not function on networks. It therefore requires a suitably specified computer for proper running. It is designed to be used on a computer already receiving *METEOSAT-8* data - EUMETCast - via the satellite television transponder on *HotBird-6*.

You should have a *HotBird-6* dish receiving a good signal strength, and have installed the *Tellique* software, edited in your EUMETSAT username and password and be seeing the data files coming in the directories set-up within the *Tellique* software. This is the point at which *METEOSAT-8* file decoding software, such as *MSG SYS DVB Trial*, takes over.



● Fig 1: LRIT images list. This displays the current list of images of a selected LRIT format.



● Fig. 2: The main (HRIT) display during normal image decoding.



● Fig.3: Sample image during zoom.

Installation

The manual available with the software comprehensively explains how to set-up the *TelliQue* software and editing of the files. It describes how to check the settings, such as IP address of the network card, in case you have configuring problems. The notes are detailed and should prove invaluable if you have a problem. Many of the problems described in posts on the WXSAT forums could probably be solved using EUMETSAT's notes, or this manual (available for free download).

Any such software should provide an option to locate the accumulating *METEOSAT-8* files delivered by the *TelliQue* software, and be able to assemble them as received, in or out of

sequence, and to save them in a defined directory, and to preferably be able to delete the original files by specific settings, and also to delete the new image files after an optional period of time.

Several gigabytes of data can accumulate on a daily basis, particularly if you are licensed to receive the various types of meteorological data transmitted by EUMETCast. *METEOSAT-8* is a treasure house of data of many types.

It installs quickly and provides optional program location. I used the default directory. On first run, the Setup screen asks for your latitude and longitude, and the location of the original files saved in the *TelliQue* directory.

Program Set-up

As well as its initial appearance during installation, the Setup menu is on the main menu - see later - and provides five tabs: Program, Options, DVB reception, RAW and Key.

Program: provides settings for Time offset from UTC, potentially confusing because Windows already has settings for this; enter the time difference between GMT and your local time zone. Monitor the results before leaving this permanently set.

Receiver location QTH: enter your station's longitude and latitude, or enter zero if you do not want the small QTH circle.

Automated image deletion: The choice is limited to 12, 24, 36 and 48 hours. This implies some early decisions regarding the retention of any interesting images. I have sometimes been advised of interesting features two or three days after the event, so consider archive saving for longer timescales if required.

Options: offers an optional colour mask for the images, coastline markings, latitude and longitude crosses and European capitals when zoomed. Several of these options also appear elsewhere.

DVB reception offers directory pointing for reception, and the placement of HRIT and LRIT image data. RAW offers the saving of *METEOSAT-8* channel data in RAW format to 10-bit resolution.

Key: This option is used to upgrade the Trial version to a fully working program.

Facilities

The program always saves the original images in bmp format. This is to eliminate the time

otherwise taken for conversion to compressed formats, such as GIF. The result is a fast operation at the expense of hard disk space, though recent computers usually come with large hard drives installed, so this should not be a problem.

Image files can later be saved to other formats if required. I would personally prefer an option to save these original images in uncompressed JPG format. One animation option (file menu) actually requires this (see 'Final Thoughts').

The program starts decoding as soon as it is run. I wanted to pause processing for several minutes; this can be done using decode, decode interrupt, on the main menu. You are given ten minutes, after which you are asked whether a further pause is required or not. The program can be re-started at any time.

Images can be displayed in their original grey-scale, or masked to add artificial colour. The software can superimpose land-sea borders, country outlines and latitude and longitude intersections with 5° intervals. The primary colours (red, green and blue) can be assigned to images of three different spectral channels, creating artificial colour to enhance features.

Working Through The Menus

The main screen provides File, View, Setup, Layout Save, Layout Restore, Decode and Help.

File: provides the main access to all current images via HRIT images and LRIT images lists. Load either, and a list of the current images of the selected format is displayed in chronological order, together with a small version of the latest image, details of image data and the precise location of the directory.

The LRIT list includes separate tabs for *METEOSAT-8* (LRIT), *GOES-140E*, *GOES-135W*, *MET5*, *MET7* and *MPEF*. A button is provided for selection of the waveband required, so if you have some images available, these are listed and the latest one is displayed. It does mean that you may have to select the band first in order to see whether images are available.

It would be useful to have a small display of all image channels to immediately identify those present. This could replace the directory screen which, in my view, wastes space because it is defined elsewhere and provides no new information.

With images that are updated frequently, such as *MET5*, a list of images of the selected band is shown, together with the latest image. Any selected image can be loaded by either clicking, or clicking Load. The Trial version produces unusable images.

Curiously, when a loaded image is clicked, the associated (Load BMP) screen closes without warning, so you cannot simply choose a different image without re-loading. The reason for this was not clear to me. You can opt to display either full images or those still updating.

The HRIT list has a similar presentation to the LRIT list, showing the latest sample image as selected from the 12 spectral band options. Operations are identical; any image can be loaded to see full resolution. From the loaded image, several possible choices are available:

Image Options

An individual image is presented in a small display window with four options. It can be reduced in size by clicking the minus sign (except at the smallest display), or zoomed progressively to maximum resolution using the plus symbol. Three small text displays show the cursor's location, latitude and longitude.

An 'i' icon offers information about the image - such as missing segments - and the fourth option provides a new window with further options. This appears to provide the easiest entry into animating images. Options include a choice of coastlines, latitude and longitude circles, country capitals and an automatic update (to provide the latest image). These options are also found on the setup, program setup option.

Five icon options offer animations, image print, save, palette and distance. The palette provides a set of colour masks that can be applied to every HRIT and LRIT channel to enhance some features.

Animation

This is an important facility because *METEOSAT-8* images are capable of high quality animations on all channels. I found this easy to set up from either image list display. Clicking on a channel, for instance 9 in the early evening, loads the latest full image. The options icon includes the tab for animation and this opens up a new

screen showing a red selection frame displayed on the image. This is for selecting the animation window coverage.

There is a choice of two sizes, and it can be positioned anywhere. Clicking again brings up yet another window and here you select the number of frames for the animation. Finally, the sequence starts. It updates automatically as new images are received. The result is very good, though the demo version is unusable due to deliberate image corruption. Animation speed can be varied, but there is no interpolation (smoothing).

Layout Saving

This useful feature allows the saving of preferred window configurations. If you want to have the HRIT files list and a couple of animations running on your screen, you can set them up as you prefer, and then use the Layout Save option. Up to five Layouts can be saved this way.

Final Thoughts

During the course of intensive testing over a three day period, preceded by some weeks of familiarity monitoring, the program crashed a few times without error messages, or giving a run-time error, or simply disappearing from the screen, and once under reproducible conditions - or was this deliberate closing? When I noticed this, I re-started the program.

There are several good features; it is very fast

and well designed for running on a single, adequately specified computer. There are some features that I have not tested, such as the Monitoring Graph facility that makes graphs of cloud cover at up to 10 locations, or automatic image cropping and saving (Special Automatic Save) in selected formats. I know of these options because I studied the comprehensive manual.

The author is Italian but the manual is written in excellent English; users of the software would have no problems understanding it. The extra cost may be partly due to the extreme efforts that have gone into preventing anyone 'hacking' the program. You require a special dongle from the company; this carries your EUMETSAT key information that only you can provide.

I think that crippling the Trial version is a big mistake. The user cannot get a good appreciation of the software or image quality under these conditions - but I do know of other software (astronomy-related) that was similarly treated until they accepted my suggestion and released a fully working version that was time-limited. I shall invite the company to provide comments on my review in due course, and I can do an update on new releases

I could not find the cost displayed on the website so I enquired by E-mail: MSG SYS DVB Light, EUR 200.00 (£133.50); MSG SYS DVB Full, EUR 600.00 (£400.00 plus delivery cost. Further details are available from the website: www.cce-bologna.com/UK/home.html or info@cce-bologna.com

WXSAT special Part 3

David Taylor's WXSAT Suite - Reviewed

Lawrence Harris takes a look at several of David Taylor's programmes.

When the decision was made for *MSG-1* data to be transmitted to users via a transponder on *HotBird-6*, little were the implications of the possible 'added extras' anticipated. Images from *METEOSAT-8* were supplemented by those from foreign satellites, as expected, but

subsequently we have seen new satellite products added to the data stream, of a quality formerly only available to the professionals.

No matter how good or timely the data, without good software to process it and present it in a form easily digested by non-experts, the data is all but useless. Professional meteorologists have their own software writers; for the rest of us,

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*100kHz - 30MHz
 *SO-239 socket
 *Size: 150 x 67 x 146mm
 *Weight 300g

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YUPITERU MVT-7300



- 521kHz - 1320MHz
- NFB, WFM, NAM, WAM, USB, LSB, CW
- 1000 memories
- 500 Pass channels
- 16 tuning steps
- 8.33kHz airband spacing
- 3xAA Ni-Cds
- 12V DC/230V AC mains
- Telescopic Antenna

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YUPITERU MVT-9000 mk2

- 530kHz - 2039MHz
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- 1000 memories
- 500 Pass channels
- 25 tuning steps
- Voice-reversed scrambled decoder
- 4xAA Ni-Cds
- 12V DC/230V AC mains
- Telescopic Antenna

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AOR AR-8600 MKII



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

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AOR AR-8200 MKIII

- 100kHz-3000MHz
- WFM, NFM, SFM, WAM, AM, NAM, USB, LSB, CW
- 1000 Memories
- 8.33kHz Channel Step
- Detachable MW Bar antenna
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- Illuminated LCD and Keypad
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- VHF airband plus lots more inc. emergency services
- 66-88/108-170/300-470/806-1000MHz
- AM & FM
- 200 Memories
- 5 Tuning steps
- Fast scan speed
- Very sensitive
- Requires 4xAA cells (not supplied)
- Includes flexible antenna, earpiece and carry strap

"BUDGET
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YUPITERU MVT-7100

- 530kHz-1650MHz
- LSB, USB, AM, WBFM, NBFM
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- High Sensitivity
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- AM, SSB, CW (FM)
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- Supply: 4 x AA
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- Weight 608g

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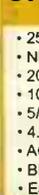
UNIDEN-BEARCAT UBC-3000XLT



- 25 - 1300MHz with gaps
- NFM, WFM, AM (Airband)
- 400 memories
- 10 Priority channels
- Twin Turbo scan & Search
- 6V 600mAh Ni-Cd pack + AC charger
- BNC Flexible Antenna
- Leatherette case
- Earphone

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UNIDEN-BEARCAT UBC-280XLT



- 25 - 956MHz with gaps
- NFM, AM (Airband)
- 200 memories
- 10 Priority channels
- 5/12.5kHz channel steps
- 4.8V 800mAh Ni-Cd power pack
- AC Charger
- BNC Flexible Antenna
- Earphone

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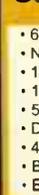
UNIDEN-BEARCAT UBC-220XLT



- 66 - 956MHz with gaps
- NFM, AM (Airband)
- 200 memories
- 10 band coverage
- 100 Ch/sec scan speed
- Priority channel
- 4.8V 600mAh Ni-Cd int.
- AC Charger
- BNC Flexible Antenna

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UNIDEN-BEARCAT UBC-120XLT



- 66 - 512MHz with gaps
- NFM, AM (Airband)
- 100 memories
- 10 Priority channels
- 5/12.5kHz channel steps
- Data skip (lockout channels)
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- BNC Flexible Antenna
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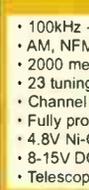


- 66 - 512MHz with gaps
- NFM
- 80 memories
- 1 Priority channel
- 5/12.5kHz channel steps
- Data skip (lockout channels)
- 4x AA cells (not provided)
- BNC Flexible Antenna
- Earphone

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- 100kHz - 2150MHz
- AM, NFM, SSB, CW
- 2000 memories
- 23 tuning steps
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- Telescopic Antenna

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UNIDEN-BEARCAT UBC-780XLT

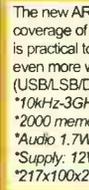


- 25-1300MHz with gaps
- NFM, WFM, AM
- 500 memories
- Analogue Trunk Tracking
- Alphanumeric display
- Automatic Tape recorder option
- Antenna BNC
- 13.8V DC 700mA

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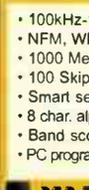


- 100kHz - 2599MHz
- FM, AM, SSB, CW
- 2000 memories
- Large digital display
- Real-time band scope
- DSP Noise & notch filters (Opt)
- Super HF performance
- Automatic Tape recorder option

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YAESU VR-500



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

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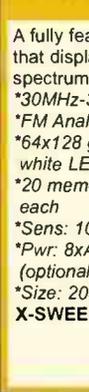
YAESU VR-120D



- 100kHz-1300MHz
- AM, FM, WFM
- Adjustable steps
- Over 600 memories
- Skip channels
- Smart search
- Alphanumeric tags
- Requires 2xAA cells

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- *30MHz-3GHz
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- *64x128 graphical display with white LED backlight
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- *Pwr: 8xAA alkaline or AC adaptor (optional) 12V DC 350mA
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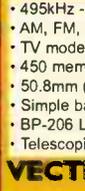
ICOM IC-R5



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

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ICOM IC-R3 SCANNER & TELEVISION

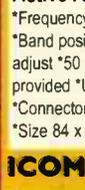


- 495kHz - 2450MHz
- AM, FM, WFM, AM-TV, FM-TV
- TV mode PAL (UK)
- 450 memories
- 50.8mm (2in) TFT colour display
- Simple bandscope
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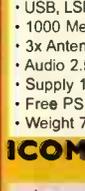


Active Antenna/Tuner

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- *Band position switch *Tune adjust *50 Ohm to Rx *Whip provided *Up to 10dB gain
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- *Size 84 x 55 x 60mm *Weight 255g approx

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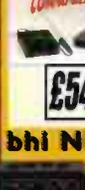
ICOM IC-R8500 "THE EDITOR'S GOT ONE!"



- 100kHz - 2000MHz
- USB, LSB, CW, AM, FM, WFM
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- 3x Antenna Connectors
- Audio 2.5W (8 Ohms)
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ICOM IC-PCR1000iS



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- BNC Antenna connector
- New Icom version 2 software
- Requires PC (Not included)

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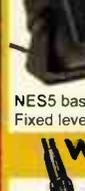


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bhi NES10-2



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- Hold Display Button
- 2 Switched ranges
- Internal ni-cad battery
- Whip Antenna
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The Scout frequency recorder automatically stores frequencies as it locks onto them

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- *Battery life: 8hrs
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- *Size: 94x70x30.5mm
- *Weight: 240g

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WSMA-7000	Sma 2m/70cm Rubber Duck 17.7cm	£14.95 A
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WHSM-270	Sma 2m/70cm Rubber Duck 40cm	£19.95 A
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- *Tailored response for speech
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- *Matches modern radios
- *Includes patch lead
- *Size 12W x 18H x 11D cm.
- *Weight 0.85kg

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WATSON WR-500I

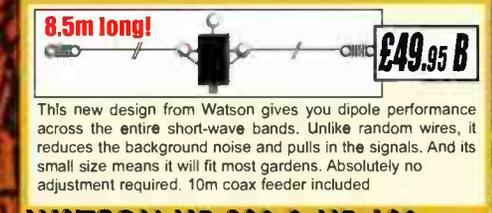


Nearfield Receiver

- *Frequency range: 30 - 900MHz (Cellular Blocked)
- *Modulation: FM *Deviation: < 100kHz *Sensitivity: < -53dBm at 500MHz *Squelch: Adjustable *Squelch indicator: Displays signal reception *Antenna: 50 Ohms (BNC)
- *Audio: Built-in speaker, ext. 2.5mm earphone jack *Case: Stamped aluminium with black anodised finish *Power: Internal 5 x AA 600mAh Ni-Cad Pack (5Hr) *Size: 100 x 68 x 31mm *Weight: 280g

£79.95 B

WDP-30 Short Wave Dipole



8.5m long!

£49.95 B

This new design from Watson gives you dipole performance across the entire short-wave bands. Unlike random wires, it reduces the background noise and pulls in the signals. And its small size means it will fit most gardens. Absolutely no adjustment required. 10m coax feeder included

WATSON HP-200 & HP-100



HP-200 **HP-100**

Superb headphones with tailored response for radio comms. Excellent sound proofing, can pull in the weak DX.

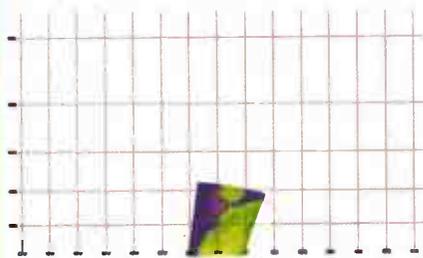
- * Mono 8 Ohm 200-10,000Hz
- * Padded ear pieces
- * 3.5mm stereo plug
- * 1/4" stereo adaptor

£22.95 B

Excellent lightweight comm headphones with tailored response for the modern transceiver or receiver.

- * 8 Ohms 200-9,000Hz
- * Adjustable headband
- * 3.5mm stereo plug
- * 1/4" stereo adaptor

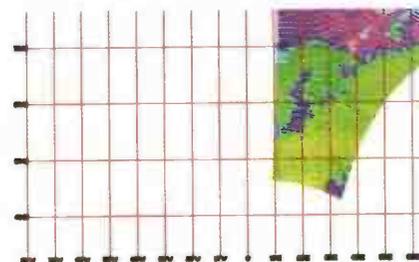
£19.95 B



● Fig. 1: HIRS 12 August 1234 NOAA-16 Athens data (image © EUMETSAT).



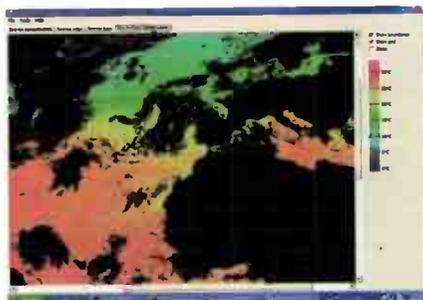
● Fig. 2: AMSUA 13 August 0713 NOAA-15 data from Maspalomas, Spain (image © EUMETSAT).



● Fig. 3: AMSUA 13 August 0520 NOAA-15 data from Tromso, Norway (image © EUMETSAT).



● Fig. 4 Animator v2 showing typical infra-red display.



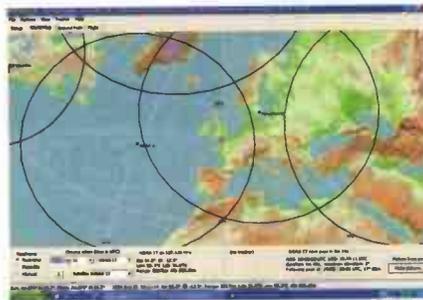
● Fig. 5: Sea Ice Viewer - temperature 6 September © EUMETSAT 2004).



● Fig. 6: 11 July sea ice concentration.



● Fig. 7: 5 September sea ice concentration.



● Fig. 8: WXtrack display.



● Fig. 9: HRPT reader - main screen.

David Taylor of Edinburgh rode his white horse to our rescue as fast as these products have been added, and produced the software to process them into an intelligible form.

A glance at David's website - www.satsignal.net/ - shows the extent of his commitment to supporting the WXSAT enthusiast. Most of David's products will run in a basic form without registration, but - hey - we all have to make a living!

MSG Animator 2

This is a new release - version 2 - of the upgraded *MSG Animator 1* program, used to produce animations of image sequences from *METEOSAT-8*, using the file formats produced by David's *MSG Data Manager*. The new version has several significant features added. The program can be downloaded from David's site, unzipped and installed. Not only can the usual *METEOSAT-8* channels be animated, but *GOES-10*, *GOES-12*, *METEOSAT-7*, *METEOSAT-5* and *GOES-9* data can now be animated, effectively providing coverage of the whole world.

The program is activated by right-clicking its icon in the system tray. This offers 10 animations, each being individually programmable for spectral band, image enhancement, grids, time limits and area selection. Selecting the required

region for animation is now easier using the new graphical interface. The selected region is shaded and has 'handles' that the mouse can grab and slide to extend or diminish the region.

Up to 10 separate animations can run simultaneously - assuming that your computer is powerful enough. They can individually be switched off without closing the window. Land/sea colour palettes can be added to infra-red animations, or you can add your own palette - the help notes include a full description of the process. Cost for single-user: **£34.95**.

ATOVS Reader

EUMETCast's *METEOSAT-8* data stream includes more than 'just' images. Part of the additional data sets include ATOVS - Advanced TIROS Operational Vertical Sounder measurements. The Sounders are instruments carried by the NOAA WXSATs to 'sound' (measure by receiving a pre-transmitted signal). Details are explained in 'Info In Orbit'.

The program can be downloaded from David's main site: www.satsignal.net selecting Satellite Tools, ATOVS Reader.

If you have configured your *METEOSAT-8* system to accept and store ATOVS data, you will find the folder located in the directory of form: `MSG-1\ATOVS\2004\08`.

Files accumulate here at a rate of

approximately 900 per day, occupying an average of about 250MB. Individual files indicate instrument, satellite, time and station: `hirs_20040812_1503_noaa17_11094_wall1c.bz2`.

The program reads the different file formats, including both compressed and uncompressed EUMETSAT Level 1C and Level 1D formats. Data from each of the twenty infra-red HIRS/3 channels, or any of the 20 microwave AMSU-A or AMSU-B channels can be displayed as a false-colour brightness temperature plot. Data is geographically rectified and can be displayed on various wide-scale projections. In most cases the image should contain identifiable land, but not always.

The data from Fig. 1 was collected at the Athens station, so the region shown includes the Mediterranean sea. Considering that this data has not been available for very long, David's reader has been developed far enough to display all the transmitted channels with fully calibrated displays. I would anticipate that multi-pass displays, possibly with self-sensing map region selection could be likely at some time. Registration costs **£28.50**.

Sea Ice Viewer & Sea Surface Temperature

As summarised in the monthly article, this data is one of the new sets provided by EUMETSAT's EUMETCast transmission system from

METEOSAT-8. The parameters obtained include Sea Surface Temperature (SST), Sea Ice edge, concentration and type. The EUMETCast transmission produces a set of files related to Sea Ice, and these can be routed, via David's MSG-DM program, into a folder: MSG-1\Images\SAF.

The software itself can be downloaded from David's website, under Satellite Tools, Sea Ice Viewer. Note the requirement for associated library files - all are linked from David's site.

Data acquisition: the data are transmitted during the early hours each day, at approximately 0400. Fortunately it is not essential to have your computer running at this hour. The data is archived online for several days at the following site: <http://saf.dnmi.no/>

This site comprises folders containing various products; if you look at the prod folder, you will see ice as the last entry. Look at this entry and you will find conc, edge and type folders. Each of these folders holds about one month's data. Only one file download is needed for each day and for each type - conc, edge and type.

For example the conc file is: multi_conc_20040812.grb (for 12 August). Neither the hdf file or the multi_conc_qual file are required from this folder.

Repeat the process with the edge and type folders - downloading just the selected *.grb file for the same day. These three files should be copied into the SAF folder where your MSG software would put it. When you open the Sea-Ice Viewer and point it to the SAF folder carrying current data, it will only show the conc file, but the edge and type files will load automatically and can be viewed, in the program by selecting the appropriate tab. The Sea-Ice viewer can load and display these files in a very attractive and intuitive manner.

Figure 5 shows the hot (black) region of north Africa at lower right, with ocean temperature calibration displayed. **Figure 6** and **Fig. 7** show ice coverage changes. Even over short time scales of a few weeks, the seasonal retreat of the ice can be seen. You can copy data from a group of days and prepare an animation. Using Tools, animate and selecting the type of animation - for instance concentration - an animated GIF file is created.

Registration: The basic version of the software is free and allows you to view the sea-ice concentration. Registration costs £32.50 via the website, with an E-mailed key arriving within a few days. The enhanced version allows viewing of all three data types and the display of country outlines. Also added are the facilities for quick access to the latest data, and animation. The original grb files are in compressed format; registration includes automatic de-compression.

WXTrack - Updated Review

WXTrack was one of David's earlier programs for the WXSAT enthusiast and is currently in version 3.4.4 as of September 2004. I originally reviewed an earlier version some years back so an update is timely. The main purpose of WXTrack is to display the footprints of selected satellites on a map projection. The program can do considerably more than this, though.

To summarise, it reads Kepler elements

from the Celestrak site, allows you to make a subsequent selection of satellites, display them on your choice of map projections, produce a predicted ground track of any satellite passing over your QTH (home) and even read and display your a.p.t. data from the same pass alongside the predicted appearance. The registered version has several extra facilities.

Download & Set-up

The software is available from David's site and requires some library files that are also linked from the site. The map display detail depends on the particular database that you use. David provides a link to an 18MB ground topography database that produces a high quality display. On installing the software, the first screen requires the collection of satellite Kepler elements by direct download from the Internet, or by updating from manually downloaded files.

After updating the elements, you can select the satellites for up to three different groups (banks). I set-up the WXSATs and ISS in one bank and other satellites in another. Selection is done by dragging and dropping required satellites from the database display to the active display. The file paths can be set on this initial screen, and your location entered at bottom right. Set-up is easy.

Choice Of Displays

When the basic data has been input, pass details for the selected satellites appear in the right-hand section. Passes are listed with associated data such as time and duration. The top of the display shows menu choices File, Options, View, Tracker, Help, each having further choices. The display itself has four tabs - Setup, World Map, GroundPath and Flight. We look at these in context.

When the program is routinely started, the World Map is displayed. There is a choice of map projection, accessed via Options, Map projection and includes variations of azimuthal equidistant, a useful projection that shows your QTH at the centre of the display, with the footprints of the selected satellites displayed in the colour of your choice. Almost everything is configurable. Footprints can be adjusted for colour and line thickness, the sun and moon can be displayed (or not). Now for some of the clever bits.

From the World Display, look at the positions of the various satellites that you have selected - presumably the NOAAs and possibly FENGYUN if you have h.r.p.t. At least one of them is probably crossing an interesting landscape. While testing the program, I noticed FY-1D was crossing Antarctica. Select the Flight tab. This screen shows you the real-time 'what the satellite sees' displayed, subject only to the accuracy of the topographical database. This option (flight) can be adjusted for any date/time for any of the satellites, and can therefore show you what is represented on your a.p.t. display during actual passes. You can obviously use it to predict the picture from future or previous passes as well.

Returning to the main multi-satellite display, details of the currently selected satellite are given

at lower left, and the details of the next pass at lower right. The selected satellite can be changed by clicking on any satellite. Data for all passes for the current day are found on the Setup page, so planning can be done, if required.

Menu Selections

Many configuration preferences can be made under Options and View. Under Options, you can select the line style (colour and type) for your satellites' footprints, the update rate of the screen display (I use 10 seconds), and various parameters that you wish to have shown, such as the terminator. The program can drive many antenna tracking systems, as well!

David has added many options to this program, making it one of the most comprehensively configurable satellite tracking programs obtainable, let alone free in its basic version. Registration costs £24.50 and provides significant extra facilities.

WXtrackGL

This is a variant of WXtrack, in which you are looking from a distance towards the earth - as from high earth orbit. The program is free and can be downloaded from the same web page as WXtrack.

HRPT Reader

When you buy a system to receive high resolution picture telemetry from the WXSATs, you are going to receive processing to display images. As you might expect, David's program is rather more functional than many, being able to read files produced not only by the well-known equipment suppliers, but also those that you can download from the CLASS (Comprehensive Large Array-data Stewardship System), previously known as the SAA (Satellite Active Archive). This latter facility offers access to NOAA LAC (Local Area Coverage) and GAC (Global Area Coverage) image files, as recorded by the tape recorders onboard the NOAA WXSATs.

Depending on the satellite data - FENGYUN or NOAA - the various channels are listed on the main screen after selecting a file to load. Also available are false colour, RGB and user; each allows specific channel selection for attributing colour information. The false colour option offers further brightness adjustment, such as histogram equalisation, capable of producing spectacular high resolution images in good colour.

Displayed images can be subjected to various forms of enhancement and saved in JPG format with a choice of qualities, and in apt format. The program is comparable to David's *SatSignal* in enabling the creation of artificial colour images, but with all the h.r.p.t. channels available, colour is more effective. The program is free for non-commercial use; the registered version costs £45 and offers additional features.

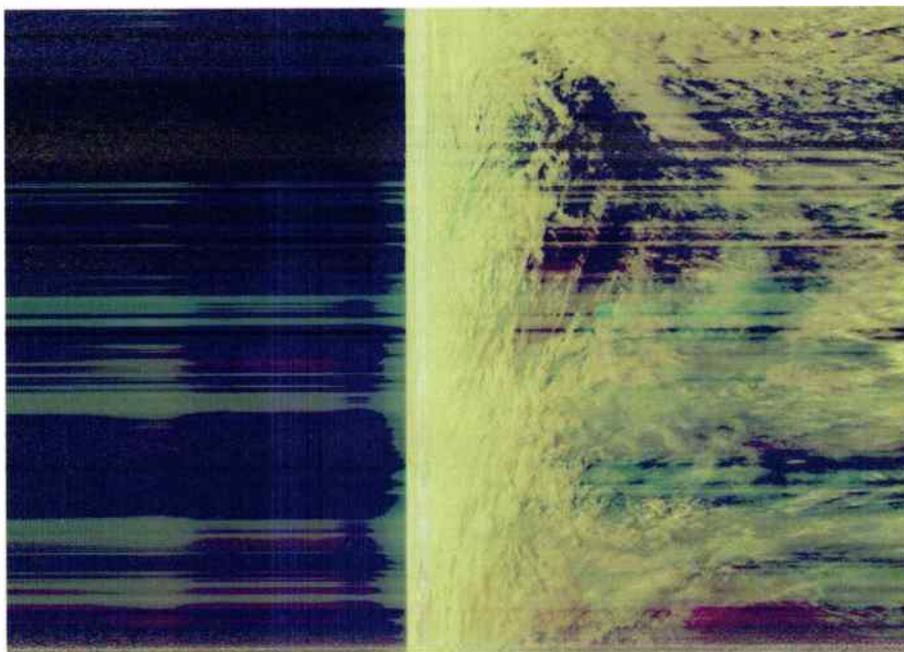
MSG-1 Toolset Plus: Includes MSG-1 Data Manager, MSG Animator 2, GeoSatSignal4 - £99.50 for the suite.

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 weather was perfect as I lay on the hospital bed looking at a bright moon shining through the open curtains just after 0600 on 1 September. It seemed to be mocking me. The glorious weather of early September was a natural by-product of my inability to use the telescope!

wrote programs within the *Windows* environment. Software from writers **Craig Anderson** of New Zealand, **David Taylor** of Edinburgh and **Luca De Angelis** of Italy are featured separately in the reviews. The theme results from comments from users in the WXSAT forums and many contributions from readers sending in images of particular



● **Fig. 1: FY-1C 1628 11 September showing unsynchronised scan.**

I had been waiting for a minor operation on my hand for about 18 months when a cancellation on the Friday before the August Bank Holiday gave me just hours to get things straight, knowing that I faced two weeks in bandages. Because of the tiny possibility of such a call, I had already spent August preparing draft software reviews for the 'WXSAT Special' - but it was still a surprise when it happened. Fortunately, all went well and the bandages and tablets still permitted me to complete this column, even if only as a one-handed typist!

This year's 'WXSAT Special' has a software theme, acknowledging the dependence of WXSAT users on the programs needed to help us get the best from the data that our equipment is able to receive. Over a period in excess of three decades in the computing business, I have known software writers that show great dedication to their trade.

My own software writing skills were quite good back in the days of *DOS*, but I never

interest, processed by the various programs.

The reviews are not intended to be comprehensive; each provides a (hopefully) informative description of the program (or suite) based on many hours of testing on my computer(s). In later editions, I hope to provide update information.

Background To The Reviews

I first heard the words 'weather satellite' (WXSAT in radio parlance) circa 1971, but it was not until 1985-86 that I built my first WXSAT receiver and got my first picture - from *NOAA-9* if memory serves me correctly. Much has changed since the mid-1980s. Extremely high quality imagery and data has become available to the amateur community.

The world of weather satellite signal decoding is indebted to a number of software writers who have devoted many hours to producing programs for tracking WXSATs and decoding their signals. We are arguably now

in better times - WXSAT-wise - with new facilities available to monitor our favourite NOAA or METEOSAT (or both).

For many years the standard method of decoding the 'tick-tock' (demodulated) 137MHz band signal from the receiver was to use a frame-store. Computer technology took over during the mid-1980s when ISA, and then PCI cards became available to decode the signal. I had to pay over £700 for my first computer ISA a.p.t. card decoder!

The WXtoIMG Review

The idea of using a soundcard in a computer to analyse the tonal content of the demodulated carrier from a WXSAT was first demonstrated a few years ago, and the first such software became available. Soundcards can now do the work previously done by a commercial product. Enter *WX to IMG* - my review of the recent version is in the 'WXSAT Special', see page 23.

The MSG Sys DVB Trial Review

The CCE - Bologna Electronics Engineering is an Italian company that has written a program that processes the data files produced in the *METEOSAT-8* data stream from *HOTBIRD-6*. A few queries about it, and an invitation from **Luca De Angelis** to review it prompted me to check it out during the summer. You can read my findings in the 'WXSAT Special'.

The David Taylor Suite

David Taylor of Edinburgh made his impact by writing weather satellite tracking and signal decoding software several years ago and continues to issue innovative programs. This review looks at some of these.

Recent Additions To EUMETCast Data

The NOAA polar orbiting WXSATs have always carried instruments to measure a variety of atmospheric and other parameters. This instrumentation includes sounders - equipment that measures the amount of specific gases such as water vapour, carbon dioxide and ozone in the atmosphere. This is



● **Fig. 2: Professor Robert Moore addressing the GEO Symposium in May 2004.**



● **Fig. 3: METEOSAT-8 1645 on 7 September showing a virtually cloudless Britain (© EUMETSAT 2004).**

one of the methods of data acquisition that has told us about the increase in concentration of polar ozone.

This sounder data is produced by a set of instruments known as ATOVS - Advanced TIROS Operational Vertical Sounder. Back in the late 1960s and early 1970s, I was part of a team using radio telescopes that made serendipitous measurements of rain attenuation during our studies of solar activity. Our highest operating frequency was about 40GHz (it was the highest frequency in routine use for measuring solar radiation) and the signal from the sun would dip significantly whenever a cloud crossed.

At these very high frequencies, we are looking at the effects of water and other atmospheric molecules. It is therefore possible to select specific frequencies that are exactly on, or between, known molecules. This is what ATOVS does.

The ATOVS instrument consists of the 15-channel Advanced Microwave Sounding Unit-A (AMSU-A), the 5-channel AMSU-B, the 20-channel High-resolution Infrared Radiation Sounder (HIRS/3) and the 5-channel Advanced Very High Resolution Radiometer (AVHRR). ATOVS data is included in the h.r.p.t. data stream. However, it requires additional decoding facilities when extracted this way, and is also limited to local data. The data is now available via EUMETCast.

The aim of the EUMETSAT ATOVS Retransmission Service (EARS) is to provide NOAA's sounder data within about 30 minutes. To achieve this, a number of acquisition stations receive the original ATOVS data from the NOAA satellites. These stations are based in Canada, USA, Spain, Greenland, Norway and Greece. Data is received and decoded by the station and passed automatically to EUMETSAT. It is added to the EUMETCast system and is routed to registered users.

Sea-Ice Data

With two-thirds of earth covered in oceans, constant data about this environment is required for forecasting. Specialised development and processing centres such as the Satellite Applications Facilities were established by EUMETSAT.

In 1997 the High Latitude processing facility operated jointly by the Norwegian and Danish Meteorological Institutes, was established for Ocean and Sea Ice monitoring. A five-year development period was followed by an Initial Operational Phase from July 2002. The main objectives of the project are to produce Ocean and Sea-Ice products in near real-time from available satellite data and distribute to users.

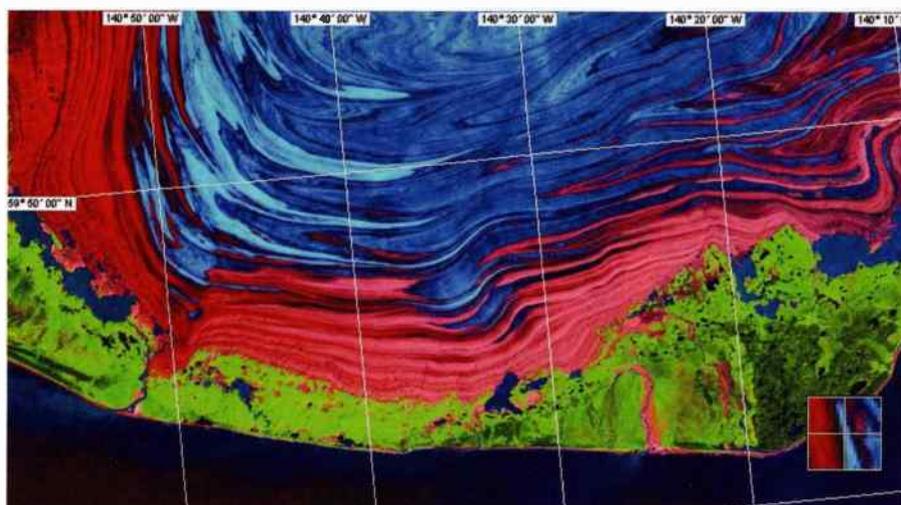
The various products cover the

East and NOAA - METOP data. Data transmitted by EUMETCast includes sea ice edge, sea ice concentration (the fraction of the sea surface covered by ice), and sea ice type - whether multi-year or first-year ice.

Current WXSAT Operations

Within a few hours of the return of my h.r.p.t. elevation motor (see end of column) I was able to check out the high resolution transmissions from the WXSATs once again.

NOAA 14's AVHRR (the radiometer that provides all image data) scan motor remains stalled since NOAA switched it off and on. As a result, all five spectral channels are now effectively empty. Other data remains within the AVHRR data stream - hence the decision to leave the transmission on. NOAA has probably ceased trying to recover the imagery.



● **Fig. 4: Malaspina glacier - LANDSAT image from Richard Gosnell - courtesy NASA.**



● **Fig. 5: NOAA-171037 on 10 September from Kevin Hughes.**

Atlantic Ocean and European seas, using METEOSAT-8, SeaWinds, the Defense Meteorological Satellite Programme, GOES-

FENGYUN-1C: Launched on 10 May 1999. I am not aware of any official Chinese reports concerning its status, but Fig. 1 shows my latest image. The lack of synchronisation is presumably permanent.

End Of METEOSAT-7 Services

We come to the end of an era in December next year. EUMETSAT has announced that, subject to METEOSAT-9 being launched and commissioned successfully, METEOSAT-7 WEFAX and HRI (High Resolution Imagery) is expected to cease at the end of December 2005. The formal decision (of termination date) has not been made.

If you are a beginner and are considering your options, a WEFAX receiving system would probably not be your best bet! Similarly, and sadly, a Primary Data User Station (PDUS system) is also no longer a reasonable option because neither of these transmission formats are being used on later spacecraft. Anyone looking for a second-hand, near-redundant PDUS system?!

Correspondence

The sudden change to warm, sunny weather in early September finally provided an opportunity to capture 'cloudless Britain'

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Yaesu's Flagship Desktop "Ultra Wideband" Scanning Receiver

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- 45 ch/sec scan
- 20 search banks
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- RS232 port
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Compact all mode wideband handheld, PC Programmable with ADMS-3 Software

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- AM/FM/WFM/SSB/CW
- 1,000 Channel Memories

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

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JIM M75

Pre-Amp

- 24MHz to 2150 MHz
- Variable gain: -10dB to +20dB
- 12V DC or internal Battery
- BNC plug & socket
- Size 95 x 50 x 33mm
- Weight 180g

£79.95

XOR AR-8500

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- 100 Memories
- 20 Radio Presets

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- Latest database (over 20,000 freq)
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- LSB, USB, AM, CW, Synchronous AM (USB, LSB and DSB), NBFM, Wideband FM, STEREO FM, Video output
- Tuning steps Auto/user
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- Stereo, Record & Video outputs
- Data Slicer
- 50 memories/steps per sec
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- 1000 memories
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- 450 Ohm Twin feeder (slotted) **£96 £79**

FLEXWEAVE (style) ANTENNA WIRE
HIGH QUALITY VERY FLEXIBLE

- 168 strands of 14 AWG copper wire.
- Ideal for all your antenna projects.

FLEXWEAVE
per metre **55p** + 10p/metre P&P
per 100 mtr Drum **£40** + £6.50 P&P

Used Equipment
ALL SAFETY TESTED & GUARANTEED FOR 3 MONTHS

Alinco DJX2	Handheld Scanning Receiver	89.00
Alinco DJX2000	Wideband Handheld Scanner	275.00
Alinco DJX3	h/held Scanner c/w accessories & book	139.00
ADR AR6200 Mk II	Wideband Scanning Receiver	249.00
Bearcat 220XLT	Handheld Scanning Receiver	99.00
Icom R2	Wideband AM/FM/WFM h/held Scanner	95.00
Kenwood R5000	HF Base Receiver All Modes	425.00
Maycom FR100	Handheld AM/FM Compact Scanning RX	50.00
Pure EVKDE 1	DAB Radio + Matching ST-1 Speaker	70.00
Realistic PRO2005	Wideband Scanning Receiver	120.00
Yupiteru MVT7100	All Mode Scanner as new	175.00
Yupiteru MVT7300	Handheld Scanning Receiver	189.00
Yupit u MVT9000 MkII	All mode Scanning Receiver with case	275.00
Grundig SAT800	HF + Airband Base/Portable Receiver	399.00
Icom R75	Base Receiver c/w Filters & DSP	599.00
Icom R75	Base Receiver	499.00
Icom R8500	W/Band All Mode RX w/PSU. As New!	999.00
Joyave WS2000	Portable Workspace Receiver	79.00
NRD JRC545OSP	Base Receiver	849.00
Palstar R30	Receiver	325.00
Roberts 9914	FM/MW/LW/SW Receiver	65.00
Sony SW7600	Portable Receiver	79.95
Sony AN-1	Active Antenna for HF	59.95
Yaesu FRG8800	General Coverage Receiver	299.00
Yaesu VR5000	All Mode 100kHz-2600MHz Base RX	489.00
Perstel Bluenote	Personal DAB Radio	59.00

YUPITERU MVT7360

Top of the range airband handheld with 8.33 kHz steps

- 520kHz - 1.32GHz
- 1000 Memories
- 8.33kHz Airband
- Duplex reception
- Descramble function
- Supplied c/w: Mains adaptor • 12V DC lead • NiCads • Belt clip

£299 £239 **3 CHEQUES OF £83.00**
PAY BY CHEQUESPREAD INTEREST FREE!

MAHA C-401 FS
NEW LOW PRICE £39.95

Rapid charge NiMH AA batteries in under 100 minutes coolly and efficiently

- The unique charging system developed by battery experts allows the battery to accept a more complete charge
- Four independent charging circuits to ensure optimum charging for each battery
- Ultra low temperature charging using Power Ex's unique Flux Negative Pulse algorithm
- Manually switch between 100 minute fast charge and 8 hour gentle charge, both microprocessor controlled
- Can be powered by AC adaptor or cigarette-lighter car adaptor
- Supplied complete with:
 - Four AA 2, 200mAh NiMH batteries
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 - Multi-Voltage adaptor (100-240V, 50/60Hz) fitted with UK 13 Amp plug

£44.95 £39.95



NEW

ROBERTS C9950

Programmable Cassette Recorder

- Dual record speed
- 6 separate timed recordings
- 6 hr recording, C90 cassette
- Voice activated recording, timed voice activated recording, remote switching of other equipment

IDEAL FOR THE RADIO ENTHUSIAST

£80.00

YAESU FRG-100

Shortwave Communications Receiver

- Fully featured radio with
- Frequency 50 KHz to 30 MHz
- Receives AM/SSB/CW
- 50 Memories
- Programmable on/off
- Twin 12/24 hour clock/Timer
- Memory Scan
- Selectable input Attenuator
- Noise Blanker
- Size 238(W) x 93(H) x 243(D)
- Optional FM Unit - £33
- Supplied with Free 240V mains - 13.8V DC Supply

FREE MAINS PSU

£449 **3 CHEQUES OF £153.00**
PAY BY CHEQUESREAD INTEREST FREE!

ICOM IC-N8500

Communications Receiver

This receiver is everything we hoped it would be, covering 100kHz - 26Hz.

GUARANTEED PRICE MATCH

LOTS OF FEATURES including computer control

£1499

3 CHEQUES OF £505.00
PAY BY CHEQUESREAD INTEREST FREE!

GRUNDIG YB400

Shortwave Receiver

- 144kHz - 30MHz
- SW, FM Stereo, MW/LW
- SSB reception (both USB/LSB)
- Dual alarm clock
- Narrow/Wide bandwidth
- Mains or Battery (with optional mains adaptor)
- Supplied complete with: SW HANDBOOK, CARRYING CASE, EXT. WIRE ANTENNA, CARRY STRAP

£99.00

3 CHEQUES OF £33.00
PAY BY CHEQUESREAD INTEREST FREE!

ETON FR200

Emergency Wind-up Radio & Light

The FR200 AM/FM/Shortwave Radio is fully portable and has many useful features:

- Receives AM, FM, and international shortwave broadcasts
- Receives continuous SW frequency coverage from 3.2 - 22 MHz including 13,16,19,22,25,31,41,49,60,75,90m bands.
- Incorporates fine-tuning control knob superimposed on the main tuning knob.
- Operates on power from four different power sources:-

NEW

AVAILABLE IN: Red, Blue, Yellow, Bronze

With a big aerial, radio stations were easily tuned in and overall we were very impressed with the results that we got from the unit, with turning up the volume and in an emergency foregoing the reliance on batteries will certainly relieve you the fear of running out of power in that emergency situation. However for us the best element is the inclusion of the light. This lets that summer picnic go on just that little bit longer with an added soundtrack or sports commentary.

OVERALL SCORE: 9/10
www.pocket-int.co.uk

- from the built-in rechargeable battery that takes charge from the dynamo crank (not supplied)
- from 3 x AA Batteries
- from the dynamo crank alone, even with no battery pack installed.
- Includes built-in emergency flashlight.
- Plays quality audio from the internal 2.5" speaker.
- Incorporates all built-in antennas: telescopic antenna for FM and SW, and an internal ferrite bar for FM.
- Size: 171w x 145h x 52d mm
- Weight: 600g

£24.95

ICOM IC-R5

Shortwave Receiver

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

SAVE £20

£149.95

3 CHEQUES OF £53.32
PAY BY CHEQUESREAD INTEREST FREE!

GRUNDIG MBR147

Multiband Receiver

Covers LW, MW and:

- Shortwave (2.3 - 22MHz)
- Marine/Airband (108 - 175MHz)
- Battery/Mains

£79.95

3 CHEQUES OF £26.65
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ETON S35

Shortwave World Receiver

- AM/FM Shortwave World Receiver
- RF Gain Control/Bass/Treble Controls
- Audio Outputs and External Antenna Input
- Alarm and Sleep Timer Functions
- Illuminated Multi-Function Display
- Size: 267 x 165 x 89 mm
- Weight: 1619 g

NEW

£69.95

SHORTWAVE RADIO'S BEST KEPT SECRET

PALSTAR R30

Portable Communications Receiver

WRTH

WRTH HANDBOOK BEST HF DESIGN 2002

★★★★★

Don't just take our word for it! Check out the user reviews on eHam.net where the Palstar R30 consistently receives the 5 Star Rating! "Great SWL RX"... "Best I have used!"... "Wow-that audio!"... "Amazing Radio Exceptional Value!"



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.

- 100kHz - 30MHz AM, SSB, SW 20kHz, 500Hz tuning steps, synthesized (low phase noise performance)
- 500kHz up/down
- 45MHz 1st IF, 455 kHz 2nd IF
- RF derived AGC, fast/slow
- 4-pole crystal filter at 45 MHz
- Ceramic filters fitted
- Bandwidth 4kHz AM and 2.5 kHz SSB
- 6-digit LCD display
- Analog S-Meter
- 100 channel memory
- 5W low distortion full fidelity audio amp
- External soft muting
- Line Audio output
- +18dBm 3rd order intercept
- 455kHz IF output
- Switchable 7 pole input filters
- Power source either: Internal batteries (not included) or 12V DC
- Ultra miniature size 8"(w) x 2.5"(h) x 9"(d)
- Weight: 7 lbs

£449 **3 CHEQUES OF £153**
PAY BY CHEQUESREAD INTEREST FREE!

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 receiving antennas. Or use as a standalone active antenna.

- Frequency: 100kHz-30MHz

£69.95

ROBERTS R30

Digital Worldband Radio with RDS

- Covers MW/LW/FM/SW
- SSB/CW reception on SW 307 presets
- Clock/alarm facilities
- Supplied with: Dual voltage AC supply, sw antenna, earphone, carrying case

We stock the COMPLETE RANGE of ROBERTS RADIO.

£189

3 CHEQUES OF £66.33
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SCANMASTER quality antennas

SCANMASTER LP1300 WIDEBAND BEAM ANTENNA 16 EL LOG PERIODIC DESIGN

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

£129.00

SCANMASTER B128 AIRBAND BASE SCANNER

A dedicated CIVIL AIRBAND base antenna designed to give long distance reception on 117-140MHz. Supplied c/w mounting tube & mast clamps.

- 'N' Type connector
- length: 1mtr

£4.75 P&P

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SCANMASTER DESKTOP WIDEBAND SCANNING ANTENNA

A complete desktop antenna covering 25 - 1300 Mhz, just 36" high with 4 m of cable, fitted BNC plug with a magnetic base.

£4.75 P&P

£49.95

SCAN AIRMASTER DEDICATED CIVIL & MILITARY AIRBAND ANTENNA

- Covers 117 - 137 MHz, 224 - 400 MHz
- Antenna contains:
 - 2 dipoles for Civil Band
 - 6 dipoles for Military Airband
 - Uses "N" Type connector

£59.95



- MEGA FAST DELIVERY
- ENORMOUS STOCKS
- AMAZING SERVICE!

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Enjoy the STUNNING QUALITY of DAB digital radio

RD-1 GENIUM 1

The latest added from Roberts Radio - including Pocket, Recharge & Record

£199.00

3 CHEQUES OF £53.33

- DAB and FM wavebands
- Pause/plus and rewind functions
- Timed recording function
- Digital optical output socket (Toslink)
- Listen to a station whilst recording another via external recording device
- Large easy to read multi-function LCD display
- Digital record/playback using built in memory or via external SD card slot (Card inc)
- 2 station presets
- Search/manual tuning
- Clock/alarm functions
- Sleep/snooze functions
- Rotary control for station/menu selection
- Rotary vol, bass, treble controls
- External DAB aerial socket
- Analogue audio 1 and 2 output sockets
- Headphone socket
- Uses 4xLR20 (D size) batt (not inc) or via mains adaptor (inc)
- Size 190w x 260h x 130d mm
- Weight: 1.74Kg

RD-3 GENIUM 3

Multi-function portable DAB/FM radio with RDS

£139.00

3 CHEQUES OF £49.66

- Easy to read multi-function LCD display
- 10 station presets
- Menu display/selection of all major functions
- Search/Manual tuning
- Rotary controls
- External DAB aerial socket
- AC mains socket
- 6 x LR14 (C size) batteries
- Size mm 260w x 160h x 76d

RD-4 GENIUM 4

Multi-function portable DAB/FM radio with RDS

£159.00

3 CHEQUES OF £56.33

- Joystick control of tuning/volume
- Select stations by name
- 10 Station Presets
- Search/Manual tuning
- Clock/Date display
- 6 Preset tone settings
- 20 hour battery life (3x AA size - supplied)
- External Power Adaptor
- AC Adaptor included
- 65(w) x 110(h) x 20(d) mm

RD-5 GENIUM 5

Multi-function portable DAB/FM radio with RDS

£149.99

3 CHEQUES OF £53.33

- Large multi-function LCD display
- RDS system on FM
- Menu display/selection
- Search/Manual tuning Rotary control for station selection
- 10 station presets - 5 DAB+5 FM
- Rotary volume & tone controls
- External DAB aerial socket
- Uses 4 x (D size) batteries
- 200(w) x 200(h) x 125(d)mm
- Weight: Approx 1.68kg

RD-6 GENIUM 6

Multi-function portable DAB/FM radio with RDS

£179.99

3 CHEQUES OF £63.33

- Long throw speaker
- 5W power output
- 10 presets
- Full remote control
- Clock (which remains on)
- Digital Optical Output
- Tone control
- Headphone Socket

RD-11 REWIND

Multi-function portable DAB/FM radio with RDS

£150.00

3 CHEQUES OF £53.33

- FM/DAB wavebands
- FM RDS station name display
- Easy to read 16 x 2 character LCD display
- Auto tune
- Amber display backlight
- Menu display/selection of all major functions
- Rotary tuning and volume controls
- Stereo headphone socket
- Stereo line output socket
- DC input socket
- Battery or mains operation via AC adaptor (included)
- Uses 4 x LR20(D size) batteries
- First stock in Claret colour
- Size 250w x 155h x 100d mm
- Weight 1.5 kg



● **Fig. 6: GOES-12 1800 11 September (from METEOSAT-8) showing hurricane Ivan (© EUMETSAT 2004).**

images. Professor Robert Moore - see Fig. 2 - of the university of Liverpool sent a convincing METEOSAT-8 image showing this rarity - see Fig. 3.

Richard Gosnell sent in a sample image - see Fig. 4 - from NASA's LANDSAT online database of images. The database provides access to a decade of LANDSAT images "where you can view or download virtually anywhere in the world to a resolution of 28 metres per pixel", Richard explained. The sample image shows Malaspina glacier, Alaska. Check the website - <https://zulu.ssc.nasa.gov/mrsid/mrsid.pl> - to locate other LANDSAT images from this NASA archive resource.

Kevin Hughes also noted the period of cloud-free Britain, and sent me an image sequence from NOAA-17, of which the abrupt ending on 10 September is seen in Fig. 5.

WXSAT Group Activities

By the time that this appears, the original wxsat-l forum may well have been re-launched. Paul Ruscher took over the list from its original owner Rick Emerson and operated with administrative help from students until 3 May when he suspended the forum indefinitely due to repeated off-topic posts of an inappropriate nature. I discussed the situation with Paul to clarify the background, and he kindly told me of his proposal to re-start the forum when time permitted. The succession of hurricanes in August caused a postponement of the re-launch.

Les Hamilton kindly provided a summary of GEO news: GEO, the Group for Earth Observation, celebrates its first birthday this month. Fronted by a free magazine which attracted plaudits world-wide, GEO has succeeded beyond all expectations. This success is due in no small measure to the energy, drive and enthusiasm of Francis Bell, who has tirelessly supported GEO from the outset, ably assisted by Nigel Evans, John Tellick, Ray Godden, Peter Wakelin, Clive Finnis and Les Hamilton, all well known in the weather satellite field.

GEO was formed with the prime purpose of promoting the live reception of weather satellites for amateur and educational users and to represent these interests to those national and international agencies who control policy and operate weather satellites. GEO seeks to promote the uptake of

METEOSAT-8 reception in schools, and plans are currently being formalised to implement awareness of this fascinating hobby in the education sector.

The Launch Issue of *GEO Quarterly* has so far been requested by over 1000 enthusiasts - and close on half these have already taken up a full year's subscription.

Last May GEO embarked on its most ambitious venture, a Symposium at the National Space Centre in Leicester. It is a testimony to GEO's standing that a number of high-profile speakers attended and gave presentations, among them Gordon Bridge of EUMETSAT, David Taylor the software author (*Satsignal Software*) and Arne van Belle and Rob Hollander of the Dutch group.

The fourth issue of *GEO Quarterly* is due out at the end of November. Readers interested in joining this dynamic group can find details about membership on the GEO website at: www.geo-web.org.uk/join.html The current one-year UK subscription is £12, a fee guaranteed until the end of 2004.

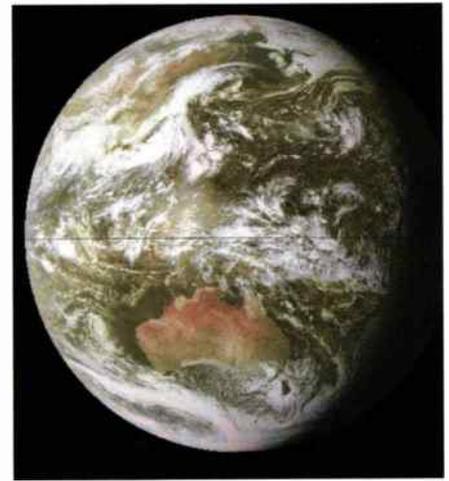
GEO has set itself the goal of staying at the forefront of developments in the weather satellite field and has already been represented at EUMETSAT's June conference in Prague. GEO also participated at the AMSAT Colloquium in July. Responding to an invitation from the Dutch Group, GEO attended their 'bijeekkomst' in Utrecht last September, and in December, following an invitation from NOAA, GEO will be making a presentation at the prestigious 'Direct Readout' conference in Miami. GEO is now recognised by agencies world-wide, and through its involvement in their events seeks both to gather the latest weather satellite news for its members and to inform these agencies of the international interests that GEO represents".

By press-time, unfortunately no monthly news update had been received from the Remote Imaging Group.

That Yaesu Elevation Motor - A Happy Ending!

As reported a few months back, the motor that controls the elevation of my h.r.p.t. reception dish failed during summer. With help from a local garage I was able to separate the two halves and extract some debris. After cleaning the insides, though not the bearings because they looked quite reasonable to my untrained eye, I re-assembled the unit and tested it. To my delight it survived two passes - before once more stopping during slowly increasing elevations during satellite tracking.

Following my request on the WXSAT forums, three very kind people offered help. Robert Finnis passes near Southampton occasionally and agreed to collect the unit from me one weekend. Robert's examination revealed that "the main bearings looked like they had suffered quite a lot of water damage. The ball bearings were rusted and pitted and the grease had solidified. The spreader cages used to keep the balls apart had caught on the shaft and had been damaged". Robert



● **Fig. 7: GOES-9 0600 11 September (from METEOSAT-8) Storms near China, sunny evening in Australia (© EUMETSAT 2004).**



● **Fig. 8: NOAA-15 1749 5 September - Cloud shadows in evening sunshine.**

replaced the bearings and grease, and also cleaned the gearing. He delivered it during another weekend and Marion and I remounted the motor and dish assembly - with trepidation! The motor worked perfectly on each pass that day, giving me good h.r.p.t. after an absence of many weeks. My grateful thanks to Robert for a splendid job!

Frequencies - a.p.t.

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

h.r.p.t.
NOAA-12 and NOAA-16 transmit h.r.p.t. on 1698.0MHz.
NOAA-14 transmits non-image data on 1707MHz.
NOAA-15 transmits on 1702.5MHz.
NOAA-17 transmits on 1707MHz.
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.
METEOSAT-8 HRIT, HRIT and other formats transmitted via HotBird-6 at 13°E on Transponder 117 - 10.85344GHz as EUMETCast data.

Decoding DRM Part 2

Kevin Ryan concludes his personal account of getting converted to Digital Radio Mondiale reception. Read how Kevin overcame the obstacles and began to enjoy the fruits' of his labours.

First DRM Tests

Everything was now in place so time for an afternoon's testing! Armed with the latest schedule from the Radio Netherlands website I fired up my PC and receiver and tried DRM signals from Deutsche Welle (DW), Luxembourg and Russia. The result was absolutely nothing! After getting over

Table 2.1.

Main DRM Transmitter Sites (Short Wave)		
Junglinster (Luxembourg) 2x50kW		
MHz	Time	Comment
5.990	0600-2400	French
6.095	0600-2400	Various (See Fig. 2.2)
Julich (Germany) 1x40kW		
MHz	Time	Comment
6.140	1000-1300	Music/German
6.140	1600-1900	Music/English/German
Wertachtal (Germany) 1x150kW		
MHz	Time	Comment
9.655	1200-1400	Music/German
6.180	1400-1600	Music
7.125	1600-1800	Music/English/German
3.995	1800-1900	German
3.995	2200-0600	German
Flevo (Holland) 1x40kW		
MHz	Time	Comment
9.815	0845-1414	Various
5.995	1700-1800	Radio Sweden
Sulaibiyah (Kuwait) 1x120kW		
MHz	Time	Comment
13.620	0930-1300	Arabic
9.880	1315-1730	Arabic
11.675	2200-0200	Arabic
Rampisham (UK) 2x33kW		
MHz	Time	Comment
9.760	1000-1100	Christian Voice (Mon)
7.320	1000-1500	BBCWS
9.565	1200-1400	Various (Sun)
9.410	1200-1400	BBCWS
9.770	1400-1700	Various (Fri & to 15.00 Sat)
15.215	1800-1900	BBC Russian
Sackville (Canada) 1x70kW		
MHz	Time	Comment
9.800	1955-2300	Various
Russia (Taldom) 1x35kW		
MHz	Time	Comment
15.780	0200-0900	Russian/English
15.780	1300-1700	Various
Portugal (Sines) 2x80kW		
MHz	Time	Comment
15.440	0800-1400	DW Various
15.545	0900-1200	DW German (Mon - Fri)
15.435	1800-1955	DW German

Fig. 2.1a: DRM log for Deutsche Welle on 6.140MHz. This is a record of good reception with no loss of audio at the speaker.

```
DRMSoftwareRadio-MERLIN-00000830
Software Version 2.0.34
Starttime (UTC) 2004-04-30 16:01:15
Frequency 6140kHz
Latitude 51°28'N
Longitude 0°51'E
Label DW Julich
Bitrate 11.56Kbps
Mode B
Bandwidth 10kHz
Comment DW
```

MINUTE	SNR	SYNC	AUDIO	TYPE
0000	14	148	740/05	0
0001	13	149	705/05	0
0002	13	146	730/05	0
0003	13	150	745/05	0
0004	14	148	745/05	0
0005	13	149	720/05	0
0006	11	147	660/05	0
0007	13	143	715/05	0
0008	13	150	740/05	0
0009	13	148	745/05	0
0010	12	141	595/05	0
0011	12	147	725/05	0
0012	13	144	715/05	0
0013	13	150	740/05	0
0014	13	148	750/05	0
0015	14	149	750/05	0
0016	12	146	735/05	0
0017	11	144	600/05	0
0018	12	148	690/05	0
0019	12	142	525/05	0
0020	13	148	710/05	0
0021	13	146	740/05	0
0022	12	149	735/05	0
0023	13	150	740/05	0
0024	12	145	675/05	0
0025	13	147	730/05	0
0026	13	149	740/05	0
0027	12	145	730/05	0
0028	14	147	745/05	0
0029	13	148	720/05	0
0030	13	147	695/05	0
0031	12	148	715/05	0
0032	13	146	745/05	0
0033	13	146	705/05	0
0034	13	145	750/05	0
0035	12	142	650/05	0
0036	13	148	685/05	0
0037	12	148	670/05	0

```
SNR min: 0.0, max: 14.7
CRC: 0x5f94
```

my initial disappointment I looked back at what I had done and quickly decided to try a little fault finding. Using the signal from RTE on 252kHz as a test source I immediately saw that the fine tune just couldn't centre the carrier to the zero point on the DRM decoder screen. My shortcut hadn't worked so I had to disassemble the receiver once more to adjust the tuning coil on the i.f. board. The trouble with this

receiver is that once you remove the rear cover the battery compartment is lifted away from the main body and the power is disconnected. Also there is no indication on the i.f. board itself on which way to turn the core. Some trial and error was therefore in order and having put a mark on the coil's can in-line with the slot in the core I moved it about 45° anticlockwise. I re-assembled the receiver and then found one of the most annoying things about this particular receiver was happening - if the power is not left removed for a considerable period of time the receiver comes up in a funny state where it does not tune properly. Time for less haste and a little patience!

Bingo! The receiver now tunes properly so back to setting up the feed to the soundcard. The i.w. signal was fed in again and the fine tune control put it dead centre on the screen. This time the DRM signal from DW looked like the illustration in the DRM manual. Still no audio but this could be down to the poor SNR ratio of about 6.5dB being registered on the screen. Just enough to turn the SYNC and sometimes the DATA line green but that was it. Now, I began to look at ways of improving the SNR ratio. Of course computers are a major source of noise and switching off all the unnecessary peripherals such as USB hub and the printer caused an immediate jump in the SNR on the DW signal on 6.140MHz and with some relief, audio came from the PC's speakers. Success! A valuable lesson in that DRM needs the best possible electrical conditions that you can provide. Also, don't give up if it doesn't work first time. Continue to experiment and go back over everything you have done. Failing all that, come back another day when the propagation conditions will be different.

Reception Reports

From a DXer's point of view, there is a really interesting thing about reporting on DRM signals. This is that you don't need to worry about the SINPO code. The station will still require you to send them a proper reception report with all the usual details before issuing a

QSL card. **Table 2.1** lists most of the main transmitter sites, together with their broadcast schedules. In my view the best signal to start with is the Deutsche Welle transmission on 6.140MHz between 1700 and 1900.

This has provided a reliable signal day after day and is pretty much interference free. In fact, DW provides good reception most of the time. RTL also gives good reception but is usually much better when it uses lower encoding rates. The Taldom, Sackville and Rampisham transmissions have been elusive to say the least, but I continue to test different antennas to try to improve the SNR. There are also a number of low power sites around 26MHz and there are some transmissions from Vatican Radio on their 1611kHz m.w. site.

To create the technical information needed by the station just press the RECORD button

Fig. 2.1b: The RTL signal produced intermittent text and a lot of audio loss. Not very pleasant to listen to!

```
DRMSoftwareRadio-MERLIN-00000830
Software Version 2.0.34
Starttime (UTC) 2004-04-21 21:04:25
Frequency 6095kHz
Latitude 51°28'N
Longitude 0°51'E
Label RTL DRM
Bitrate 14.48Kbps
Mode B
Bandwidth 10kHz
Comment Radio Luxembourg
```

MINUTE	SNR	SYNC	AUDIO	TYPE
0000	12	149	800/10	0
0001	13	140	910/10	0
0002	13	144	1170/10	0
0003	14	147	1110/10	0
0004	10	122	270/10	0
0005	11	146	550/10	0
0006	11	146	570/10	0
0007	13	147	1020/10	0
0008	12	135	520/10	0
0009	12	148	780/10	0
0010	11	134	520/10	0
0011	12	149	740/10	0
0012	7	98	0/00	0
0013	8	144	0/00	0
0014	6	135	0/00	0
0015	8	106	0/00	0
0016	10	147	190/10	0
0017	8	112	10/10	0
0018	9	146	250/10	0
0019	11	143	810/10	0
0020	10	140	500/10	0
0021	10	109	230/10	0
0022	11	136	450/10	0
0023	11	140	580/10	0
0024	13	145	1010/10	0
0025	13	150	780/10	0
0026	13	148	600/10	0
0027	13	145	1350/10	0
0028	12	143	750/10	0
0029	12	147	780/10	0
0030	12	145	860/10	0
0031	12	144	850/10	0
0032	13	149	920/10	0
0033	13	147	730/10	0
0034	13	148	800/10	0
0035	14	146	1030/10	0

SNR min: 0.0, max: 15.1
CRC: 0x7e49

on the DRM decoder's screen and this starts a log file of several parameters that is written away every minute. The software asks where you want the files to be stored but it names every file as DRMSoftwareRadio.log. Do be aware, that if you start and stop the RECORD function the software appends the new information to the file. I have adopted the habit of renaming the file with the name of the station or the frequency to avoid any confusion. **Figures 2.1a to 2.1c** shows some examples of the log file for various stations and encoding rates. Nearly all DRM signals carry a low speed text service that contains a lot of interesting programme, contact and technical data.

For example the DW signal from Sines on 15.440kHz did not produce more than a few scraps of audio, but I was able to copy down an extensive headline news service. The

Fig. 2.1c: This DW signal gave no audio output! The text messages came through OK and DW verified the report as I had copied them down correctly.

```
DRMSoftwareRadio-MERLIN-00000830
Software Version 2.0.34
Starttime (UTC) 2004-05-01 09:08:21
Frequency 15440kHz
Latitude 51°28'N
Longitude 0°51'E
Label DW-Sines
Bitrate 17.38Kbps
Mode B
Bandwidth 10kHz
Comment DW
```

MINUTE	SNR	SYNC	AUDIO	TYPE
0000	13	143	560/10	0
0001	13	150	490/10	0
0002	13	147	140/10	0
0003	13	149	360/10	0
0004	13	148	220/10	0
0005	13	149	210/10	0
0006	12	148	0/00	0
0007	10	133	0/00	0
0008	5	144	0/00	0
0009	7	113	0/00	0
0010	4	57	0/00	0
0011	7	136	0/00	0
0012	11	148	0/00	0
0013	12	149	0/00	0
0014	12	150	0/00	0
0015	12	149	0/00	0
0016	11	148	0/00	0
0017	10	145	0/00	0
0018	11	143	0/00	0
0019	11	145	0/00	0
0020	12	149	0/00	0
0021	12	149	0/00	0
0022	12	146	0/00	0
0023	11	149	0/00	0
0024	11	148	0/00	0
0025	10	143	0/00	0

SNR min: 0.0, max: 14.1
CRC: 0xf97d

Radio Luxembourg service on 6.095MHz carried the schedule information listed in **Fig. 2.2** despite producing intermittent audio. This became the basis of the reports together with the log file, which gives the engineers the technical data they need to assess their signal. Do bear in mind that just sending the log file to the station is unlikely to bring a QSL response.

So far, I have had QSLs from Deutsche Welle for their three transmitter sites. Radio Sweden also responded quite quickly, but I am still waiting for RTL Luxembourg to get back to me. A follow-up report did bring a response that their QSL Manager was very busy! Usually the text service tells you where to E-mail the reports, but if it doesn't, then you just have to rely on the more traditional methods, such as *World Radio TV Handbook* or *Passport To World Band Radio*.

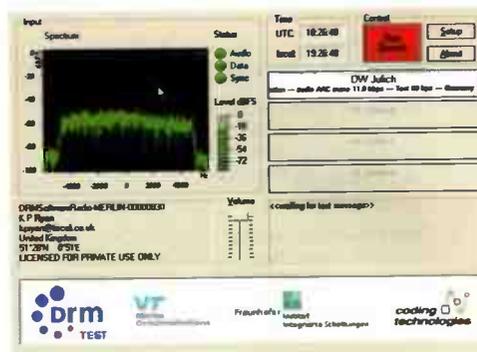


Fig. 2.3: Perfect reception from DW on 6.140MHz. Notice the shape of the DRM spectrum and that all status lights are green.

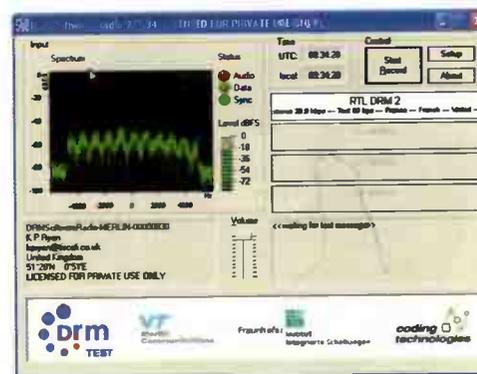


Fig. 2.4a: Stereo from RTL in French but unable to

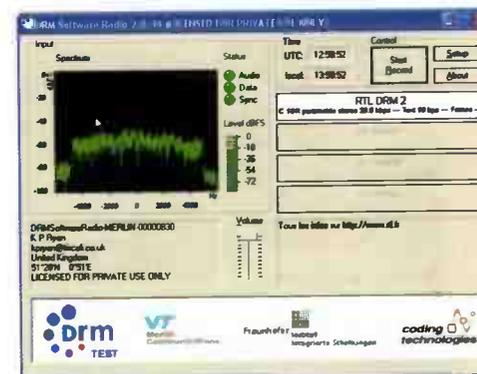


Fig. 2.4b: Stereo from RTL in French.

Other DRM Features

As you begin to decode some actual DRM signals you will begin to notice additional content in the DRM signal. If you click on the scrolling display another screen opens up that captures text or multimedia information. So far there is only one transmission that I have found to carry Multimedia, which is the Deutsche Welle broadcast at 1200-1300 but it seems to carry only news in German. You will also notice a lot of acronyms appearing in the scrolling window and I have tried to explain them in later in the article. Check out the web links or see previous issues of SWM, if you want to learn more about the theory behind DRM.

Noise

Noise should be thought of as any unwanted signal and there are several sources to contend with in decoding DRM. Some noise, like that added during the analogue-to-digital conversion process and the assembly of the DRM package, cannot be influenced by the end-user. Equally, we have no control over noise added during the transmission process, or the phase noise generated by the local oscillator of the receiver. However, we can do something about the noise in the local environment and this is where I finally found what was limiting my ability to receive DRM.

In the preceding paragraphs I have mentioned the noise generated by PCs and their peripherals. To overcome this I located the TMR7602 receiver as far away as possible from the PC and connected the audio to the PC soundcard via shielded cable. This made a big difference and I can now have my USB devices powered whilst listening to DRM. Even then, I was still not getting the most out of my investment, as up to this point, I was able to consistently decode transmissions that had been encoded at around 11Kbits/s. Most of the time I could get audio from the 14.4Kbit/s ones, but at the higher encoding rates used to accommodate stereo, the decoding reliability decreased rapidly.

Almost by chance I switched off the remainder of my receiving equipment including a Freeview set-top box and VCR on standby. Suddenly I was able to receive stereo from RTL (Fig. 2.4b). Yes, the audio quality was pretty good as delivered by the PC soundcard and speakers. I must say that I was very pleased about this as I was forming the view that if DRM could only deliver mono then there wouldn't be much point to it! Later that same day I also picked up DW from Sri Lanka, which must have arrived via at least two hops.

Interference

Another thing that I have discovered, is that analogue signals wreak havoc with their DRM counterparts. Take the Luxembourg signal on 6.095MHz and you'll notice that it spans 6.090-6.100MHz. An analogue signal on

either of these three channels will destroy reception of the DRM signal. You will get bursts of text but not much else. I have also found reception of the RCI Bouquet on 9.800MHz and the RNW from Bonaire on 15.150MHz to be regular victims of analogue co-channel signals.

So far there are not enough DRM transmissions to interfere with one another, so it's anyone's guess what effect this will have.

What Next?

I have found decoding DRM to be challenging and rewarding. It took some time to understand how to get the most from it, but it has now opened up a new dimension to short wave listening that will help compensate for the ongoing decline in traditional analogue broadcasts. With more international broadcasters joining the DRM community, I for one, am going to stick with it and hopefully we might even see dedicated bandwidth being



Fig. 2.5: Multimedia engine showing DW on 6.140MHz at 1200-1300.

allocated to the digital broadcasts with decent receivers available at reasonable prices.

If you can, I would encourage you to join the growing family of DRM supporters. My next challenge is to decode the Vatican Radio's daily broadcast on medium wave. **SWM**

DRM JARGON

Understanding The Log File

MINUTE	SNR	SYNC	AUDIO	TYPE
0009	13	148	745/05	0
0010	12	141	595/05	0
0011	12	147	725/05	0
0012	13	144	715/05	0
0013	13	150	740/05	0
0014	13	148	750/05	0
0015	14	149	750/05	0
0016	12	146	735/05	0
0017	11	144	600/05	0

There are usually 150 transmission frames per minute in a DRM signal.

MINUTE - The software makes an entry every minute of these parameters. It is logged relative to the start of the recording so you need to keep your PC's clock as accurate as possible.

SNR - this is the average Signal-to-Noise in that minute.

SYNC - the number of frames where the FAC (Fast Access Channel) information was received without error. There is one FAC data frame per transmission frame, so this figure should be in or around 150.

AUDIO - this is of the form M/N where M = the number of error free audio frames received this minute and N = the number of audio frames per transmission frame. In this example there are 05 audio frames per transmission frame and 150 transmission frames per minute so, we should have received 750 (150x5) audio frames for totally error free reception. In fact, DRM should be able to cope with losing up to 25% of the audio frames without any drop-outs.

TYPE - refers to the audio encoding, such as AAC but generally this field is 0.

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- 100 channel/sec, high speed scan
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Radio Software

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UI-View has full support for connecting to APRS servers on the Internet.

UI-View uses bitmap images for its maps. Also, the 32-bit version has full support for Undertow Software's Precision Mapping CD atlas, allowing you to zoom to street level anywhere in the USA.

UI-View has an open architecture. It is designed to make it easy for other software authors to write add-on applications that provide additional functionality.

There are two versions of *UI-View*:

The 16-bit version will work on *Win3.1*, and also on 32-bit versions of Windows. It is supplied as 'registration-ware'. An unregistered copy is almost fully functional (the only restriction is that some of the IGATE functionality is disabled). Registration costs £10 and covers both *UI-View16* and *UI-View32*. The Registration section of the *UI-View* help gives full information on how to register, payment options, etc.

UI-View32 is a 32-bit version and so needs a 32-bit version of Windows - *Win95*, *Win98*, *WinME*, *Win2000*, *WinXP*. It is for registered users only, and has many extra features compared to *UI-View16*. If you are unfamiliar with *UI-View*, then it is recommended that you try *UI-View16* before paying for a registration so you can use *UI-View32*. The absolute minimum hardware required to run *UI-View32* is a P120. If you run it on anything less than that, it will be very slow.

PSK31

What is PSK31 you may ask? It's simple, and yet it's not. Translated literally, it's an acronym for "Phase Shift Keying, 31 Baud". PSK31 is a form of modulation (or "mode") that offers a new and higher level of performance in conversational communications (keyboard-to-keyboard) that we "hams" (amateur radio operators) can enjoy. And it's been made instantly usable by all of us, due in part to the proliferation of the

personal computer, and in part to the superb and generous efforts of some very talented ham/programmers.

In the short time that PSK31 has been in use, its popularity has grown by leaps and bounds. It may in time replace or at least greatly supplant RTTY and other modes for person-to-person communications. It's fun, easy, and well worth the effort to get set up, which is not very much at all.

It should come as no surprise that the PC is transforming the way we operate. Think about it, in your little PC you've got one of the most powerful tools for digital signal processing, spectrum analysis, database, logging and much more.

PC-ALE

If you would like to try this software you will need at least a 133MHz Pentium and a soundcard. Also this software is highly experimental so may not work on your machine. Limited technical support will be provided via E-mail from the author.

First install the ZIP file then copy the second exe file to the sub directory that contains the executable. If you have any problems please let the author know about them, so he can correct them in a latter release.

There is a FAQ for this software, which can be found at the WUN website.

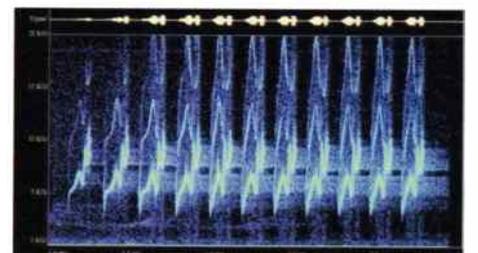
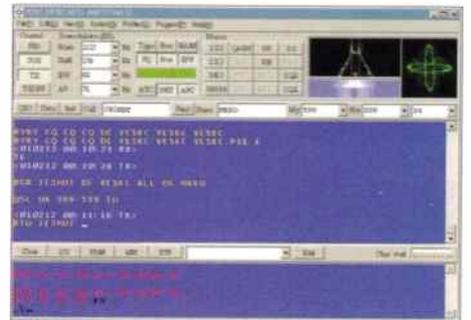
Since *PC-ALE* is transmit capable please be aware that, neither the author nor *SWM* will not accept responsibility for any damage to your equipment through use of this software. When using this *PC-ALE* use an Automatic Antenna Tuner and run the transmitter well below rated output. It is advisable to go through a tune sequence on each of the operating frequencies before handing control of your radio to the computer. You have been warned!

PC-HFDL

The commercial version of *PC-HFDL* is now available and is in its own subdirectory on the CD version 2.01.

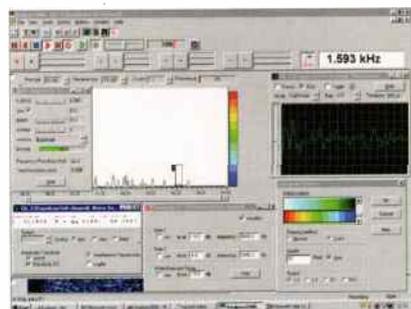
Without a Licence key the program will run for 10 minutes before closing down.

A single user licence costs \$35 and permits you to run one copy of the program at a time. The Licence key will be sent by the author via E-mail within 24 hours of payment.



What's on the CD?

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The commercial version includes more extensive protocol support and interfaces to a number of commercial packages. It also includes E-mail technical support for one year after purchase.

UK customers contact the author by E-mail for alternative payment methods.

The Original Unsupported version of PC-HFDL, also located in its own sub directory, is similar in use to the commercial version but does not require registration.

POCSAG

This program decodes pagers without any receiver modifications by using the soundcard. No discriminator output is needed. It uses simple digital signal processing to regenerate the transmitted signal.

You have only to plug the receiver's 'line-out' or speaker out cable to 'line in' of the soundcard and to adjust the mixer settings. That's all!

WACARS

ACARS Reception and Decoding Software For Windows

The only ACARS software to feature in-line message decoding and aircraft tracking.

WACARS Version 0.7 is the latest release of the popular ACARS decoder for windows. This software will allow you to decode the ACARS signals received by your air band receiver using the soundcard that is installed in your PC.

New features in this version

An entirely new decoding algorithm, Support for any DDE ACARS server, for example the *Lowie Airmaster 2000* or *Skyspy*, better map display, larger database entries, airline specific modes database, change of log file name format and a host of minor bug fixes.

Other features

Position of aircraft plotted on a map, Automatic Log of all messages received, Automatic sorted lists of all aircraft and flight numbers Company name determined from flight number. Built-in signal strength and CPU load

meter. Unlimited aircraft database, Programmable message and IATA and ICAO airport designator decoding.

Analyzer2000 v5.0

This program, by Brown Bear Software, is very sophisticated and powerful. Its major features are:

- * makes use of multiple windows
- * presents an amplitude-frequency display, a vertical waterfall display and an oscillographic amplitude-time display
- * basic frequency span is 0-4kHz, or wider, with zoom for smaller spans
- * uses cursor-controlled markers to measure frequency
- * has adjustable but unlabelled time ticks
- * the oscillographic display has three sweep speeds
- * can save audio samples in WAV format
- * includes Morse, FSK and PSK demodulators
- * extensive on-screen Help available

This is an excellent program for serious Monitoring System work although it requires some knowledge of the FFT process in order to make best use of the program's many features. Brown Bear Software recommends a 300MHz Pentium II computer, but we found the program ran fine most all of the time on a 266MHz Pentium II, though occasional processor 'catch-up' was evident. A monitor with at least 1024x768 pixels resolution is recommended for working with the program's many windows. The FSK and PSK demodulators don't actually decode or read a signal but they are wonderful tools for finding the keying speed and for studying the bit and frame structures of digital signals. In addition to the on-screen Help for these functions, there are several short but helpful tutorial articles on the Brown Bear website www.brownbear.de

An evaluation version of the program is featured on the CD.

Also included on the CD

AALog v2.46

ACE-HF

Active Beacon Wizard ++

Analyzer2000

AR5 including

sr5

bkn5

ar5grabber

CwGet v1.40

DigiPan

FFTDSP

GeoClock

GIMP

Gram v5.0

Hamview

KRACARS

MixW

MMSSTV

MMTTY

MSG Animator 2

PC-ALE

PC-HFDL

PD

PDW

PKTMON

POC32

POCSAG

PPM

PSK31

QuickMix

RadioRaft

RDBM Radio Database

Manager

SeaTTY v1.50

Spectra

Spectran

Spectrogram

Spectrum Lab

SSC

tk8500

TrueTTY v2.33

Trunksniffer

Two Tone Tester (TCube)

UI-View

WACARS

WinWarbler

WXtoIMG

WXTrack

Xcorder

Xcorder Lite

xrit2pc

plus

DAFIFT Data for AirNav

(23.3MB)



Starting Out

Part 6

The beginners' series that's back due to reader demand. This month we continue the rerun of the excellent beginner series from the past, originally brought to you by the late Brian Oddy G3FEX.

Although many radio signals are present at most locations in the world, their presence cannot be detected without a suitable antenna and receiver. It's important to appreciate that the antenna provides the tiny signal voltages required by the receiver and that both the antenna and the receiver work together as a team in this detection process!

As the electromagnetic waves associated with each signal travel past a receiving antenna, their electric (E) and magnetic (H) fields induce, or set up, a tiny alternating electromotive force (e.m.f.) on the antenna - this in turn causes a tiny alternating current to flow in it. The peak-to-peak potential of any signal is likely to be only a few microvolts, where one microvolt (μV) is one millionth part of a volt.

The waveform of each signal voltage will be an exact replica of the modulation envelope generated by the transmitter concerned - see 'Starting Out', *SWM* September 2004. For the highest efficiency, the length of the antenna must bear some relationship to the length of the radio wave and this and other aspects of antenna design will be discussed later in this series.

The Receiver's Role

The receiver's role in the incredible job of receiving and listening to a signal, is to select just one particular signal required by the listener, from all those present on the antenna. Then the receiver's job is to process the incoming signal so as to recover the original audio modulation.

Some receivers are more effective than others at sorting out and recovering the modulation of the wanted signal from amongst all others. And over the years, numerous receiver designs have evolved, ranging from the simple crystal set, which was only capable of detecting strong signals from a local broadcast station, to the modern communications receiver. Modern receiver designs may be capable of processing signals to recover audio information from voltages of only a few tenths of a microvolt from the antenna!

Tuned Circuits

Irrespective of the complexity of the receiver, each design relies upon the properties of **tuned circuits** to select wanted signals and reject unwanted ones. A simple tuned circuit consists of a coil of wire called an **inductance** (L) attached to two or more insulated metal plates, which form a **capacitor** (C). These two components, L and C, may be connected either in parallel as shown in **Fig. 6.1a** or in series, as shown in the illustration of **Fig. 6.1b**. The component values of L and C determine the frequency to which the circuit responds or **resonates**. By changing the value of L or C the circuit may be adjusted or **tuned** to resonate at any desired frequency.

It can be shown that, in the case of parallel connection (as in **Fig. 6.1a**), the circuit acts as a high impedance at the resonant frequency, f_0 and that a low impedance exists at all other frequencies. The illustration of **Fig. 6.1c** shows the type of response that may be expected from a parallel connected LC combination, although the exact values of f_0 and Z, will vary with component values.

When the inductor and capacitor are wired in series, **Fig. 6.1b**, exactly the opposite response to that of **Fig. 6.1c** is obtained. And in this latter case, the impedance reaches its lowest value at the resonant frequency f_0 - at all other frequencies, the impedance value rises,

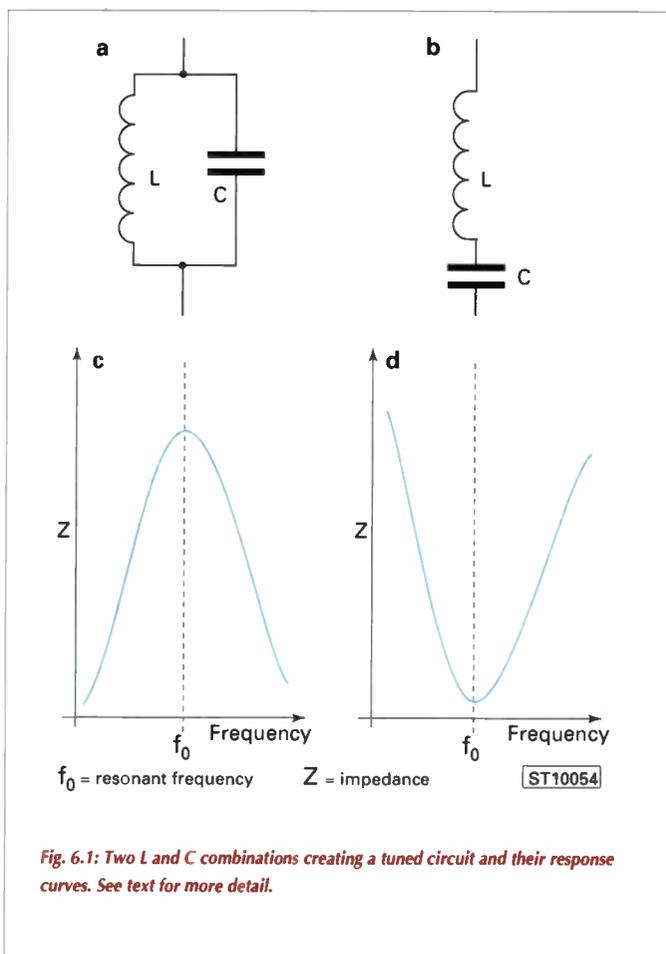


Fig. 6.1: Two L and C combinations creating a tuned circuit and their response curves. See text for more detail.

Fig. 6.1d. And as before, the actual values of f_0 and Z will depend on the values of L and C.

Any practical LC tuned circuit, unavoidably contains some resistance in the leads and wire that forms the inductor. And this extra resistance causes the resonant values of the response curve to become flattened, so that the selectivity of the circuit, meaning the ability to separate out the wanted signal, is reduced.

If an antenna and earth are connected to a parallel tuned circuit and the L/C values are adjusted (we say that it's tuned) to resonate at the frequency of a wanted incoming wanted signal on the antenna, the circuit will present a high impedance to the wanted signal. It will though, present itself as a virtual short circuit to all other frequency signals. It will in effect select the desired signal and reject all others.

In the earliest receivers, the coil was usually tapped to provide a form of adjustment. But later the capacitor was made to have a variable value instead. This variable capacitance value, has the effect of giving a more precise adjustment, so that better tuning arrangements can be made. More modern continuously tuned receivers contain fixed coils and variable tuning capacitors. To change the range of frequencies that the receiver could be tuned to, a bank of fixed coils is employed and each coil is selected by a **wave change switch**.

After the desired signal is selected, it then has to be processed by the

receiver in order to recover the original modulating (audio) information. The tiny signals that come in at the receiving antenna, become more difficult to process as the frequency of a signal is increased. In the early receivers the process called **detection**, was carried out immediately after the signal had been selected by a single tuned circuit.

Until recently most modern receivers however, made use of the **superheterodyne** principle (usually 'superhet' for short), which overcomes these problems. By converting the tiny high frequency signals to a much lower frequency that can then be more easily amplified and processed, the lack of sensitivity can be easily overcome.

Superhet Principles

When two frequencies are fed into a mixing device, it can be shown that both the **sum and difference** frequencies are generated from the two input frequencies. By mixing an incoming signal (f_c) with a locally generated oscillation (f_o), then the two frequencies of (f_c+f_o) and (f_c-f_o) are produced. If the difference frequency (f_c-f_o) is selected then, effectively a lower frequency results. This new selected lower frequency is called the **intermediate frequency** (i.f. for short), see Fig. 6.2. If the local oscillator tuning and the incoming signal circuit tuning are **ganged** or coupled together, it may be arranged that a constant i.f. difference (between their resonant frequencies) results.

Although the i.f. is a lower frequency than the original antenna signal, it's a replica of the original signal modulation. This replica is fed to an i.f. amplifier which can be sharply tuned at the factory to the chosen intermediate frequency so, it provides both amplification and selectivity. The i.f. then passes into a **demodulator** or **detector** circuit that recovers the original audio modulation from the signal. The audio output from this detector stage is amplified and is then used to drive a loudspeaker or headphones.

A portion of the signal present at the output of the i.f. amplifier is used to provide an **automatic gain control** (a.g.c.) potential to vary the gain of the i.f. amplifier(s) as the strength of the signal varies due to fading. These general principles are building blocks used in most of the simpler modern receiver designs and there are so many receivers to choose from these days that a newcomer to this hobby may well find it difficult to decide which receiver will suit his needs! Some of the receivers are quite inexpensive - certainly cheaper than one could build for the money.

Portable Receivers

Most of the cheaper receivers available are transistorised portable superhets and include a built-in telescopic 'whip' antenna. Although nearly all of them cover the long wave (l.w.) and medium wave (m.w.) bands, some have only one short wave (s.w.) range, often covering several s.w. broadcast bands. This often results in a very cramped scale, so this type of radio is best avoided.

The better (and often more expensive) analogue tuned portable radios may have individual s.w. bands, selected by the wave-change switch, spread out over the length of the dial. You may find bands such as 16,

19 and 31m. These bands correspond to the internationally agreed broadcast bands (see page 43, June 2004 SWM).

Limitations

Obviously these receivers have certain limitations, especially on the s.w. bands, where, for example, the receiver tuning may gradually drift off the station over a period of time. This drifting can be overcome by an occasional adjustment to the main tuning knob. You may find that the calibration of the dial/scale may not be very accurate, but this can be overcome, to some extent, by adding a logging scale and preparing a set of calibration graphs, see appendix, page 45 July 2004 SWM.

The simple circuits used in the cheaper portable receivers may result in a lack of sharpness in the tuning, allowing the sidebands from an unwanted station to interfere with a wanted signal. Another more important problem is that **image signals** may appear on the bands - the cause of these will be revealed in a future article in this series.

More Advanced Designs

Because of problems, the word 'portable' may imply something less than the best in the mind of some listeners, however, these days there are many semi-professional solid-state portable receivers available in a higher price range (often £100-350), which may suit most listeners. They are capable of providing excellent reception of most of the global s.w. broadcast bands and are very easy to operate.

Everything that the average listener needs is built in - even the built-in whip antenna will often prove to be adequate for anyone who lives in a fair location! Many of these portables are often more sensitive than some of the older valved communications receivers, which require an effective and often large external antenna. Many portable radios also have another advantage over the older valved sets, namely a **digital frequency display**, which makes it a simple matter to tune accurately into a particular station or to find the station again on a subsequent occasion.

Communication Receivers

Now we come to communications receivers, used by most dedicated DXers, who are intent on searching for signals intended for distant target areas. Since such signals may be very weak, or hidden under copious amounts of interference from other stations, DXers do not rely on a portable receiver to obtain their results - instead they often employ a modern **communications receiver**. Such receivers have always been the standard of excellence and needless to say they are very expensive, ranging in price from about £400-2000 or more.

To ensure the best results from many communications receivers, you'll often require a good external antenna system. To get the best out of these sets, they also need to be used by someone who understands how to operate them! Some of the interesting features included in the more advanced portable sets and communication receiver designs will be discussed next month.

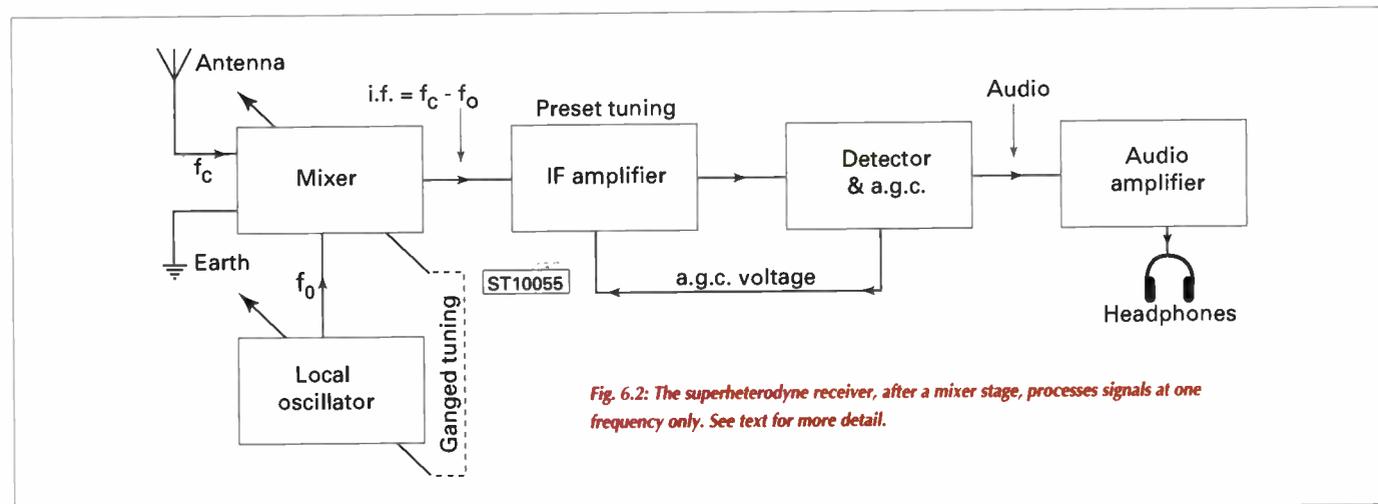


Fig. 6.2: The superheterodyne receiver, after a mixer stage, processes signals at one frequency only. See text for more detail.

In The Ed's Shack

VLF and microwave antennas plus why MSF was off-air. All this during a 'whistle stop' visit to the rapidly cooling Ed's Shack!

As I bring you this episode of the Ed's Shack I am reminded there is really no question that it is a genuine stereotypical shack that I inhabit.

You see, I was gently evicted from the spare bedroom by my wife earlier this year. I don't really have a problem with this, I can see her point of view too. Who in their right mind wants their guest room filled to the brim with radio and computer paraphernalia? So, I lost the argument. The result was a rather rapid conversion of the somewhat dilapidated, dirty and damp shantytown style hut that had been used as a workshop by the previous owner of our house some seven plus years ago.

It really is amazing what you can achieve in a week with a broom, some paint brushes

and miscellaneous tins of paint. I transformed what was a smelly tip into a crisp 'new' home for my radios and associated 'junk'.

Now that the weather has begun to behave true to the changing season, I am reminded that the new shack is a rather poorly insulated garden building that I'm sitting typing in. I really must find space to accommodate the oil filled radiator as the temperature is beginning to fall to a rather less than comfortable level out here! I'm hoping I won't have too much to contend with by way of interference from the thermostat as it goes about switching the element on and off in an attempt to raise the comfort level.

Though I'm not alone in this battling with nature, being separated from the elements by only a thin and poorly insulated substrate. It seems that you can't be the Editor of a radio enthusiasts' magazine without inhabiting an outside building. They're all at it. Only last week **Rob Mannion**, Editor of sister publication *PW* joined the fray with his rather plush new outbuilding - I must say I'm a little envious as Rob's going to some lengths to ensure his comfort levels remain high. Lastly, **Elaine Richards**, *Radio Active's* Editor is also a member of the great outdoors club too she's been alfresco for over a year now...

VLF Loop

Those of you who have been patiently awaiting the concluding coverage of the v.l.f. antenna project, which I began back in July's *SWM*, need wait no longer. I've finally managed to squeeze the space to include the

conclusions of this interesting high performance active loop antenna.

The design was courtesy of German amateur and v.l.f. enthusiast Klaus Bekke and it has proved to be a superb performer. I mentioned in July, that the construction was relatively simple, so I recommend the antenna to anyone who's looking to investigate this part of the spectrum. One thing that left me wondering for some time was how to support the 40 turns of wire that make up the loop element? For the moment I've used a crude crucifix arrangement, but I've discovered one builder who has just wrapped his in layers of tape. It seems to work so I may try that.

MSF

There are some things that you accept in life. Things you can rely on, such as the sun rising every day, the price of fuel increasing and taxes never abating. Well, until recently I viewed the presence of MSF's signal on 60kHz to be in the same unerring category as those constants.

What a shock it was when the shack clock, an Oregon Scientific MSF-locked one, lost synchronisation with its radio based reference. The MSF transmitter at Rugby was off-air. Fortunately, it was for maintenance only and back on air not long afterwards. It turns out that there are several such scheduled maintenance periods throughout the year. Just what happens in the down-time I don't know. I feel an article coming on...

μ Wave Antennas

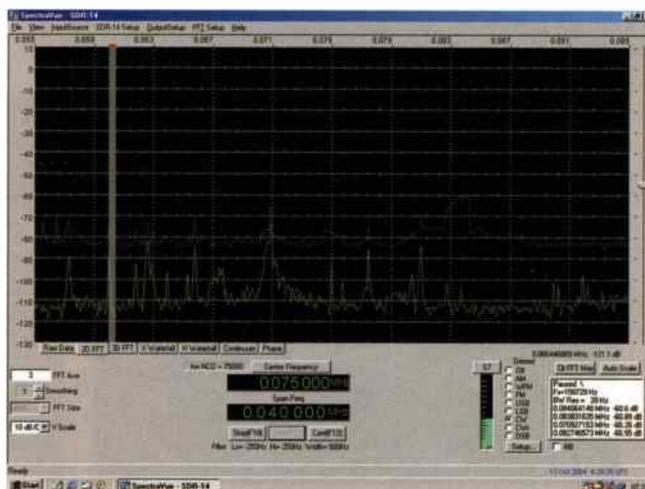
Right at the other end of the spectrum, my interest in microwave monitoring has led to the acquisition of suitable equipment. In *SWM* last year we featured some introductory articles on video monitoring. A vital element of the microwave receiving set-up is a suitable antenna. It is very interesting to experiment and build lots of antenna designs. It is incredible just what you can achieve with pieces of copper clad glass fibre and 18s.w.g. wire. But even if you have the resources to build and you feel confident in your abilities you still need some form of reference to

measure your success, or failure, against. The appropriate test gear is far from cheap, so the answer is a ready-made antenna of proven pedigree for comparison.

In steps G1MFG the purveyors of "The best ATV gear in the world..." or so goes the company tagline. Giles has some high gain Grid antennas for both 23 and 13cm (1.3 and 2.4GHz). He spent a considerable time searching to find these good quality antennas



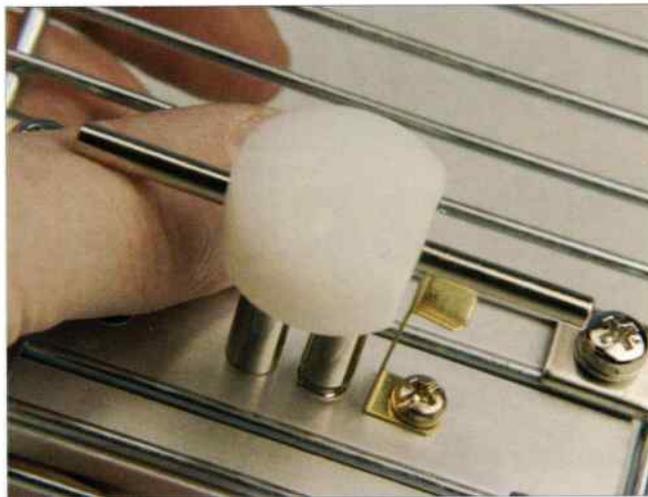
A v.l.f. loop covered in insulating tape - seems to work!



The plot of the loop in action - MSF is the signal in the shaded portion.



The 23cm grid before assembly.



The radiator with the tuning strip fitted for optimum amateur performance.

that provide good coverage of the amateur allocations in the 23 and 13cm parts of the spectrum and very usable performance in the licence free areas too.

Due to the wideband feed employed with the grid antennas, the 23cm version boasts a transmit span of 1.2 to 1.32GHz with usable gain on receive between 0.8 and 1.8GHz. The antenna is rated at 50W continuous transmit power with a gain of around 13dB. The 13cm version, although physically smaller, has similar gain and power specifications. It provides 2.3 to 2.5GHz

performance on transmit and a very useful 2.2 to 2.7GHz spread for receive. So, they also offer 802.11b wireless networking suitability - ideal for those extended point-to-point links. The antennas are priced at £53 for the 23cm version and £47 for the 13cm type. Both antennas can be mounted to offer both horizontal or vertical polarisation. For more information contact **G1MFG.com**, **L'Eglise, Durely Street, Durley SO32 2AA** Tel: **(01489) 860318** or E-mail: **sales@g1mfg.com**

TVC101 Video Controller

Whilst on the subject of microwave matters, I was recently at the home of a local radio enthusiast and microwave expert who happened to have a couple of 2.4GHz video receiver cards for sale. We got engrossed in conversation - as you do - and the subject moved around to controller boards for the Comtech type of microwave cards.

You may not realise but this type of microwave receiver card and its companion transmitter card require the setting of numerous d.i.p. switches to allow frequency selection. For those of us who like to spin a knob to select frequencies or perhaps rapidly punch in a frequency on a keypad, this is a very frustrating and backwards step.

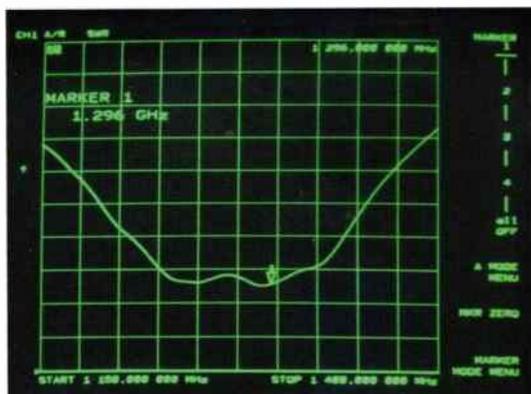
My host presented me with a very interesting solution to tuning the boards. He had the prototype of the TVC101 controller. A solution that was designed to fill the vacuum of proper tuning solutions for microwave cards. The TVC101 controller turns the G1MFG cards, either receiver, transmitter or both into something very close to the type of radio we are all familiar with.

Next month you can follow my build and experiences of a TVC101 kit.

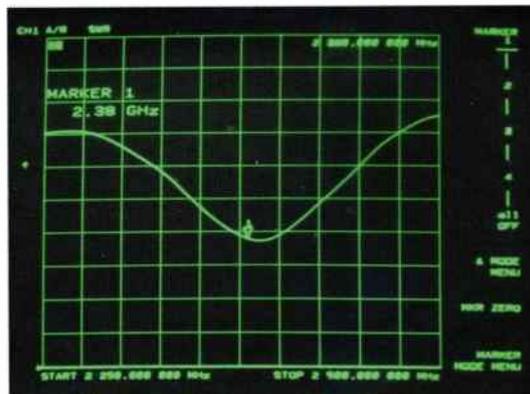
See you then.



The 13cm version mounted.



VSWR plot for the 23cm antenna.

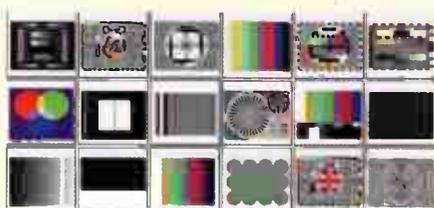


VSWR plot for the 13cm antenna.

Universal Test Card Generator £89.99



Our new Test Card Generator is supplied with over 20 sample test cards and can hold 100 or more on its Compact Flash memory card – and you can use almost any image editing software to make your own test cards! Very easy to use. Operates from 12V DC. Composite and S-video (Y/C) outputs. Comprehensive set of accessories supplied including mains adapter, remote control, composite & S-video leads. **Amazing value!**



ATV Transmitters 23cm / 13cm £42.50



Transmits high-quality pictures and sound (includes 6.0 and 6.5MHz sound subcarriers). DIP switches set the operating frequency.

23/24cm version power output 50mW minimum, typically 70mW. 13cm version typically outputs 25mW. **The UK's most popular amateur television transmitters!**

23/24cm Platinum ATV Receiver £60.00



Our most popular and most sensitive 23/24cm receiver. Covers whole band in 500kHz steps. Includes CCIR de-emphasis and 6.0

and 6.5MHz sound. Connects to A/V inputs of a TV or monitor. Superbly sensitive.

'Gold' 23/24cm receiver £39.99

Just a few left of our previous-generation "Gold" receivers available at a special offer price to clear. Similar to Platinum receiver but no CCIR de-emphasis.

13cm Advanced ATV Receiver £55.00



Covers the 13cm amateur band (and beyond) with 1MHz steps. Demodulates 6.0 & 6.5MHz sound. Superb for 13cm

ATV - very stable, very sensitive.

"ENG" 2.202.7GHz Receiver £55.00

Wide band receiver. Looks like the 13cm Advanced (above) but covers 2.2-2.7GHz (nominal) in 2MHz steps.

Special Offers

DC - 18 GHz 12V coil SMA relays



Small quantity of high quality new and used SMA relays. Latching, with indicator contacts. Originally cost a fortune, but we're offering new ones at £70 and used ones at £50 (phone to check availability).

13cm Grid antenna

Normally £47.00
£37.00



SMA input, with free mast mounting kit. Typically 13dB gain, OK for receive from 2.2-2.7GHz.

Great for 802.11b networks!

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Wireless camera & monitor £89.99



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- **E-mail** skyhigh@pwipublishing.ltd.uk

Following on from my comments last month regarding the *UK Defence Review*, further information has been sent to me: RAF Brize Norton - the four 99 Squadron C-17s will be purchased after their lease expires, a fifth aircraft will also be bought by 2010/2011. RAF Coltishall - as expected - the base is to close by December 2006 and sadly the fate of the long serving Jaguar is sealed.

2005 and operations by 25 Squadron will finish at some stage during 2008.

The future of 100 Squadron and its Hawks is also in doubt and it is expected that changes to this unit will be included in the *2005 Defence Review*. RAF Leuchars - the number of Tornado F.3s operating with 56 (R) Squadron is expected to be reduced. RAF St. Mawgan - the Search and Rescue operations of 203 (R) Squadron and their

overseas in support of any number of different operations, then surely a little more prudence in defence cuts would have been the order of the day! I am grateful to Steve F, the RAF website, MAR and the *Daily Telegraph* for the information.

Further Changes/ADR

Changes that affect the UK Air Surveillance and Control Systems (ASACS)/Air Defence Radar system were announced in July. On 21 July 2004 the Minister for the Armed Forces announced the outcome of the Air Combat Service Support Unit (ACSSU) and the Minor Unit Basing Review.

The basic task of the review was to centralise two of the main elements of the ACSSU, which are A4/Logistics and A6/Communication and Information Systems, with their A3/Operations elements co-located. The A4 group would be centralised at RAF Wittering and the A6 group at RAF Scampton.

Whilst many elements are affected, those that are relevant to this column are as follows: The Control and Reporting Centre (CRC) at RAF Neatishead will be relocated to RAF Scampton in early 2005. The No 1 Air Control Centre at RAF Boulmer will move to an interim site at Kirton-in-Lindsey (Lincolnshire), by early 2005 and will then be relocated to Scampton by 2009.

The School of Fighter Control also at Boulmer will move to Scampton no later than 2010. The main CRC at Boulmer will move to Scampton by 2012. The relocation of the various ASACS units to Scampton will, along with RAF Waddington, form the main core of the UK Intelligence Surveillance Target Acquisition and Reconnaissance operations. With thanks to the RAF website.

Mildenhall

My thanks go to all the *SWM* readers who have been in contact regarding the sad passing of John Morley, as reported in the September magazine. (John farmed the fields adjacent to the undershoot of Runway 11 at Mildenhall). From the number of responses I have had it is obvious that many *SWM* readers have used John's field over the years.

Martin L writes, "I was very saddened to hear of John's death. I have spent many a happy hour in the field, listening to the airbands, taking photos and chatting with John and other enthusiasts". Martin then makes a



- This month's photo comes from the Heydays of the Excalibur exercises. Landing at Lakenheath in 1989 is a Zweibrücken based RF-4C from the 26th TRW.

Both 16 (R) Squadron and 54 Squadron will lose their Jaguars by 1 April 2005, 41 Squadron will see them withdrawn by 1 April 2006. The 6 Squadron will move to Coningsby by the 1 April 2006 and their Jaguars will be the last to be withdrawn, receiving a stay of execution until 31 October 2007. The Jaguars of the Fast Jet OEU at Coningsby will also be withdrawn by 1 April 2005.

RAF Kinloss - by 1 April 2005, the number of operational Nimrod MR.2s has been further cut, originally from 21 to 18 and now to just 12 aircraft. RAF Leeming - of the two remaining Tornado F.3 Squadrons, 11 Squadron will disband by 31 October

associated Headquarters are to be moved to RAF Valley, (no date given).

With the *Defence Airfield Review* still to be published in the future, the indications are that the future of Leeming and St. Mawgan may be in some doubt. I have to say that this is quite an emotive subject for me and what I would really like to say would most definitely be deleted by the Editor!

The many cuts in recent years, I still feel are too much too soon, everything seems to be money orientated rather than the primary object of our Air Force, which is defence of the realm in an uncertain world! If we are to continue to have many of our aircraft based

good point, "I hate to be the Devils Advocate, but I wonder what the future holds for those fields. We have already seen the USAF expand the base fence out to encompass other land so I wonder if the same thing will happen here?"

It's a good point Martin. I had a quick word with my Mildenhall contact and he says that at present with the permission of the family the fields are still being used by aviation enthusiasts. They are hoping to keep the fields within the family, (they are currently leased), let's all hope that is the case.

My contact also reports that Mildenhall is now fully operational. By the time you read this the base will have hosted some of Ramstein's transport movements for up to two weeks from the 12 September whilst work is carried out at the base. There is also two new pieces of frequency information regarding Mildenhall.

Firstly, there is a new v.h.f. ground frequency in use of 121.675 and secondly, I have had a report that a new u.h.f. US Navy Operations frequency has become operational on 315.475, (as yet unconfirmed). According to official documents, the v.h.f. Navy Ops frequency 142.85 is still in use.

I am grateful to Mark L who sends me a cutting from the US military newspaper *Stars and Stripes*. In a statement to the newspaper, Colonel Richard Devereaux, commander of the base's 100th Air Refuelling Wing, said that base officials are planning to hold some form of big community event at RAF Mildenhall next year. Although it is an option, this may not necessarily mean the return of the weekend Air Fetes of the past, the last taking place in 2001.

There is little doubt that security will be a major issue, but let's hope that the USAF experiences of the RIAT at Fairford will give them a lead to perhaps return to the Air Fete format. A decision on what form of event will take place is to be made by late September.

Excalibur

Many airband enthusiasts will remember the fantastic Excalibur exercises of the eighties and early nineties that took place at Lakenheath. In March 1989 some 60 aircraft from 15 USAF Europe Squadrons took part, (plus a few support aircraft). Considering that this Exercise was not meant to be public knowledge it must have been quite a surprise for the arriving aircraft to find around 1000 enthusiasts parked under the approach to Runway 24.

After an absence of many years, it was

therefore pleasing to see that a mini-Excalibur was arranged for August this year. My thanks go to Jonathan and Brian who sent in this arrivals report from Lakenheath on 18 August.

Tailcode	Call	A/C	Unit
90-0777/AV	Buzzard 01	F-16D	31st FW
90-0709/AV	Buzzard 02	F-16C	31st FW
89-2029/AV	Buzzard 03	F-16C	31st FW
89-2009/AV	Buzzard 04	F-16C	31st FW
89-2102/AV	Buzzard 05	F-16C	31st FW
90-0772/AV	Nickel 01	F-16C	31st FW
89-2041/AV	Nickel 02	F-16C	31st FW
87-0359/AV	Nickel 03	F-16C	31st FW
87-0350/AV	Nickel 04	F-16C	31st FW
90-0795/AV	Nickel 05	F-16D	31st FW

Waddington Air Show

My thanks go to Richard L who has sent me a list of the frequencies he noted in use at the Waddington airshow on the 25 and 26 June.

Tower	121.175 (UK Airshow Common) /370.125
Approach	312.5
Radar	125.35/300.575 (Director)
Ground	122.1 (NATO Common) 342.125/409.8 (n.b.f.m. Base vehicles)

The following air-to-air frequencies were confirmed by Richard and his friends for the various aerobatic display teams, etc.:

Team	MHz
AAC Blue Eagles	135.95
Frecce Tricolori	140.6 (Ground)
Frecce Tricolori	307.8 (Display)
RAF Falcons	255.1
Red Arrows	243.45
Royal Navy 'Blackcats' (Lynx x 2)	375.45
Team Condor (ASK 21 x 2 RAF)	242.35
Helicopter Pleasure Flights	130.675

The Team Condor frequency 242.35 is new to me. Incidentally, they say you learn something new every day - something I did not know until now is that the Ask-21s belong to the RAF Gliding and Soaring Association based at RAF Bicester. Jim also E-mails me and asks did anyone get the Team Aquilla air-to-air frequency, he tried the known frequency of 337.975 but with no success?

Lower Airspace

I have had an E-mail from Roger who lives in Somerset, he asks the following question. "I was just wondering if you could clarify something for me please? Each day I hear a number of scheduled airline flights using London Military v.h.f. frequencies, usually coming across the Channel, or inbound to Plymouth or St. Mawgan. Would I be right in thinking that they are being controlled by London Military because they are off the Airways system, but too high to be controlled by the likes of Plymouth Approach, etc.?"

Your assumptions are correct Roger. At lower levels the Southwest of the UK has very few Airways or in other words, controlled airspace. The Airway R8 runs West from Midhurst to finish at DAWLY (Dawlish) and N864, (formally A25), runs North/South from Brecon to DAWLY, Berry Head and then South towards France as N862. The base of N864 at say DAWLY is Flight Level FL65. West of airway N864 there is no controlled airspace in the form of Airways at lower levels, (there is of course primary airways in upper airspace such as UR8 which runs Midhurst west to DAWLY and then down to Lands End and out into the Ocean.

Consequently, on most mornings you will currently hear airline callsigns such as, Red Dragon (Air Wales) and Swallow (Air Southwest), descending from the airways system and then using London Military for a Radar Advisory service before they descend and are handed off to the radar units of their destination airfields in the Southwest. For example, this morning I heard a Red Dragon flight working London Military on 133.3

they asked for a climb up to Flight Level 140 before being handed off to London Control.

It is also worth mentioning that aircraft can also call Lower Airspace Radar Units (LARS), for a radar service. These LARS units cover a fair percentage of the UK and whenever possible overlap their boundaries so as to provide a continuous Radar service. For the equivalent area in the Southwest the four LARS units are at Exeter, Plymouth, Culdrose and St.

Mawgan and aircraft both civil and military are regularly to be heard calling these LARS units.

Stop Press

It was announced in September that the Mildenhall Airshow will be held no more - full details next month.

WR-G313i

High Performance HF Receiver

- 9 kHz-30 MHz frequency range (optionally extendable to 180 MHz)
- Software-defined DSP demodulation
- Excellent sensitivity
- High dynamic range
- Continuously adjustable IF bandwidth
- Excellent suppression of internal spurious
- Real-time spectrum analyzer
- Graphical IF shift and notch filter
- Noise blanker
- Audio and IF recording and playback
- Test and measurement facilities



The WinRADIo WR-G313i receiver is a software-defined high-performance HF receiver (9 kHz to 30 MHz, optionally extendable to 180 MHz) on a PCI card. The front-end is a DDS-based double-conversion superhet, the last IF stage is implemented in software resident in the on-board DSP.

This receiver is intended for government, military, security, industrial, surveillance, broadcast monitoring, and demanding consumer applications.



The receiver is extremely sensitive, making it possible to comfortably read CW signals well under -130 dBm input level, yet featuring a respectable 95 dB dynamic range making the receiver resistant to strong signal overload.

The high sensitivity is also matched by that of the S-meter: The calibrated S-meter shows the received signal levels in dBm, μ V or S-units, down to the receiver noise floor. The IF bandwidth of the receiver is continuously adjustable from 1 Hz to 15 kHz, in 1 Hz steps.

Several WR-G313i receivers can reside in a single PC (as many as there are free PCI slots), which provides an ideal solution for high-performance multi-channel surveillance and monitoring systems.

As the last IF and demodulation processing are entirely software-defined, this means that additional demodulation or decoding modes can be easily added by a mere software change.

In addition to audio recording, the receiver can also record a 20 kHz wide spectrum at the IF level, making it possible to thoroughly analyse a signal, and experiment with a weak signal with different filter settings for the

Apart from the antenna and audio interface or power supply, every modern computer is a powerful

Check out our latest "G3" software-defined receivers to find out why users and reviewers are raving about them!
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WinRADIo

www.winradio.com

World Radio History

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Although I really enjoy the winter season, many people absolutely dread the long nights and corresponding colder and often, wetter or snowy weather.

For h.f. radio enthusiasts there is, however, the knowledge that h.f. propagation is significantly enhanced during the dark hours with the added advantage that one isn't expected to perform gardening chores, and the like, outside!

Digital Dominates?

To a large extent it can be thought that digital radio signals dominate the h.f. bands these days, but the market for h.f. s.s.b. voice communications, especially those that are field deployable, continues to be buoyant. While much military manpack or portable equipment is utilised, the manufacture of h.f. transceivers for civilian authorities, Non Governmental Organisations (NGO) or other non military use, is ongoing with new radios frequently being added to product ranges.

Typical of these is the Vertex/Standard VX-1210. This h.f. manpack portable transceiver can run up to 20W c.w./s.s.b. or data and is field programmable with 500 available channels.

The frequency range is from 5 to 30MHz on receive with transmit capability from 1.6 to 30MHz. It has an optional antenna coupler, a built-in battery pack and Selcall. It's possible to disable the transmitter remotely via Selcall to prevent unauthorised use. With a variety of antenna options available and weighing just about 3.2kg this radio has found favour with individuals operating in remote areas from the Americas, Indonesia and many regions of the former Soviet Union. All at a cost of under £2000.

The VX-1210 complements the Vertex System 600, 100W base transceiver that has been in production for several years and is widely used for field base communications. The VX-1210 is seen by many as a direct replacement for the Yaesu FT-70GH, 20W radio manpack set that had similar frequency coverage but weighed about twice as much. Any weight reduction is welcome when on the trail and this is a major factor in the sales success of the VX-1210.

Canadian Military

There has recently been some discussion on the Internet with regard to whether the Canadian military forces use h.f. radio when operating in Arctic regions such as Baffin Island. There seem to be as many opinions on this subject

as there are informed correspondents contributing to the debate.

The Canadians have a very sophisticated h.f. field deployable system consisting of large self sufficient shelters that are dumped on the ice together with their crews. Separate containers serve transmitter and receiver equipment and are typically located between 5 and 15km apart.

They have an inter-site communications system and you've guessed it, that's digitised too. The system was built by Thales Canada (pronounced Tar-lez). Known as Beyond Line Of Sight (BLOS) its function is to provide digital secure voice and data links between the Canadian NORAD Operations Centre at North Bay, Ontario and operational units in Canada and offshore.

As the system is digital it provides little opportunity for meaningful monitoring. Some Canadian field units also use the Harris PRC-138 manpack/vehicle h.f. transceiver.

Having said this, the Canadian Airforce use extensively h.f. in conjunction with some maritime and ground based units, try 3.047, 3.092, 4.703, 4.940, 5.717 (the primary frequency for search and rescue), 5.845, 6.706, 6.745, 6.754, 6.980, 8.989, 9.007, 11.265, 11.271, 13.257, 15.031, 15.034 and 17.994MHz - all are u.s.b. The main transmitter sites are at St.John's, Newfoundland (often heard in the UK), Trenton, Ontario and Edmonton, Alberta on the edge of the prairies.

As I mentioned in May 2004, the Inuit people seem to use the Paracommm Technologies PCX-250 series portable h.f. sets with Near Vertical Incidence Skywave (NVIS) dipole antennas deployed close to, if not actually at, ground level. The PCX-250s are sometimes marketed as the Spilsbury-11A.

In August and early September the American 'Hurricane Net' has been active on 14.325MHz u.s.b. in the 14MHz amateur band. The monitoring has been interesting to say the least. This frequency is well worth some attention during the hurricane season as weather forecasts and public service information bulletins are relayed and stations

One of the containers deployed by the Canadian Military from their BLOS system. The h.f. antennas are shown in the foreground (see text).



give 'on the spot' reports as events occur.

In the UK the frequency is easily heard from about mid-day onwards. The Salvation Army welfare net is also sometimes audible on 14.265MHz. Local channels are usually announced on this frequency, with 3.950 and 7.242MHz having been in use (both of these frequencies are l.s.b.).

The frequencies 5.211 and 10.493MHz u.s.b. have been monitored in use by the Federal Emergency Management Agency while the Bahamas Defence Force use 8.156MHz u.s.b. The US SHARES (SHARED RESOURCES) system is also in use during hurricanes and other emergencies with 5.236MHz u.s.b. and sometimes l.s.b. in use.

Getting Away From It

There is nothing like getting away from other people and hiding away with a radio, well out of the way of interfering electrical noises. I take a small FT-817 radio with me and find it to be a truly excellent (if a trifle expensive) receiver for utility monitoring.

When you have to carry personal kit, as well as the set, the weight factor has to be considered. Having spent too much of my life carrying all sorts of equipment including radios, generators and other various heavy objects over seemingly interminable distances I always pay attention to how much each item will cost me, in sweat, to move.

For reception you need an antenna that doesn't pull in too much noise, can be roughly resonant and doesn't require a pre-selector or tuner or any heavy coils or traps. This pretty much restricts the choice to a dipole. So, that's what I have, or had until it blew off a mountain while I was packing it up in a gale!

The military have thought this out over the years and I copied their simplest option. I cut a dipole antenna for the lowest frequency on which I wished to receive signals. I then measured quarter-waves from the dipole centre for other favourite bands and marked them with a small cable tie attached tightly to the wire at the appropriate point on each leg of the dipole. The dipole is fed by coaxial cable from the centre and then I can unfurl the dipole legs to the required frequency band and roll up the unused wire at either end on a pair of old solder reel centres. Deployed in the air with suitable cord it works just fine for me.

Finally, to keep the radio and any papers, etc., dry while operating during inclement weather, purchase a plastic emergency bivvy bag from a camping shop. Mine cost about £3 and I can climb in as well if I have to!



The Vertex Standard VX-1210 transceiver.

Decode

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This time, I'm going to look at a few interesting items that I haven't covered for some time. So, let's start with the powerful decoding program known as *SeaTTY*.

SeaTTY

With the winter months upon us and those long dark nights to spend in the shack it's a good time to try out a few new programs and perhaps dabble in a new area. *SeaTTY* is a very useful utility program that clearly has the mariner/weather watcher in mind. The modes supplied are RTTY, NAVTEX and h.f. FAX - all the modes you need to monitor weather traffic on the h.f. bands. Not only does it feature all the main modes, but it has a very well developed interface that goes a long way towards ensuring error free reception on our busy h.f. bands.

First stop is to visit the website where you can download your copy of *SeaTTY*. Or for those of you who have no Internet access or just can't be bothered to download, you could get the software CD. See coverflap - Ed.

Fortunately, the author has made the demo version freely available on the web, a version that's fully functional with nothing disabled, though it does expire after 30 days. However, if you decide you like it, registration is a very modest \$35, which shouldn't break the bank!

As with most Windows based software, installation was very straightforward with a set-up program wrapped-up in the supplied ZIP file. The latest version at the time of the review was 1.39, though it's best to visit the authors preferred site when you download to

make sure you have the latest version - to be found at:

www.dxsoft.com/en/products/seatty/

The *SeaTTY* program seems to be compatible with just about all versions of Windows from '95 upwards so you shouldn't have any problems running it. In addition to the operating system, you will need a soundcard that supports mono 16-bit sound with a sample rate of 11025Hz. To be honest, you'll probably find it almost impossible to find a soundcard that **doesn't** support this modest requirement!

When you start the program it automatically takes its input from the default Windows' soundcard, so you shouldn't have to do very much to get going. The connection to your radio should be from the 'line' or 'tape' output to the line-in socket on your soundcard. Please don't use the 'MIC' input as it's all too easy to overload, which causes mayhem inside the decoder. With the *SeaTTY* program installed and running you will be presented with quite a busy interface as shown in the screenshots. Although busy, the interface is well thought out and easy to get to grips with. The three central windows deal with the decoded information whilst the rest deal with the way the signal from the receiver is processed.

Let's start from the top, as they say! The top display is a fast moving spectrum analysis that shows the relative volume of all the signals in the bandwidth 300Hz to 3kHz. In the example I've shown, you can see a generally bumpy display with two very clear peaks. The general spikes are just noise on the band, whereas the two peaks indicate the two tones of an RTTY or similar utility signal. The display is very fast moving and responsive so readily adapts to changing conditions, making it an excellent tuning indicator.

To tune in a typical h.f. weather station you need to know the speed and shift of the signal. Fortunately, this is pretty much standardised on 50baud with a shift of 450Hz - these are set using the Speed and Shift menu tabs. All the standard combinations were included so *SeaTTY* will be able to handle all the h.f. and l.f. stations.

With the mode set you then need to select the signal to receive. This is very easy and just requires a mouse click on the spectrum display mid-way between the peaks of the signal. To help ensure accurate

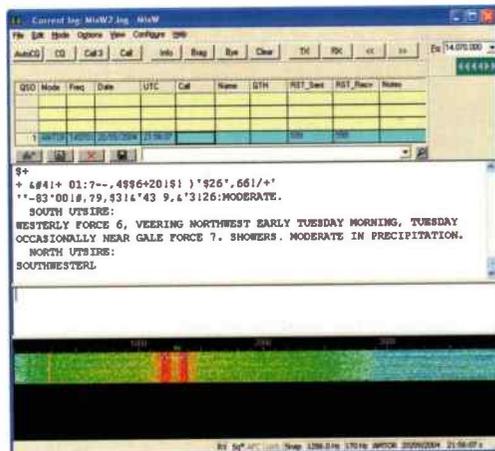
tuning and to cater for any receiver drift, *SeaTTY* includes a very sophisticated automatic frequency control (a.f.c.). This is activated by pressing the AFC button on the Toolbar. The author has very unusually provided a couple of a.f.c. adjustments so you can get the system to behave exactly as you like.

The number immediately to the left of the AFC button is the Global a.f.c. control and sets the maximum amount of drift that the decoder will adjust for. The default setting is 300Hz which means the receiver (or transmitter) can drift up to 300Hz from the start position and the decoder will continue to track it. The setting to the left of the Global a.f.c. setting is the Local a.f.c. and controls the amount of drift allowed for each tone of the two-tone RTTY signal. This is a much finer setting hence the default value of 50Hz. In practice these two adjustments provide for excellent tracking of a RTTY signal even under very difficult conditions.

There are some h.f. RTTY stations that drop carrier when there is no information to report, in those cases the *SeaTTY*'s Squelch facility can be used to help prevent the screen filling with rubbish. The squelch adjustment can be found to the left of the Squelch button and is normally set to 50. When you operate the Squelch button you will see a horizontal red line on the display that shows the squelch point. You then adjust the squelch point so that the line is just above the background noise level but below the wanted RTTY signal. In practice these sophisticated and well thought through adjustments make *SeaTTY* a very capable decoder that does well to pull signal out of the noise.

To wrap-up the RTTY section, *SeaTTY* has a very clever method of processing RTTY messages. It is standard practice for h.f. RTTY transmitters to wrap all messages within a simple code that's used to mark the beginning and end of each message. You may have seen this when monitoring h.f. RTTY, but the message start indicator is **ZCZC**, whilst the message end is **NNNN**. *SeaTTY* uses this protocol to identify messages and then save them as individual text files. This is very useful in itself, but *SeaTTY* has one more trick up its sleeve. A quick look through the Setup menu options will reveal one that says 'Don't save SYNOP messages'. You could be forgiven for just ignoring it and stepping on, but this is actually very useful.

Whilst *SeaTTY* doesn't include a SYNOP decoder you can use this feature positively to make the program save all messages that are not SYNOP. In case you're not familiar with SYNOP,



MixW offers decoding of a wide range of amateur modes.

this is a coded message system that's used extensively to broadcast weather messages throughout the world using a standard format. Whilst it's a very good system, it requires a separate program to decode and make sense of the data. It therefore makes sense to use *SeaTTY*'s filter system to make sure you don't save the coded message. The net result should be that you can use *SeaTTY* to gather the much more useful plain text weather reports that most stations send from time-to-time.

FAX

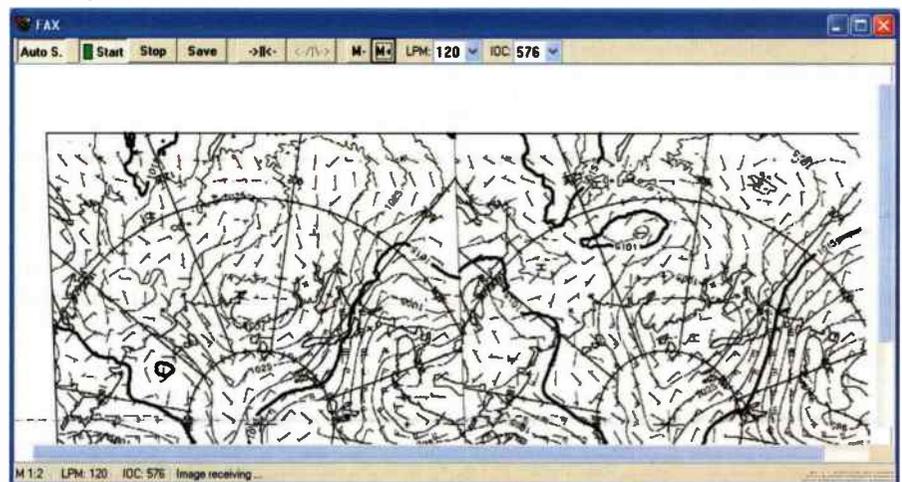
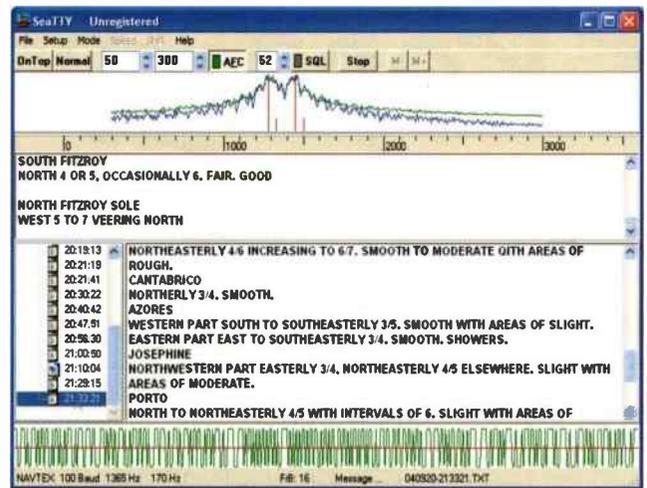
The FAX implementation in *SeaTTY* is both very effective and remarkably simple to use. For simplicity, FAX doesn't use the a.f.c. and 'click-to-tune' features of the RTTY section, but instead, uses fixed tuning points so you have to adjust your receiver to align the FAX signal to the black and white points on the tuning display. Once tuned, *SeaTTY* supports fully automated FAX reception and recognises all the standard automatic picture transmission tones. The received image quality is remarkably good and the program has very simple, but effective, tools to correct common FAX problems such as image slant and edge correction. The simplicity of operation makes *SeaTTY* a particularly good program for those trying FAX for the first time.

NAVTEX

To complete the suite of weather related h.f. modes, *SeaTTY* includes a very effective NAVTEX decoder. When selected from the Mode menu the program automatically switches into NAVTEX mode with a fixed receive speed of 100 baud and a shift of 200Hz. Tuning a NAVTEX signal uses all the features that were available in RTTY mode so you can mouse-click to set the tuning point and use the sophisticated a.f.c. options to keep a tight grip on any stations that appear. When you attempt to receive a NAVTEX message with a conventional SITOR/FEC decoder you can sometimes find that synchronisation takes a long time. This is because conventional FEC synchronisation requires reception of vital idle characters that are normally sent at the start of any message and in any gaps during the message.

If you tune into a message that is already in progress it can take a while before the decoder locks-on. *SeaTTY* overcomes the problem with a special Fast-Sync mode that can be selected from the set-up menu. The

Fast NAVTEX synchronisation, again from *SeaTTY*.



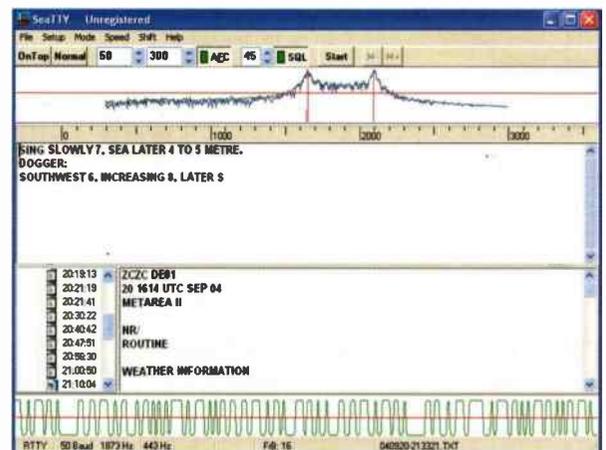
Great FAX reception from *SeaTTY*.

Fast-Sync allows the decoder to try and achieve synchronisation using the message as opposed to the idle characters. It seemed to work extremely well, though there is an increased risk of false synchronisation. If you want to try something slightly different and haven't yet tried *SeaTTY* it is well worth a look - it's free for a month!

MixW

If you want to be able to take a look at some of the more unusual amateur modes as well as the core utility modes, *MixW* makes an interesting start point. The current version features the following extensive range of modes: c.w., BPSK31, QPSK31, BPSK63 & 125, MFSK, RTTY, FSK31, Packet (h.f. and v.h.f. including TCP/IP over AX25), Pactor RX/TX (TX requires TNC), AMTOR SITOR TX/RX (no TNC is needed), Hellschreiber, FAX (RX only), SSTV, THROB, and MT63.

A pretty impressive list of modes by any standard! Like many newer utility programs the main tuning aid is a waterfall type



The main RTTY decoding screen of *SeaTTY* in action.

spectrum display and you just click on the signal you want to decode. Decoding takes place in a separate window just above the waterfall display. If you want to give the program a try there's a 20 day demo version available for free download from the following website: www.mixw.net If you like it and want me to cover it in more detail just drop me a line.

Propagation

forecasts

- Jacques D'Avignon VE3VJA
- 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.

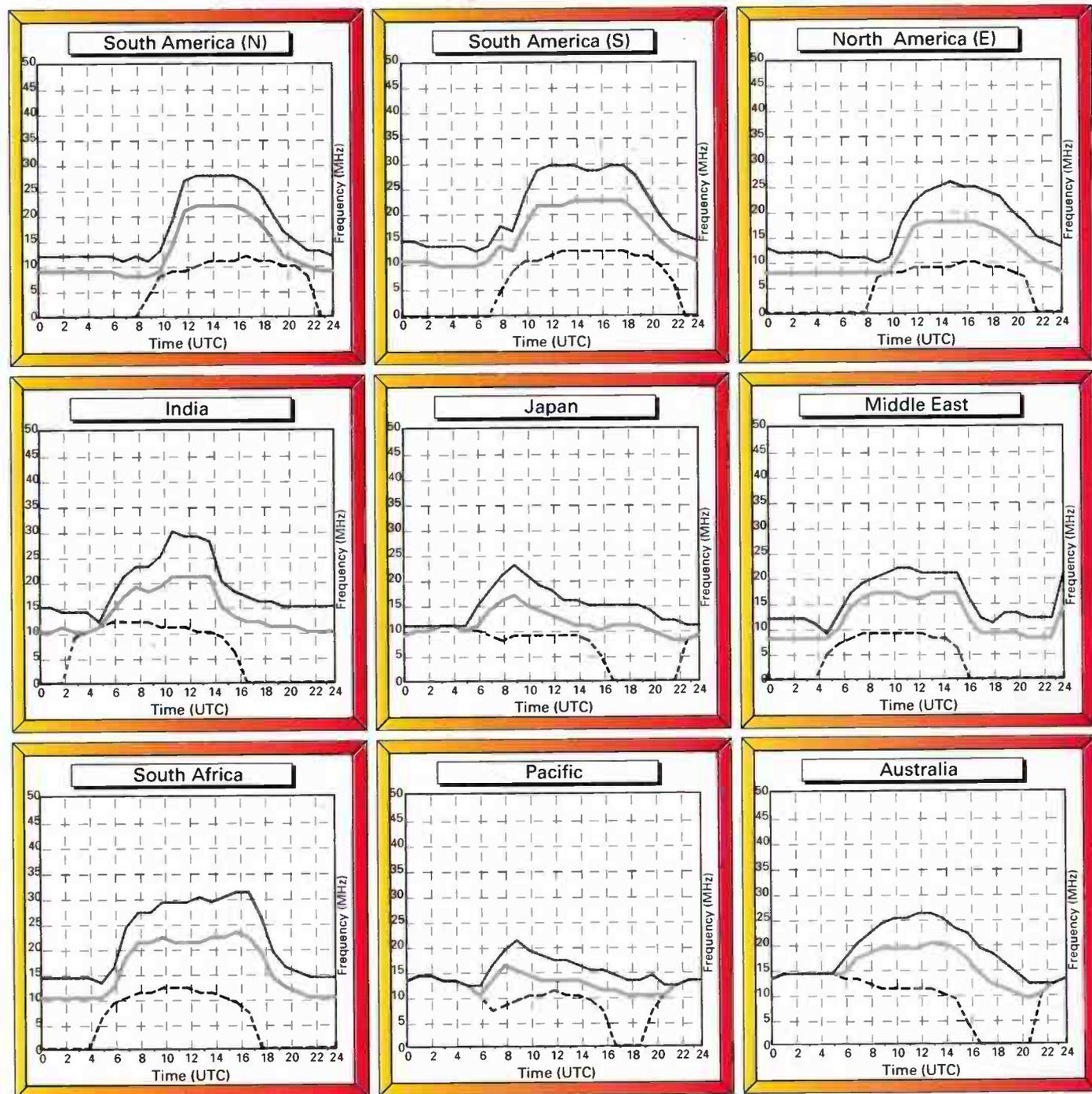
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

November 2004
Circuits to London



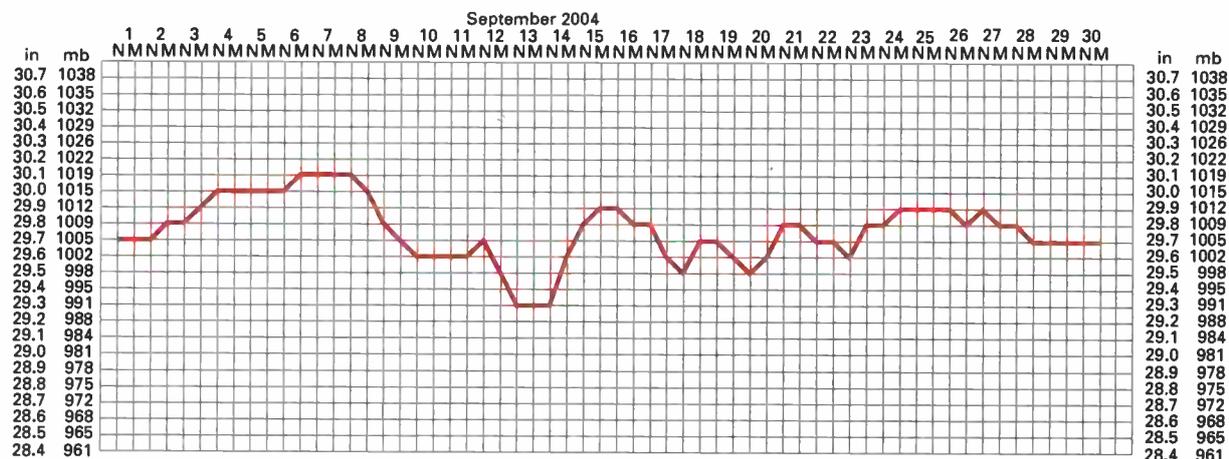
SK10052

Propagation

Extra

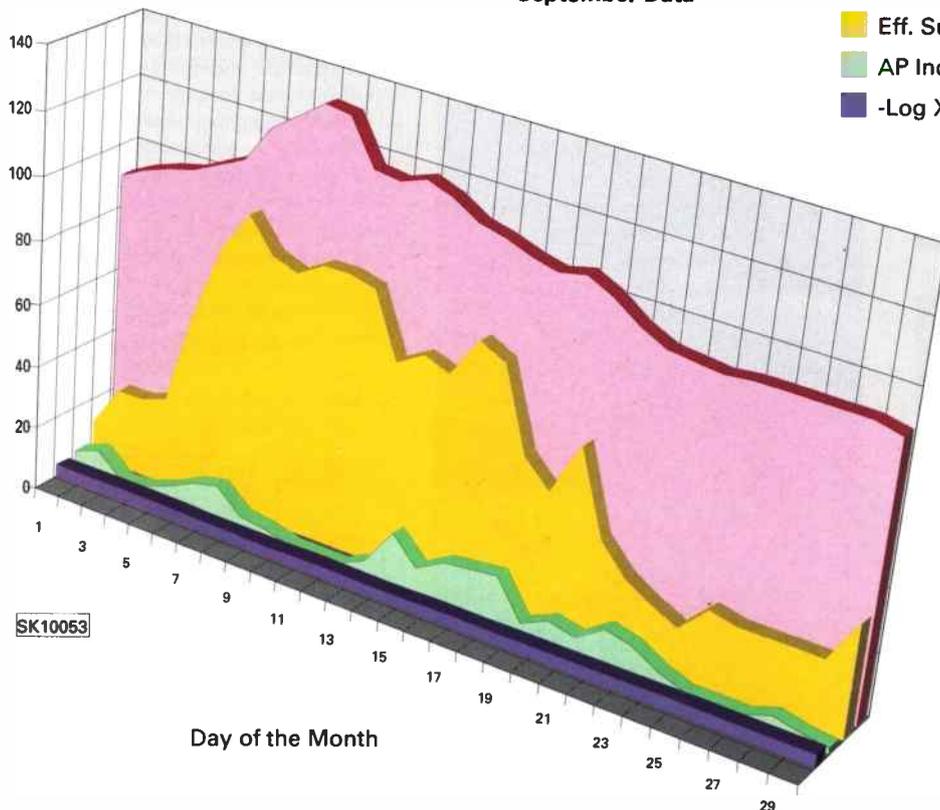
- **Kevin Nice** G3UNR, BR95787
SWM Editorial Offices, Broadstone
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Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, September 2004..



September Data

- 10.7cm Flux
- Eff. Sunspot No.
- AP Index
- -Log X-Ray



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.

Amateur

Bands

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I'll start this month with a good idea from 'Uncle Sam', The American Radio Relay League (ARRL), which is the United States of America's national amateur radio society, has come up with a new proposal to define which modes can be used in different parts of the amateur band spectrum. In the UK, the band plans, which designate where in a particular amateur band certain modes should be used, are purely voluntary.

Usually, on/off keyed c.w. operation takes place in the lower frequencies of an amateur band, with s.s.b. speech filling the majority of the higher frequencies. Various other modes e.g. SSTV and RTTY are often used around specific spot frequencies or in small sub sections of a band. Whatever the band plan is, it's just a written version of a gentlemen's agreement that's been arrived at through custom and practice.

In the USA there's an element of legal regulation to the band plans, which amateurs are keen not to transgress. There, current regulations are ambiguous when faced with some new modes. Is digital speech, for example, a digital or speech mode and if so, where should it be put in a band plan?

What the ARRL has proposed is that instead of designating what modes should be used in what sub-section of a band, the designation should be based on the bandwidth of the signal. For example, what is now defined as the c.w. section of a band would be defined as the 200Hz bandwidth section. In other words, no signals wider than 200Hz would be permitted in that section. Another section, suitable for other data modes, would have a 500Hz limit and others 3, 6, 9, 16, and 100kHz bandwidth limits.

The thinking behind the proposal is that the bandwidth of a mode would determine in which part of an amateur band it would be used. This should bring some order and consistency to the band plans and would also eliminate any confusion about where any new modes would fit within a band plan.

If the proposals are accepted it almost goes without saying that, on h.f. at least and in practice if not in words, band plans on this side of the 'pond' will inevitably align themselves with the ARRL model.

RAYNET

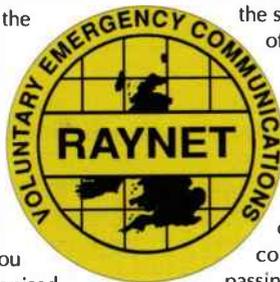
Back in August almost 50 RAYNET operators were involved in the second staging of the Ironman half triathlon at Sherborne Castle in Dorset. Most were placed along the route of

the 90km cycle ride section of the event between Sherborne and Dorchester, and used v.h.f. voice comms through two strategically placed temporary cross-band repeaters to keep in touch with RAYNET Control. From that point of view, it was very similar to last year's event, if you want to read how that was organised look at look at a copy of November 2003 SWM.

What was significantly different about last year was RAYNET's use of APRS to track the position of the two cars leading the first male and the first female cyclists. Using the frequency of 433.800MHz RAYNET was greatly assisted with this by my local club setting up APRS nodes on that frequency alongside its

permanent v.h.f. nodes at its two sites, Eggardon (G0ROZ-3) and Bulbarrow (M1ABD). Conveniently placed either side of the cycle course and on the two highest point in the county, the coverage they provided meant that it was possible to track the cars all along the route.

I set up an APRS screen in the transition area where the competitors got on and off their bikes after the 1.9km swim and before the half marathon. Even in these technologically aware days, all the press, officials and stewards looking at the screen were extremely impressed to see the position of the lead vehicles so accurately displayed on the maps of the course. Several cameras were pointed at the screen during the event, so it may well have appeared on the small screen by now. If not, look out for an episode of *Airport* where one of the pilots takes part in the event.



Another Back-to-Back Socket Circuit

A few months ago I described a little circuit built between a couple of four-hole SO-239 chassis sockets and designed to be used with a dummy load to measure a transmitter's output power. The big attraction for me of using directly coupled sockets is that it eliminates fitting the circuits into boxes, with all the filing and drilling that this involves. Of course, there's only so much space between the sockets, but it's enough for a handful of components.

This month I've taken a circuit straight out of SWM's sister magazine, *Practical Wireless* (October 2004). The design, by Rev. George Dobbs, is for monitoring the r.f. power going out of a transmitter. It uses transformer coupling to take a 'sniff' of the r.f. passing through the inner conductor. That small voltage is rectified and can be measured with a meter.

Unlike the previous circuit, this one can be left in-line during normal operations. Without lots of calibrating at different frequencies, the voltage readings can't be used to calculate actual power output levels, but the moving needle of the meter can provide a very useful indication that r.f. is going along the coaxial cable.

Hopefully, the photo shown here should give enough guidance for anyone wishing to use the socket method to build the circuit.

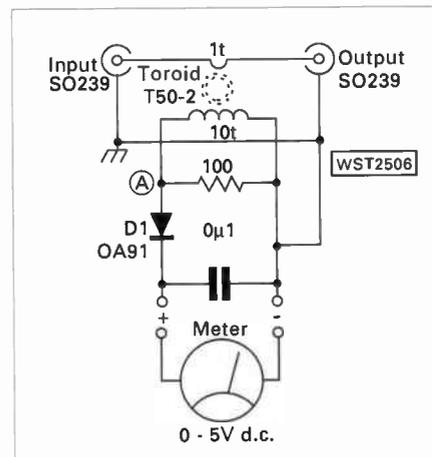
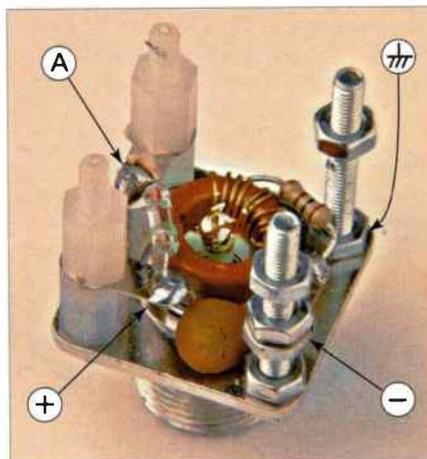
UI-View Software Creator is

Silent Key

During the early hours of Thursday 9 September Roger Barker G4IDE, probably best known for writing the *UI-View* APRS and *Winpack* software, passed peacefully away. Roger had been ill for several months. As an active user myself of *UI-View*, I'm very grateful for the enormous effort that Roger put into writing the program.

There's still going to be plenty of support for the software from his little army of beta testers and registration continues to be available for the price of a suitable donation to Cancer Research. Visit www.apritch.myby.co.uk/uiview.htm for more information and downloads.

Next month I'm planning to look at 10GHz operating. See you then.



Scanning

Scene

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

On the 4 September BBC Radio 4 aired an interesting 30 minute programme entitled *Unsung Heroes*. It dealt with the aftermath of the World Trade Centre (WTC) bombing on 9 September 2001. As the tallest buildings in New York the WTC's towers were host to many of the public service's radio base repeaters. Radio Amateurs are specifically authorised to scan police and emergency service channels and when they realised the seriousness of the situation the amateurs responded immediately.

Briefly this illustrates the vast difference in attitude between the US and British Governments towards radio hobbyists. In America we are respected as a valuable resource while in the UK we are looked on as, at best, 'anoraks' and often as figures of fun, fit only to be ridiculed with constant references to Tony Hancock's (at the time) funny TV sketch.

All-in-all I'd rather be thought of as some sort of 'techno-geek' than be wearing Union Jack boxer shorts and an England shirt while throwing chairs through shop windows after a football game. Each to his own...

Spectrum Use

Illegal use of the frequency spectrum remains widespread. Frequencies in and around the amateur v.h.f. and u.h.f. bands are being almost constantly pirated these days by everyone from building companies, to nutters suspended below hang gliders. The latter are using 143MHz almost as a matter of course.

Spot what at first appears to be a darn big bird of prey that's just caught a bloke and then tune the band. Chances are that the sounds of the intrepid aviator will soon be bursting through your speaker.

In recent weeks in addition to the aforementioned, I've monitored fishing boats on 145MHz, builders throughout the u.h.f. amateur allocation and foreign language transmissions, that I believe are taxi operators, pretty much anywhere on the v.h.f. or u.h.f. bands. Dodgy 'security' companies also infest amateur bands as well with 145.7625 being found in use at the Reading Pop Festival in late August this year.

If you live near the coast listen out for smugglers as well. I had a pint with a fisherman the other day and he was telling me that some drug runners are using amateur radio sets to contact their landing crews. It works like this.

A large freighter, or similar, transits British waters. The smugglers on-board call up a small vessel on the radio if there's no mobile 'phone coverage and arrange either a night time rendezvous at sea or to drop off bales of stuff beneath a small buoy, the exact location

being noted by GPS. The smaller boat then brings the stuff ashore to a remote cove or similar.

The problem is widespread and ongoing. These guys don't use the marine band for obvious reasons and in any case some dodgy marine electronics vendors are flogging v.h.f. sets that will transmit anywhere between about 137 and 174MHz.

Just dial in the frequency. It really does pay to monitor the amateur spectrum you see.

Pager Service

Although BT are to discontinue their paging service some people will still require the service of pagers. They have the advantage of being quicker and much more reliable than Short Message Services (SMS) offered by mobile 'phone companies.

The frequencies of 137 and 138MHz have allocations at 137.975, 138.075, 138.150 and 138.175 as well as those BT services currently in 153MHz. POCSAG decoders are available from Pervisell, on the Internet or on the SWM shareware CD this month and it's surprising just what information is sent out on air by this means. Who, for instance, outside the North West of England has been aware of car bomb attacks on police stations in Liverpool?

Feedback

The most interesting thing about penning this column is the large amount of feedback and mail that I get from readers.

Steve from Burton-on-Trent (great brewery country) was kind enough to contact me and put me right on something I wrote in *Scanning Scene Extra* that was given away free with the September SWM. You may recall that I mentioned the E2 AWACS that had to put down at Stornoway. It contained some Mexicans who got totally gassed in the Lewis Bar. I wrote that it was part of the JMC course ongoing at that time...it wasn't.

Steve pointed out that the E2 was in fact *en-route* to Mexico being one of a pair supplied to the Mexicans from Israel. Thanks again for that one Steve. *Dos tequilas por favor.*

Over the last year or so there has been an ongoing debate about whether the scanning hobby is in swift decline. The knarled old police monitors amongst us have lamented the change to digital communications while hunched over the faithful Bearcat in the dusty radio shack, lit only by an ancient angle poise lamp while storms rage outside. Well that's how things are here anyway.

But consider for a moment some recent legislation. The Regulation of Investigatory Powers Act 2000 and the Regulation of Investigatory Powers (Scotland) Act 2000.

These Acts of Parliament formalise the procedures for surveillance in the UK and have codes of practice that are to be adhered to by those engaged in such activities. The acts specify the authorisation level for various types of surveillance and this is where it becomes interesting.

What has all this got to do with scanning? Stick with the programme and I'll come to the relevant bit eventually. The Code of Practice specifies the officers empowered to authorise such surveillance within each organisation. Then the organisations are specified.

You would expect the police to be there, the National Crime Intelligence Service and the National Crime Squad (and by implication the new Serious Organised Crime Agency). You would also expect the Security Service, the Secret Intelligence Service and GCHQ to be on the list as well. Likewise Customs and Excise, the armed forces, MOD, Serious Fraud Agency, the Prison Service, the Immigration Service and, at a pinch, the Inland Revenue, whose surveillance teams always used to have the best cars!

But how about the Horticultural Marketing Inspectorate or the Egg Marketing Inspectorate. The Welfare Foods Policy Unit (whoever they are) can also run a job on you as can the Coal Health Claims Unit (don't take employment as a concert pianist if you're claiming for vibration white finger).

The Head of the Common Agricultural Policy Unit can authorise a team to follow you off. You may become a target for the Environment Agency, the Intervention Board for Agricultural Produce, or the Health and Safety Executive. You may find that a team from the Food Standards Agency are on your case remember "you are what you eat".

The Post Office can put you under surveillance so can your local council or the NHS. Imagine being a prime target of the Royal Pharmaceutical Society of Great Britain. There are a host more. Without a doubt surveillance is becoming the latest growth industry in Britain. Guess what... these people will all need communications.

Many will just use mobile 'phones but others will require radio systems and you can bet that they won't be spending a mass of cash on the Airwave network. For interest's sake this may be a time to start collecting the frequencies of the security department of the local hospital.

Local councils usually have a radio system and although some may employ specialist companies to run operations on anti social tenants some councils will want to carry out the occasional surveillance job 'in-house' to save money and may use their ordinary radio system. As many of the security posts are filled by ex-police officers the competence level of the operators may be better than would be immediately imagined.

In the 1980s and early 1990s there was always concern by civil libertarians that a nuclear society would inherently be a surveillance society. Nuclear power has been largely by-passed but the surveillance society has definitely arrived and radio monitors are, without doubt, prepared for it.

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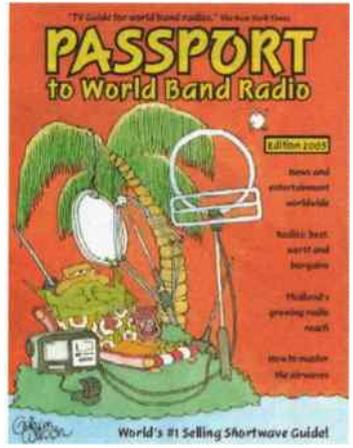
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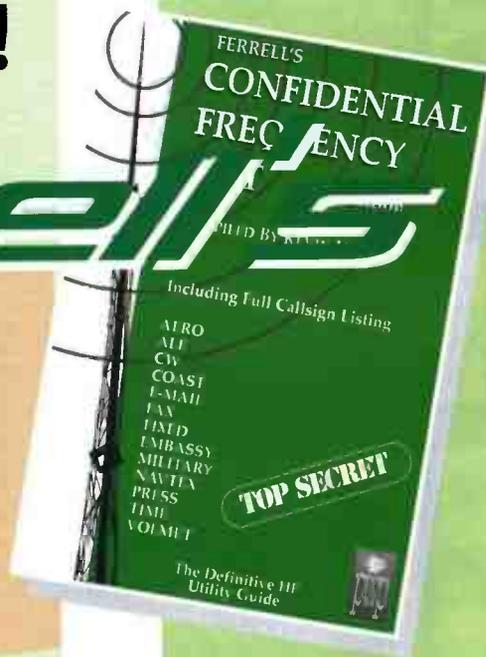
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Television

- **Keith Hamer & Garry Smith**
17 Collingham Gardens, Derby DE22 4FS
- **E-mail:** dxtv@pwpublishing.ltd.uk
- **Web Site:** www.test-cards.fsnet.co.uk

Sporadic-E (Sp-E) activity throughout August was above average compared with recent years. Openings were sustained and intense on many days but activity diminished rapidly after the 26th, signalling the end of the season.

Band I Reception Reports

August started off well with **Tim Bucknall** (Congleton) identifying Canadian signals on Channels A2 to A5 during the early evening of the 1st. At 1030 on the 4th, **Peter Barclay** (Sunderland) received programme schedules on E4/B from the south-east. Peter previously encountered this unidentified station in late July at a similar time; a rotating '2' symbol was visible in the lower-right of the screen.

Peter Barber (Coventry) comments that on the 7th a breakdown in Spanish transmissions at 0928 meant only a blank screen with a logo was displayed. A still picture followed with the normal transmission resuming at 0959. On the 8th at 0725, the Italian private station TeleA+ (located just below E2) displayed a 'screen-saver' style moving background.

The 11th was highly productive with a deluge of stations from 1000 until late afternoon. These included Slovenia (SLO-1) E3 with teenagers playing musical instruments at 1015, BT (Belarus) R1, Ukraine (YT-1) R2 and R3, Germany (ARD) E2 with the *Tagesschau* news at around midday, Croatia (HRT-1) E4, Austria (ORF-1) E2a (same frequency as R1) and Lithuania (L1) R2. At 1048, Peter Barber noticed a sloping box '1' logo in the top-left of the screen on R3 during the end-of-programme credits. By 1115, ORT-1 (Russia) occupied R3 with news and programmes at excellent quality until 1150. Over on R2, another Russian service (RTR), with 'TV POCCNR' logo, was showing an old feature film until 1230.

This station was also logged by **Stephen Michie** in Bristol. At times, Russian and Rumanian carriers were present up to R5 (93.25MHz). Belarus returned to R1 by 1136 with a pop concert from Lithuania appearing on R2 and R3. At 1209, an unidentified test pattern emerged on E4 co-channelling with programme schedules. A mystery at the time for Peter Barclay was a cartoon on R3 which

bore a '5' logo in the top-right with temperature details below. This was subsequently identified as St. Peterberg TV, which we also mentioned last month. From midday, Sweden (SVT-1) dominated E2, E3 and E4 and at 1231 Peter discovered Estonia (ETV) R2 airing the PM5534 test card accompanied by a 1 kHz stereo pulse tone until 1251. From 1317, Stephen Michie logged Finland (YLE TV-1) on E3 and E4 co-channelling with Sweden.

On the 12th at 1418, Stephen noticed a mystery PM5534 test card co-channelling with Spain on E3. As Stephen points out, this was fairly late for Scandinavian test cards to be aired. Did anyone else see this?

Later on the 12th, **David Hamilton**



Fig. 1: A Swiss test card aired throughout the night by Cablecom and received in Klosters, Switzerland.

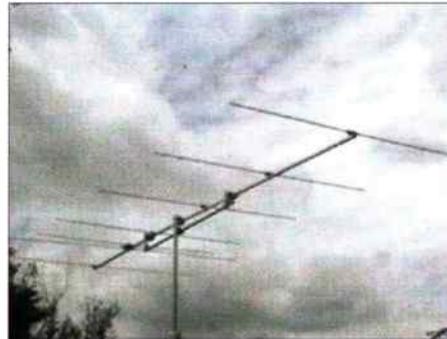
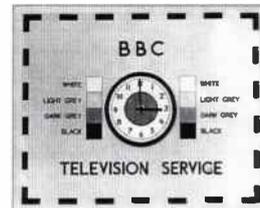


Fig. 2: David Hamilton's new 7-element antenna for American channels A2 to A4.

Fig. 3: The BBC Tuning Signal and Clock caption that was first transmitted on 24 July 1949.



(Ayrshire) encountered weak transatlantic signals on A2. David has recently installed a custom-built 7-element Yagi (see the DXTV website mentioned at the end of this column) cut for American Channels A2 to A4 (55-80MHz). Initial reports indicate that the antenna is extremely directional and sensitive. The array has a boom length of around five metres just to please the neighbours!

Tony Jones (Basildon) captured several stations from the south-east during the afternoon of the 19th. These included Italy (RAI UNO) on Channel A screening a 'Miss Marple' adventure, Hungary (RTL KLUB) R2 with its teleshopping spot at incredible levels, Norway (NRK-1) with scuba diving at 1510

and Croatia (HRT-1) E4 with a topical discussion, again very strong. Tony has just installed a VF-1004 4-element Band I array which out-performs the smaller arrays he has used. The Dutch NED-1 signals from Lopik on E4 are now considered an irritation as they are available most of the time!

Spanish Band I Closures

Simon Hockenull hopes that the lack of on-screen messages advising Spanish viewers of the impending Band I transmitter closures suggests that the outlets will continue to air for a little longer. Last year, messages were scrolled on E4 before the outlet closed. Both Peter Barber and Peter Barclay confirm that the Madrid E2 was indeed alive and well on August 26th.

Hungarian Radio

Simon Hockenull comments on an interesting opening which affected the old OIRT f.m. band (62-73MHz) to Hungary on 2 August with their 1st network Kossuth Radio was audible from five of their outlets. Further investigation of the 2004 *World Radio & TV Handbook (WRTH)* shows that this is the last of the networks to use the old f.m. band. Interestingly, Simon picked up these signals using a hand-held scanner with a small telescopic whip antenna whilst sitting in the back garden!

A Grundig Yacht Boy 400PE portable World radio has just been purchased. As well as having excellent performance on all the a.m. bands, it looks to be a highly sensitive f.m. radio as well, handy for use both at home and while on trips away.

Service Information

Our thanks to Stephen Michie for the following updates:-

Lithuania: No clock has been seen this year but the Panorama news is still shown at 1730. The identification 'L1' is shown between adverts.

Germany: ARD has a revised logo: the figure '1' is smaller and located inside a circle in the top-left corner of the screen.

Sweden: There are slight changes to SVT-1 graphics this season in the form of a large '1' to the left of the clock. News reports are called *Rapport* and *Dabatt*. The PM5534 test card is still shown with SVT-1 at the top and SVERIGE at the bottom.

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

Shack

Web

- **Jerry Glenwright** c/o SWM Editorial Offices, Broadstone
- **E-mail** shackweb@pwpublishing.ltd.uk

Hello and welcome to 'ShackWeb', the bi-monthly round-up of some of the best the web has to offer short wave listeners. As I write, the nights are drawing in once again (it's noticeably dark around 1935, which will tell you when I'm writing this) and it's the time of year when we abandon the great outdoors in favour of a comfy chair in the shack and a finger on the dial (or else a mouse click on the desktop!). There's lots to cram in once again and this column is devoted to newcomers to short wave listening, so without further ado.

Internet Excels

Diligent readers of SWM's 'QSL' page will no doubt have read Tristan Mill's missive in the October issue concerning websites for novice listeners and those returning to the hobby. There are, as you might imagine, a great many of these on the web, full of interesting and useful information so that neophytes can come quickly up to speed with things audible.

It is in this field that the Internet excels. Knowledge is available by the screenload for anyone who can be bothered to perform a quick search using Google, Alta Vista or a similar search engine. Don't believe everything you read on the web - though there's plenty of diamonds, there's also lots of nutty slack! And, as Tristan warns, watch out for the newsgroups. These are notoriously ridden with squabbling (virtually all newsgroups - not just those devoted to radio).

Beginners Start Here

For beginners, an excellent place to start is www.passband.com - the Internet headquarters of the publishers of the ever popular *Passport to World Band Radio*. The site's front page features a downloadable PDF describing how to get started in short wave listening, another with details of choosing a suitable radio and there's a link to Receiver News, with snippets and items of interest from the world of listening. There's also a link here to Passport to Web Radio, the on-line counterpart to the conventional paper edition, and featuring a wealth of info about broadcasters who choose the web as their medium.

As a newcomer, you can spend a lot of time tuning through what appears to be random noise before finding something worth listening to and while tuning across the bands is in itself fun, novices benefit by being pointed in the right direction. That's where a site such as the WWW Shortwave Listening Guide at www.anarc.org/naswa/swlguide comes into its own.

Point your browser at the page and all the

stations which are scheduled to be broadcasting at the time are listed - that's what I call convenience! Simply select programming type and click the 'current day, current time' button. A comprehensive list of programmes appears complete with time (UTC), type of broadcast (news, etc.), target audience and a range of frequencies - perfect for anyone who wants to explore what's out there before specialising in a particular kind of listening.

A similar service is offered by hfradio.org at



www.hfradio.org/hffreq Enter any short wave frequency into the appropriate field and the site will tell you which stations are scheduled to use it. Alternatively, simply click the 'English Broadcast, Now' button for a detailed list of broadcasters, frequencies, country and power.

In fact, hfradio.org offers a great deal more at its excellent website. Tristan asks for propagation information and discussion forums like those which other hobbies enjoy on the web - it's all at hfradio.org. A 'live' propagation page provides amazingly comprehensive details of sun spots and other solar phenomena, current reports from s.w.l.s, weather and science centres around the world, charts, graphs and more so that you can forecast coming listening conditions.

Another great site for comprehensive propagation information is dx.qsl.net which sports a dynamically updating grey line map showing those countries which are just passing from day into night and vice-versa.

Back on the [hfradio](http://hfradio.org) home page, you can join discussion forums dedicated to scanning,

amateur radio, m.w. DXing and general radio issues, read user reviews of popular receivers and get a list of current optimal listening frequencies for the US (west, central and pacific), South America, Japan, India and Australia as well as western and eastern Europe - great stuff for novice listeners and old hands alike.

If neither of those sound alluring, check out the deliciously-named Prime Time Shortwave www.primetimeshortwave.com/radio.html from which you can simply click a location for a list of live stations or else download schedules sorted by time, frequency or location for the short wave bands in Excel, dBase and ASCII formats.

Quality Listening

Short wave listening requires patience, a deft touch on the dial, research and at least a basic understanding of radio wave propagation. But, in the spirit of the 'new' amateur licensing arrangements in which simply showing up and writing your name correctly is enough to get you a basic 'ticket' (uh oh, bit political there!), the *Monitoring Times* Hot 1000 web page is a listing of the 'top' thousand u.s.b. short wave frequencies. No insight necessary: just switch on, dial up (or tap in) the frequency and away you go.

Joking aside, lists like these are an ideal way to get you into quality listening quickly. Spend a few weeks tuning into 'hot' frequencies and, when the bug has well and truly bitten, you can move up a gear and start to search out your own and that's when the fun really begins. There is lots more on offer at the *Monitoring Times* website including obscure frequencies such as an (admittedly US-oriented) hurricane monitoring frequency list, baseball radio networks, space shuttle frequencies and crisis monitoring.

An interesting phenomena unique to the web are sites, which exist only to provide links to other sites. Much as you might bookmark a link to your favourite page, some people gather so many that they put up a web page featuring nothing but links. One of the best of these as far as radio is concerned can be found at dxworld.com/swlmarks.html Sporting dozens of links to DX sites, commercial radio sites, international broadcasters and the home pages of other hobbyists and listeners, there's enough here to keep you interested and exploring for weeks!

Finally, potential recruits to our hobby who are yet to buy a receiver might like to know that with a web connection, you can tune in all kinds of broadcasts using 'virtual' web-controlled short wave radios. Point your browser www.qsl.net/oe3mzc/receivers.html download a free copy of *RealAudio* from the link on the page (if you don't already have it installed on your machine) and select a receive from the list supplied. Using these you can listen to stations right across the bands from l.w. to 30MHz, broadcast, utility and amateur.

There, that lot should be enough to get you started. Until next time, good surfing and good listening

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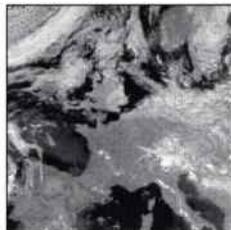
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Satellite

TV News

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

Unfolding news in Russia is usually difficult to locate as raw satellite feed, particularly if events are outside of Moscow. McDonalds may have arrived in the main centres but news - as it affects Russia - still appears to be 'diluted' compared with say regional news in Europe or the USA. Reporters from the West are able to present their own news reports to the West but within Russia, accurate news seems carefully prepared to give the locals only the basics rather than the full story. This situation came graphically obvious with terrorist activities of late August and early September.

Two airliners were blown out of the air by Chechen bombers and a car exploded in Moscow, both events resulted in considerable loss of life. The aircraft came down in the countryside, only limited footage became available but the Chechen car bomb on the 31st in Moscow's 'Prospekt Mira' allowed a local sat truck - 'NTV-RUS-2' to be on-site uplinking live pictures into Europe over *Eutelsat W2*, 16°E (12.533GHz-H, SR5632 + FEC 3/4). An impromptu press conference was convened by a Russian official and later an English reporter from the scene itself. Ironically the 'Prospekt Mira' means 'Avenue of Peace'.

On Monday 6 September, 120 funerals took place. Satellite truck coverage in that remote area is minimal but two uplinks were up on *Eutelsat W1*, 10°E - 10.967 and 10.979GHz-V (4167+5/6) signing as 'RUS 006' and 'RUS 008', possibly dual uplink feeds from a single truck to carry the intense demand for live news. Later, 'RUS 006' ceased transmissions and 'RUS 008' continued to provide interviews and coverage for foreign reporters. Satellite truck 'NTV RUS-5' appeared at Beslan on 6 September with uplinks on the first funeral day, NTV always use 16°E capacity, appeared at 12.5632GHz-H (5632+3/4).

At 1930 on 7 September whilst monitoring *W1*, a 'looped' video sequence appeared in widescreen showing internal pictures of the Beslan school gym. The footage would have been taken by a terrorist, how this video was recovered has yet to unfold, the UK networks carried the footage extensively.

It was interesting to see the 'UTR' TV channel out of Kiev, Ukraine which is fed to transmitters between the Ukraine to Kazakhstan/Uzbekistan and downlinked from the *Express AM-22*, 53°E on 3 September. The events unfolded in Beslan - within their coverage area, the channel offered about four minutes of Beslan news followed with an eight minute item on a car crash and road safety. At the same time Sky News were carrying almost full time the story of Beslan.

The *Express AM-22* satellite is an interesting bird providing strong signals into the UK. A scan on 22 August revealed a four channel bouquet at 11.046GHz-V (29812+3/4) with music 'MUZTV-UNOST'; 2 x time shifted general TV programme channels 'CTC+0' and 'CTC+2', all FTA but a 4th 'Skystream' was encrypted. A two channel bouquet appeared at 11.102GHz-V (6000+3/4) - 'PEREGON', just colour bars and a TV channel ex-Kiev, Ukraine - 'UTR'. With the more recent events in Southern Russia a further check was made in early September and a further activity spot was found @ 11.124GHz-V (13500+3/4), one carries the Kiev TV channel 'UTR' but the other simply titled 'FEED' carries PAL colour bars and an evening news broadcast, this the output of a news studio, which included the rehearsals, the transmission and weather forecast - then back to colour bars! **Roy Carman** (Dorking) also reports that activity on 53°E has been seen at 11.526; 11.618 and

11.622GHz-V (3125+7/8) late August with Spanish language feeds to Mexico, possibly the first hop into Europe prior to a 2nd hop into Mexico perhaps via Spain and *Hispasat*, 30°W.

There's a lot of activity in the Eastern sky if you have visibility of the lower elevations. **Roger Shaw** (Bardney, Lincs.) has just 'lost' access onto *Intelsat 804*, 64°E with excessive growth of his neighbour's tree but he can just 'see' *Intelsat 902* @ 62°W where he found the infamous 'FOX FEED' (that's appeared on several satellites in recent years) at 11.546GHz-H (3254+5/6) in NTSC with a 'JERUSALEM' identification slide. Nearby at 11.680GHz-H (3500+7/8) is an 11 TV channel bouquet with radio, TV, data and a single Greek general entertainment channel, the bouquet has the service identification 'KBI-TEST PLATFORM'. *NSS-703*, 57°E occasionally carries 'TV5 ANKARA', a news feeder running NTSC @ 11.144GHz-V (an unusual 12500+7/8). To the West, Roger is screened by more trees and to receive *PAanAmSat-9*, 58°W has rigged up an elderly 650mm dish in a tree so he can monitor 'CUBAVISION' - 11.612GHz-H (3670+?) and the irregular Sky Sports feed at 11.477GHz-H (266463+?).

I rarely scan the content of the *Eutelsat Hot Bird* slot of 13°E, but sat-zapper **Alan Richards** (Horncastle, Lincs.) checked out 'CNES-TV', the Toulouse Space downlink but there seems to be just a blank screen + hiss, previously carried satellite news items, space research and earth surveillance content, perhaps it's busy as you read this - it's on 12.554GHz-H (27500+3/4). And if you only have an Astra digital dish (for 28°E) can try receiving OB content, Alan found an outdoor pop concert at 12.589GHz-V (6111+3/4) for the German TV stations 'RBB BRANDENBURG' and 'RBB BERLIN' from *Eurobird* - 28.5°E on August 29th. A Sky 'Digibox' won't catch this as the parameters are restricted.

Roy C has received South African programming in August over *Europe*Star-1*, 45°E, this is a feeder channel for 'NSAT TV' and comprises content from the SABC and other local channels both in English and Boer. The 'NSAT' material is compiled into a sampler programme currently aired over Sky Digital TV channel no. 837 as 'Sth African TV' and will remain FTA until December when 'NSAT' plan to encrypt and go subscription only, hoping to run a 24 hours-a-day service in due course. 'NSAT' have leased capacity over 45°E for the J'burg-London link prior to uplinking onto *Astra*. The service is intended for exiled South Africans living in Europe.

An E-mail from **Adrian Howman** (Norfolk) says that a *PAS-3R* 43°W 'hidden' signal he suspected has now been confirmed at 'TV FRAD', it only appeared after replacing his 0.6dB noise Grundig LNB with a 0.3dB noise Invacon LNB. 'TV FRAD' is actually the Mexican TV channel 'WHTV-4' from Mexico City.

A satellite that attracts little interest is *Intelsat 901* @ 18°W, once favoured for Italian OB feeders back to the studio centre. August Bank Holiday Saturday - evening - and a check to see if there was still life on this bird - and there is a little movement still! Apart from an encrypted feed the 'NASCAR BRISTOL MOTOR SPEEDWAY' was being linked, possibly into Sky Sports/Eurosport.

The NASCAR event was carried at 11.688GHz-H with the service ident 'NYW_SD_Enc_10'. On the nearby 11.680GHz-H slot was a baseball match with San Francisco v. Atlanta, the service ident 'LAX ENC 6', game end and colour bars with inlaid 'Goodnight from Atlanta' - both circuits used SR5632 + FEC 3/4.



American volunteers have built an impressive Hindu Temple in Chicago, Illinois, (*Atlantic Bird-1*, 12.5°W)



The financial group 'Old Mutual' carried out a corporate presentation between Johannesburg, AS and London recently via *Europe*Star*, 45°E.



This is the new South African TV channel 'NSAT' (45°E).



An unusual view of the Athens Olympic stadium for STV, Sweden (*E-bird* 33°E).



An in-the-street report from Islamabad, Pakistan concerning the success of Pakistani women in running a business into good profit from *SESAT* 36°E.



An Olympic report from Athens for Japanese TV over 45°E.



ENEX is the Luxembourg switching centre for sports feeds via *W1* 10°E.



The ever vigilant helicopter machine-gunner at sunset over the Iraqi desert *W2*, 16°E



APTJ Test Card over 10°E.

SWM UK Radio Club Listing

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

NORTH WEST

CHESHIRE

CHESTER & DRS, G3GZ. Meets at the Burley Memorial Hall, Waverton. Details from Chris Wild. Tel: (01244) 683623.

HALTON RADIO CLUB, M0BZX. Meets at the Play Centre, Norton Hill, Windmill Hill, Runcorn. Details from Alan Parker 2E1DSF. Tel: (01928) 790228.

MACCLESFIELD WIRELESS SOCIETY, G4MWS. Meets at the Pack Horse Bowling Club, Abbey Road, Macclesfield. Details from Nils Hazel Perrot.

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

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

RADIO OFFICERS ARS, M0ROA. Details from Mr J. Bell G0CMM.

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

WARRINGTON & DARS, G0WR5. Meets at the Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington, Cheshire. Details from John Riley G0RPG. Tel: (01925) 762722.

WIDNES & RUNCORN ARS, G0RNR. Meets at the Scout Hut, Castle Road, Halton Castle, Runcorn, Cheshire. Details from Martin Tust G4LUQ. Tel: (01928) 714843.

CUMBRIA

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

FURNESS ARS, G4ARF. Meets at the Farmers Arms Hotel, Newton-in-Furness. Details from Mr K. Moore M1BWA. Tel: (01229) 465691.

WHITEHAVEN ARC, M0BEE. Details from Mr N. Williams M0CRM.

GREATER MANCHESTER

BURY RS, G3BR5. Meets at the Mosses Centre, Ceol Street, Bury, Lancs BL9 0SB. Details from Steve Gilbert G3OAG. Tel: 0161-881 1850.

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

ECOLDS & DARS, G3QXJ. Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester. Details from Chris Harrison G8VRG. Tel: 0161-773 7899.

THE MANCHESTER WIRELESS SOCIETY, G5MS. Meets at the Simpson Memorial Community Hall, Moston Lane, Moston, Manchester. Details from Ian M0VPR. Tel: 0161-288 730 or visit www.g5ms.com

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

OLDHAM HILLS ARS, G0UQA. Meets at the Oulder Community School, Hudsons Walk, Oulder Hill, Rochdale. Details from Alan G4TMV. Tel: (01706) 344186, E-mail: info@oulderhills.org.uk

ROCHDALE & DARS (RADARS), G0RCC. Meets at the Barnfield & Fieldhouse, Cricket Club, Barnfield Village. Details from John Cannell G7OAJ. Tel: (01706) 376204.

SOUTH MANCHESTER RAD & COMP CL, G3FVA. Meets at the Sale Cricket Club, Dawe Road, Sale, Cheshire. Details from Chris Ward G4HON. Tel: 0161-483 5174.

STOCKPORT RS, G8UQ, G8SR5. Meets at the T.S. Hawkins, Stockport Sea Cadets HQ, Pearmill Ind. Est., Stockport, West. Howe, Lower Bredbury, Stockport. Details from David Simcock M1ANT. Tel: 0161-456 7832.

TRAFFORD ARC, G0TRC, G1TRC. Meets at the Watch House, Cruising Club, Canal Bank, Stretford, Manchester M32 8WE. Details from Roger May G4YLQ. Tel: (01457) 8666575.

TRAFFORD RADIO GROUP, G0TRG. Meets at 17th Stretford Scouts HQ, Barton Road, Stretford, Manchester. Details from Jon Mossman G7JKJ. Tel: 0161-965 5809.

WEST MANCHESTER RC, G4MWC. Meets at the Astley & Tydesley Miners Welfare Club, Meany Road, Astley, Tydesley, Manchester. Details from Jeffrey Moran M0BGU. Tel: (01204) 497694.

WIGAN & DARC, G0RHW. Details from Mr D.H. Barkley G0DPI. Tel: (01942) 237162.

ISLE OF MAN

ISLE OF MAN ARS, G03FLH. Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas. Details from Dave Walton M0DBX. Tel: (01624) B16308.

LANCASHIRE

BURNLEY & DARS, RS87674. Meets at Barden High School, Barden Lane, Burnley, Lancashire. Details from Bill Scriver G0BQC.

CENTRAL LANCAS ARC, G0FDX. Meets at the Priory Club, Broadfield Drive, Leyland, Lancs. Details from Steve Shearing M1ACJ.

DARWEN ARC, G4J5. Meets at the Darwen Catholic Club, Wellington Fold, Darwen, Lancashire. Details from Len Jackson G0NPJ.

FISTS CW CLUB, G0PKX. Details from Mr E. Longden G3ZQS. Tel: (01254) 703948.

FYLDE ARS, RS538939. Meets at the A.N.T. Flying Clubhouse, Blackpool Airport. Details from Ken Randall G3RFH. Tel: (01253) 407952.

MORECAMBE BAY ARS, G4Y85. Meets at the Trimpell Sports & Social Club, Outness Lane, Morecambe, Lancs. Details from Paul 2E0DX. Tel: (01524) 427793, E-mail:

2e0dx@mbars.co.uk

PRESTON ARS, G3HUE. Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from Eric Eastwood G1WCQ. Tel: (01772) 686708.

ROLLS-ROYCE ARC, G3RR. Meets at the Club Room, Rolls-Royce Sports Ground, Barnoldswick. Details from Mr J.A. York G3KYJ.

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

THORNTON CLEVELYS ARS, G4ATH. Meets at the Frank Townsend Centre, Beach Road, Thornton Clevelys, Lancs. Details from Mr J.E. Duddington G4BFH. Tel: (01253) 853554.

MERSEYSIDE

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

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

SOUTH-PORTH & DARC, G2QA. Meets at St. Marks Church Hall, Scotsbrick, Lancs. Details from Don Atkins M1BUL.

WIRRAL & DARC, G4MGR. Meets at the Irby Cricket Club, Mill Hill Road, Wirral. Details from Tom G4RHF. E-mail: secretary@wirradarc.com Tel: (07050) 291850.

WIRRAL ARS, G3NWR, M1JARC. Meets at the Club Room, Ivy Farm, Arrowe Park Road, Wirral L49 5LW. Details from Alan Upton G3UZU. Tel: 0151-677 3266.

NORTH EAST

CLEVELAND

EAST CLEVELAND ARC, G4CR5. Meets at the New Marske Institute Club, Gurney Street, New Marske (near Redcar). Details from Alistair Mackey G4OLK. Tel: (01642) 475671.

STOCKTON & DARS, G4XG. Meets at the Billingham Community Centre, Billingham, Cleveland. Details from David J. London G0VGB. Tel: (01642) 896395.

CO DURHAM

BISHOP AUCKLAND RC, G4TF. Meets at the Stanley Village Hall, Rear High Road, Stanley, Crook, Co. Durham. Details from Mark Hill G0GFG. Tel: (01388) 745353.

DERWENTSIDES ARC, G4PFQ. Meets at the Steel Club, 36 Madonsley Road, Consett, Co. Durham. Details from Mr G. Darby G7UJU. Tel: 0191-370 2032.

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

PETERLEE RADIO CLUB, G0KJV. Details from Andrew Pennell G0NSK.

HUMBERSIDE

EAST YORKSHIRE ARS, G0EOR. Meets at the Northern Fodds Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4EBT. Tel: (01482) 876702.

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

GRIMSBY ARS, G3CND. Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

HORNSEA ARS, G4EKT. Meets at The Mill, Awlwick Road, Hornsea, North Humberside. Details from Jeff Southwell G4KCY. Tel: (01964) 533331.

HULL & DARS, G3AMV. Meets at the SWL Centre, Club Room, Gosthland Close, Walton Street, Hull. Details from Mr R. Hatton.

RAYWELL PARK SCOUTS ARS, G4CMT. Details from Mr A.D. Russell M0AWU.

SCUNTHORPE STEEL ARC, G4FUH. Details from Alistair Butler M1EFC.

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

QUEEN MARY ARC, G6QM. Meets at Blazefield, Pateley Bridge, Harrogate, North Yorks HG3 5DR. Details from Frank Hams G4EY. 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, G0X000. Details from Roy Clayton G4SSH. Tel: (01723) 862924.

THE VINTAGE & MILITARY ARS, RS183536. Details from H.A. Aspinall.

YORK ARS, G3HNV. 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 Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392.

NORTHUMBERLAND

NORTHUMBERLAND ARC, G4MAX. Meets at the Old Telephone Exchange, Crosswell Road, Ellington, Morpeth, Northumberland. Details from Charles Quininn G0ECQ. Tel: (079747) 99881.

SOUTH YORKSHIRE

FINNINGLEY ARS, G7AH. Details from John Fennell G4HOY. Tel: (01427) 872522.

MALBY & DARS, G4SKM. Meets at the Centenary Hall, Clifford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798096.

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

SHEFFIELD ARC, G0NF, NRAE/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Glossop G0SFH.

TYNE & WEAR

HOUGHTON LE-SPRING ARC, G3NMD. Meets at the Dulmire Royal British Legion, Dulmire, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Angles GOA8F. Tel: 0191-584 4673.

SOUTH TYNNESSIDE ARS, G0WQW. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWL. Tel: 0191-421 9921.

TYNEMOUTH ARS, G0NMD. Meets at the Linsell Centre, Linsell Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0SBN.

TYNNESSIDE ARS, G3ZQM. Meets at the St Teresa's Club, 2000 Heaton Road, Newcastle-upon-Tyne NE6 5HP. Details from Mr J. Pickersgill G0DZG. Tel: 0191-265 1718.

WEST YORKSHIRE

DENBY DALE & DARS, G4ODD, G8MKK. Meets at the Pe Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4FSQ.

HAUFAX & DARS, G2UG. Details from Mr S.P. Ortmayer G4RAW. Tel: (01422) 203062.

KEIGHLEY ARS, G0KRS. Meets at the Cricket Club, Ingrow, Keighley, West Yorkshire. Details from Mr I. Townsend M1BZY. Tel: (01274) 723951.

LEEDS & DARS, G4LAD. Meets at The Radio Shack, Yarnbury (Horsforth), RUF Grounds, Brownberrie Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0BU.

NORTH WAKEFIELD RC, G4NKK. Meets at the East Ardsley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 0113-253 9087.

OTLEY ARS, G3QXQ. Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SNV. Tel: (01274) 836197.

PONTEFRAC & DARC, G3PYQ. Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0NQE. Tel: (01977) 877000.

SPEN VALLEY ARS, G3SVQ. Meets at the Old Bank WMC, Mirfield, West Yorkshire. Details from Mr J.R. Wide G0FOI. Tel: (01274) 875038.

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

WAKEFIELD RPTR GP, G0KNR. Details from Mike Charlton G60Z.

WHITE ROSE ARS, G3XPE. Meets at the Moortown RUF, 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 Chevus House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XW. Tel: (01525) 384419.

SHEFFALD & DARS, G3FJE. Meets at the Church Hall, Amphill, Sheffal, Bedfordshire. Details from John West. Tel: (01462) B12739.

ST. SWITHUN'S ARC, M0AJV. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelynn Danton G0WDD. Tel: (01787) 683179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2XV. Meets at the Coleridge Community College, Redegund Road, Cambridge. Details from Ron Huntman G3GSR. Tel: (01223) 501712.

DUXFORD ARS, G82WM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.I. Pope. Tel: (01529) 656149.

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Farset Road, Fletton, Peterborough. Details from Alan D. Ralph G8XJH.

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Meadow Centre, Meadow Road, Huntingdon. Details from David Leach G7DUJ. Tel: (01480) 431333.

MARCH & DARS, G3PMH. Meets at the British Legion Club, Rookwood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

PETERBOROUGH R & ES, G3DQW. Details from Mr V. Edwards G8NZC.

WISBECH AR & ELEC. CLUB, M5ARC, G4PQL, G8NED. Meets at RAFA Club, Old Market, Wisbech. Details from Alan Bridgeland M0DUQ. www.warc.org.uk

DERBYSHIRE

BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morns G0RRT. Tel: (01246) 822856.

BLUXTON RA, G4SPA. Meets at the Leewood Hotel, Bluxton. Details from Derek Carson G4IHO. Tel: (01298) 25506.

DERBY & DARS, G2JQ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Sherdlow G3S2J. Tel: (01332) 558875.

EREWHAM VALLEY ARG, G0PCX. Meets at The Sitwell Arms Public House (between Horsley Woodhouse and

Woodside). Details from Peter Russell M0AQJ.

MOUNT ST. MARY'S ARC, G4NSM. Meets at the College, Spinlith, Sheffield. Details from Rev. P. McArdle G0DAG. Tel: (01246) B12230.

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

NUNSFIELD HOUSE ARG, G3EEO. Meets at the Nunsfield House, Boulton Lane, Avonst, Derby. Details from William F. Smith G7PJJ.

STH DERBYS & ASHBY W ARG, G0SRC. Meets at the Moira Repin Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 6DJ. Details from Mrs B. Waley. Tel: (01283) 760622.

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Gething M0CJQ. Tel: 0115-955 5766.

GLOUCESTERSHIRE

CHELTENHAM AR ASSN, G5BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ian Wilson G4BGW. Tel: (01452) 731956.

CHELTENHAM CLUSTER SUPP GP, G8TDIC. Details from Mr A.M. Davies G0HDB. Tel: (01684) 72178.

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

SMITHS INDUSTRIES RS, G4MEN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G1JMF.

STROUD RS, G4SR5. Meets at the Minchampton Youth Centre, Nr. Stroud. Details from Mr S.G. Spencer G3L0C.

WHITE NOISE LISTENING G0WNL. Details from Adrian Deane G7KGC.

HEREFORD & WORCESTER

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

BROMSGROVE ARS, G4TUL. Meets at the Likey End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TFS. Tel: (01527) 542266.

DROITWICH ARC, G4PVO. Meets in the Community Hall, Droitwich Spa, Worcs. Details from Hector Whagg M1BUV. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gaol Street, Hereford. Details from Tim Bridgland-Taylor G0WJW. Tel: (01432) 279435.

KIDDERMINSTER & DARS, G0KRC. Meets at The Chainwire Club, Zortech Avenue, Kidderminster. Details from Mr A.W. Saunders G0DZB. 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@gallenson.fsnet.co.uk

REDDITCH RC, G4ACZ. Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01829) 762041.

VALE OF EVESHAM RAC, G0EPA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsey G4NRD. Tel: (01386) 41508.

LEICESTERSHIRE

1F ATC, G7MCD. Details from Sqn. Cmdr. Adrian Utting G1WZQ.

BEAUMANOR ARC, G3BMR

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

HINCKLEY AR & ES, G3VGL. 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 Gilreos Cottage, Groby Road, Leicester LE3 9QL. Details from Mr S.P. Hay G3HYH. Tel: 0116-224 2598.

LOUGHBOROUGH & DARC, G3RAL. Meets at Hind Leys College, Shephed, Loughborough, Leics. Details from Chris Walker G1ETZ. Tel: (01509) 504319.

MELTON MOWBRAY ARS, G4PDK. Meets at the St. John Ambulance Hall, Astorby Hill, Melton Mowbray, Leics. Details from Mr R. Writers G3NVK. Tel: (01664) 633689.

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

TAMWORTH ARS, G8TRS. Details from Mr A.I. Dyson G0HUV. Tel: (01827) 830437.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The Secretary. Tel: (01478) 657436.

LINCOLNSHIRE

EAGLE RADIO GROUP, M0ERG. Meets at the Eagle Hotel, Victoria Road, Mablethorpe. Details from Terry Stow G

Fossebank, Sadilly 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, website: www.sdiars.org.uk

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

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Liacs Public House, 39 Church Street, Isham, Kettering, Northants N14 1HD. Details from Fay Bewley G6AKS. Tel: (01536) 390954.

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

NORTHAMPTON RC, G3GWB. Meets at the British Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller G0GZB. Tel: (01327) 349188.

NORTHAMPTON SCOUT ARG, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rivett G5WPU.

PARALLEL LINES CG, G4LJP. Details from Mr P.S. Lindsay G4CLA.

NOTTINGHAMSHIRE

ROE OF NOTTINGHAM, G3BKW. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XDU. Tel: 0115-919 9177.

DUKES ARS, G4KTL. Meets at Ambleside Community Centre, Ambleside, New Olterton, Notts. Details from Colin Foster G7DXX.

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

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

NORTH NOTTS DATA GROUP, G0WNN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8IGQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0OAU. 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 G4G6S. Tel: (01302) 743130.

SHROPSHIRE

SALOP ARS, G3SRT. Meets at the Telepost Club, Railway Lane, Abbey Forge, Shrewsbury. Details from John Burnford G0GTH. Tel: (01743) 249943. E-mail: john.burnford@virgin.net

TELFORD & DARS, G3ZME. Meets at the Dawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UKV. Tel: (01952) 255416.

STAFFORDSHIRE

BURTON-ON-TRENT & DARS, G3NFC. Meets at the Staphell Institute, Main Street, Staphell, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HBY.

CANNOCK CHASE ARS, G6SW. Meets at the Four Crosses Inn, Wating Street, Hatherton, Cannock. Details from Arnold Matthews G3ZFW. Tel: (01543) 262495.

CHAD RC, G4CAR. Meets at the Swinlen Officer's Club, Swinlen, Lichfield, Staffs. Details from Bernard Jayne G8BFL. Tel: (01543) 268569.

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

MOORLANDS & DARS, G4NHT, G3MAD. 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 G4DHO. Tel: (01782) 638801.

SUTTON COLDFIELD RS, G3RSC. Meets at the Rugby Club, Walkley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

WARWICKSHIRE

AVON VALLEY ARA, MORAD. Details from Mr Peter Bracham G0WJL. Tel: (01905) 724531.

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

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

STRATFORD-UPON-AVON & DRS, G0SDA. Meets at the Home Guard Club, Tiddington, Stratford-upon-Avon, Warwicks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, G0NEJ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NOL. Tel: (01922) 636162.

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Binley Road, Coventry. Details from John Beech G8SEJ. Tel: (01203) 673999.

DUDLEY ARC, G4DAR. Meets at the Community Centre, Sedgley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. Tel: (01384) 277925.

HILLREDS ARS, G0SPM. Meets at The College, Simms Lane, Netherton, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457.

KYNOCH R & TVS, G3HPP. Meets at the Club Workshop, IMI Ltd., Sportsfield, Perry Bar, Birmingham. Details from Mr G. Nicholls. Tel: (01922) 635376.

MIDLANDS ARS, G3MAR. Meets at Unit 22, 60 Regent Place, Hockley, Birmingham (jewellery quarter). Details from John A.

Crane G0LAI. Tel: 0121-628 7632.

SANDWELL AMATEUR RADIO CLUB, G0CWC. Meets at Sandwell ARC, Broadway, Oldbury, Warley, West Midlands B68 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARS, G0OBS. Details from Warwick M. Hall G4WMH.

SOLIHULL ARS, G3GEI. Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaslin G8AVY. 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, G6SRS. Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards.

WEST BROMWICH CENTRAL RC, G4WBC. Meets at The Strandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Leitch G0PPL. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, G0OCP, G1WMP. Details from Steven Jones G6LUR.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

WOLVERHAMPTON ARS, G8TA. Meets at the Electricity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

WORDSLEY RC, G4WRA. Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PWZ.

LONDON & CENTRAL

BERKSHIRE

ARBORFIELD ARC, G3IHF. Details from Mrs E.W. Harding 2E1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Ellerton G3NCC.

BURNHAM BEECHES RC, G3WRM. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Cheslett G6BL. Tel: (01528) 625720.

MAIDENHEAD & DARC, G3WOL. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

NEWBURY & DARS, G5XV. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Max Maxwell G7DXC. Tel: (01635) 253233.

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

BUCKINGHAMSHIRE

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

CHESHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirwell G0FWV. 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 Malcolm Bay M0MBO on (01525) 874075.

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quarnes, 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, Pawsions 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 Chewer G0KQK. Tel: (01708) 474443.

BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechil Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TUK.

CLIFTON ARS, G3GHJ. Meets at the Hidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Vesney G7BKH.

CRYSTAL PALACE & DRC, G3VCP. Meets at the All Saints Church, Pansh 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.

ECHFORD ARS, G3UES. Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3TRD. Tel: (01784) 456513.

EDGWARE & DRS, G3ASR. Meets at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Slater G0PQB. Tel: 0208-953 2164.

HAVERING & DARS, G4HRC. Meets at the Fairlytes Arts Centre, 51 Billet Lane, Hornchurch, Essex.

RS OF HARROW, G3EFX. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Friel G4AUF. Tel: (01895) 621310.

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

MITCHAM & DISTRICT ARS. Meets at the AITC 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. Berry G4DFB.

ST. DUNSTONS COLLEGE ARS, G4SDC. Details from Sam Kennard G4OHK. 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, RS95589. Details from Robin Clay G0VJL.

WHITTON ARG, G0MIN. Meets at the Whittton Community Centre, Perry Road, Whittton. Details from Ian Clabon G00FN. Tel: 0208-894 9131.

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5GZ. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PQF. Tel: (01279) 506933.

DACORUM ARTS, G7RHH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TCD. Tel: (01442) 211925.

HODDESDON RADIO CLUB, G0TSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Plett G3JNU. Tel: 0208-292 3678.

MIMRAM CONTEST GP, M0ABC. Details from Alan Hordsworth G80U. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G82RST. Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Uyers G2OXB. Tel: (01992) 558493.

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Don Bache M0KJF. E-mail: d.bache1@ntlworld.com

VERULIAM ARC, G3VER, G8VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Crane G3PWF. Tel: (01923) 262180.

VERULIM (ST. ALBANS) RADIO CLUB. Meets at the RAFA, New Kent Road, off Marlborough Road, St. Albans, Herts. Details from Ralph G1BSZ. Tel: (01923) 265572.

WELWYN & HATFIELD ARC, G3WQC. Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (07973) 560649.

SURREY

BENTLEY ARC, G0VZS. Details from Derek Gilbert G0NFA.

CATERHAM RG, G0SCR. Details from Mr P.N. Lewis G4AFL.

COULSDON AMATEUR TRANS. SOC., G4CVR. Meets at St. Swithuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZJ, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meadon Avenue, Farnborough, Hants. Details from Mr M. Halsey G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G6GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitcomb G0SWE.

KINGSTON & DARS, G3KYN. Details from Mrs Mary Ashdown G40VQ.

REIGATE ATS, G5LJK, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01885) 344723.

SUTTON & CHEAM RS, G2XP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0BWW. Tel: 0208-644 9945.

THAMES VALLEY ARS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Gligs Hill, Thames Ditton, Surrey. Details from Cor. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBLEDON & DARS, G3WMM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Jim Bell. Tel: 0208-874 7456 or E-mail: james@bell0144.fsnet.co.uk

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON RADIO CLUB, G4GQR. Meets at Vallance Community Centre, Sackville Road, junction of Connaught Road, Hove. Details from Hon. Sec G0RNS. Tel: (01273) 699104.

CROWBOROUGH DARS, G0CWR. Meets at the Plough & Horses, Walshes Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VX. Details from Keith Ellis G8GHM. Tel: (01323) 720220.

HASTINGS ELEC. & RC, G8HH, G1JHH, G8LL. Meets at the William Parker School, Parkstone Road, Hastings, East Sussex. Details from Peter Fynn G0FUU. E-mail: peter.fynn@virgin.net or visit www.g4tucs.freemove.co.uk

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4DRV. Tel: (01323) 729479.

THE ORZ ARG OF SUSSEX, G83VX. Meets at the Coach Station, Wartling Road, Eastbourne. Details from Stuart Constable M0CWH. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER ARC, G0ARC. Meets at the Village Hall, Wilheim, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

BASINGSTOKE ARC, G3TOR, G8YNN. 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 Road, Portchester, Hants. Details from Andrew Slinn 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 Lovecane Village Hall, Lovecane Lane, Lovecane, Hants. Details from Stuart Swain G0FYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, G0VVR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

SONY BROADCAST ARC, G4S2C. Accredited C&G RAE centre. Meets at Sony Sports & Social 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 G0PFF. Tel: (01329) 232386.

THREE COUNTIES ARC, G4AWR. Meets at the Bramshott Parish Inst. & Club, Headley Road, Liphook, Hants. Details from Damian Kamm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JNY. 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 Cent, Newnham Road, Binstead, Isle of Wight. Details from Mr Pebody.

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bournemouth. Details from Alan Reeves G4ZFO. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, G0BRA. Meets at St. John's Church School Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1SYT. Tel/FAX: (01295) 253509.

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LUD. Meets at the Grove House Club, Grove Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALLEY OF WHITE HORSE ARS, G5RFP, G4VWH, G8VWH. Meets at The Fox, Stowton, Oxfordshire. Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NNM. Meets at The Panoras Hall, Chichester. Details from Graham Swann G0WSD.

CRAWLEY ARC, G3WSC. Meets at the Tilgate Forest Rec. Centre, Hut 18, Tilgate Forest, Crawley, West Sussex. Details from Keith Farrow G8KZJ. E-mail: keith.farrow@btinternet.com

HORSHAM ARC, G4HRS. Meets at the Guide Hall, Denne Road, Horsham, West Sussex. Details from Alistair Watt G3ZBU. Tel: (01403) 253432.

MID SUSSEX ARS, G3ZMS. Meets at Marie Place, Leylands Road, Burgess Hill, West Sussex. Details from Mr C. Childs 2E1DCP. Tel: (01444) 244689.

T.S. VINDICATRIX ASN, G0WVB. Details from Don Still G00CC.

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, Chippenhams, Details from John Ainge G4LJZ. Tel: (01249) 462610.

SWINDON & DARC, G3JFC. Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Den Forrest M0MCH.

TROWBRIDGE & DARC, G2BQY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wils. Details from Ian Carter G0GRH. Tel: (01225) 864698.

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTOL ARC, G3TAD. Meets at the Lodgegate Club, Lodge Road, Kingswood, Bristol. Details from Dave Bendrey G7BYN.

GORDANO ARG, G6GRG. Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NORTH BRISTOL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Bremer Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 750448.

SEVERNIDE TV GROUP, G

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter. Details from Ray Donno G3YBK.

EDMOUTH ARC, G0XRC. Meets at The Scout Hut, Marpool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARG, G0AVC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Hanson G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterloo Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

PLYMOUTH RADIO CLUB, G8PRC, G3PRC. Meets at the Weibek Manor Hotel, Sparkwell, on the 1st & 3rd Tuesdays of the month. Details from Frank Russell G7LUL. Tel: (01752) 263222 or E-mail: frank@foxonradio.finet.co.uk

TORBAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Oway G3RMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UOP. Details from Alan Stanley G0XAV.

DORSET

BLACKMORE VALE ARS, G4REB. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 8PF. Details from Mr A. Marriott G0GFL. Tel: (01258) 860741.

BOURNEMOUTH RS, G2BR5. Meets at the Kinson Community Centre, Kinson, Bournemouth, Dorset. Details from Chris R. Ellis M5AGG, Broken Ridge, Fir Tree Close, St. Leonards, Ringwood, Hants BH24 2QW. Tel: (01202) 893126.

CHRISTCHURCH ARS, G0MJD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerset, Christchurch, Dorset. Details from Mr K.P. Harris 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 C.F., Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0KWL. Tel: (01202) 700903.

PORTLAND ARC, G0VOP7VQP. Meets at Clifton Hotel, Grove Road, Portland. Details from Kerry Morris G1WIK. Tel: (01305) 788591.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickerell, Weymouth, Dorset. Details from John Rose M0BQO. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLJ. Meets at Kings Arms, Langton Matravers, Dorset. Details from Peter Wakefield M1WCHW3WCH. Tel: (01929) 424413.

WESSEX AMATEUR WIRELESS CLUB, G1WAW. Details from Ken Powell G1NDG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G13DVC. Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade. Details from Mrs Anne Mourant M0BUJ. Tel: (01534) 734948.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HJD. Tel: (01935) 71131.

TAUNTON & DARS, G3XZM. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewam M0CIF.

WEST SOMERSET ARC, G00WA. Meets at the West Somerset Community College, Minehead, Somerset. Details from Robert Bonar G1ONV/M30NV. Tel: (01843) 863462.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506.

YEOWIL & DARC, G30MH, 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, G3GK. Meets at the Braitree Hockey Club, Church Street, Bocking, Braintree. Details from John M5AIB. Tel: (01787) 460947.

CHELMSFORD ARS, G0MWT. Meets at the Marconi Social Club, Beehive Lane, Chelmsford, Essex. Details from George Fain G3UTC. Tel: (01277) 622707, E-mail: info2005@g0mwt.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCO. Meets at the Colchester Institute, Sheepen Parade, Colchester. Details from Frank R. Howe G3FU. Tel: (01206) 851189.

DENEGE HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G8UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Blackstone 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, G4QNP. 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 G0TMM. 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, Basilton, 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, Etham, London SE9. Details from Bob Treacher BR53252 via www.cvs.org

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Jim Cairns M18W. Tel: (01304) 852773.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Heme Bay. Details from Paul Nicholson G3VJF. Tel: (01227) 743070, FAX: (01227) 742288.

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQA.

HOMER 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, G5MMW, G8MMA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walkerside, Chatham. Details from Mr J. Hale G3FTH.

NORTH KENT RS, G4CW. Meets at The Pop-in-Parour, Graham Road, Besey Heath, Kent. Details from Mr A.V. Friobens G8MLQ. Tel: (01474) 365694.

SWALE ARS, G4SRC, G6SRC. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AQA. Tel: (01795) 685559.

THE MORSE CLUB, G4OQX. Meets at The Five Wents Memorial Hall, Swanley/Hextable Road. Details from Ken M3CZA. Tel: 0206-306 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, G0TAV. 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, G3PXO. Details from Rev. R.N. Myerscough G3PXO.

KINGS LYNN ARC, G3XYZ. Details from Derek Franklin G0WKL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0VZD. Tel: (01953) 604769.

NORTH NORFOLK ARC, G8ZMC. Details from Tony Smith G4FAI. E-mail: g4ai@connectfree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TDO. Meets at the Culford School, Culford, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT.

FELDSLOWE & DARS, G4ZFR. Meets at the Orwell Hotel, 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 Wednesdays at The Hollies, Buckingham Straight Road), Ipswich. Details from Keith Gaunt G7CYV. Tel: (01394) 420226.

LESTON ARC, G4GFS. Meets at Leston Town Athletic Assn., Victory Road, Leston, Suffolk. Details from Paul Cattermole M3MIG. Tel: (01728) 746044.

LOWESTOFT DRS, G3JRM. Meets at The George Barrow Hotel, Outon 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 Hatcher. Tel: (01473) 644475.

SUDBURY & DRA, G0SM, G7SRA. Meets at the Old School, Wells Hall Road, Great Cornard, Sudbury, Suffolk. Details from Bryan Parton G11WY.

SUFFOLK DATA GROUP, G8TMDM. Details from Peter Pyle G8HJE. Tel: (01473) 631313.

NORTH WALES

CLWYD

CONWAY VALLEY ARC, G4W5M. Meets at the Studio, Penrhos Road, Colwyn Bay, Cwyd. Details from Mr R.W. Evans G6WPC. Tel: (01745) 855068.

HALKYN & DARS, G4WHRG. Details from Mr D. Austin G4WDHG.

NORTH WALES RS, G4WNR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Cwyd. Details from Ted Shipton G4WDSJ. Tel: (01745) 336939.

WREGHAM ARS, G4WAM. Meets at the Community Centre, Maeswynn Road, Wrexham. Details from Mr P. Moran G4W0ER.

GWYNEDD

MERION ARS, G4WZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Genevieve Chevassé G4W4UR. Tel: (01341) 421028.

PORTHMADOG & DARS, G4W0MM. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M41DFN.

THE DRAGON ARC, G4W4TTA. Meets at the Ebenezer Church Hall, Lon Foel Graig, Llanfawr, Isle of Anglesey. Details from Stewart Rolfe G4W0ET. Tel: (01248) 362229.

POWYS

POWYS ARC, G4W4M. Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown 2W1CEZ. Tel: (01686) 640814.

SOUTH WALES

DYFED

ABERPORTH YMCA, G4WSZ. Meets at the Hut B17, The Airfield, Aberport. Details from Mr G. Caruther G4W4GJ. Tel: (01239) 811205.

ABERSYSTWYTH & DARS, G4W0ARA. Meets at the Scout Hut, Plasrug Avenue, Abersystwyth. Details from John Woodward G4W6DK. Tel: (01970) 890657.

CARMARTHEN ARS, G4WYCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynw Road, Llangunor, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G4W4ZL. Tel: (01267) 231359.

CLEDDAU ARS, G4W0SYG. Details from Trevor Perry G4W4XK. Tel: (01646) 600725.

LLANELLI ARS, G4W0EZX. Meets in the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones G4W0KZK. Tel: (01554) 820207.

PEMBROKESHORE RS, G4W0EJTE. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones M4W0CAB. Tel: (01437) 763028.

GWENT

ABERGAVENNY RS, G4W4GFL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes G4W0DQY. Tel: (01633) 483186.

BLACKWOOD & DARS, G4W6GW. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans G4W8TL. Tel: (01495) 225178.

EBBW VALE COLLEGE RS, G4W0VW. Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden G4W0HCN. Tel: (01495) 305192.

NEWPORT ARS, G4W4EZW. Meets at the Brynglas Community Centre, Brynglas Road, Newport, Gwent. Details from Paul Nichols.

PONTYPOOL ARS, G4W3RNH. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G4W0OZ.

MID-GLAMORGAN

BRIDGEND & DARC, G4W4LNP. Meets at the Club Bymynydd, Bymynydd, Bridgend. Details from Alan Huimes. Tel: (01656) 721574.

HOOPER (MERTHYR) ARC, G4W3RDB. Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Merthyr Tydfil, Mid Glamorgan. Details from Robert Cummings G4W0RVG.

MID GLAMORGAN ARS, M4W0CNA. Meets at Aberkenfig Sports & Social Club, Details from Mervyn Carey G4W4VSE. Tel: (01666) 734668.

SOUTH GLAMORGAN

BARRY ARS, G4W3YKL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Mortimore G4W4BV. Tel: (01446) 738756.

HIGHFIELDS ARC, G4W4LFD. Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

WEST GLAMORGAN

PORT TALBOT (BS PLC) ARS, G4W3RDB. Meets at the British Steel PLC Sports & Social Club, Margam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock M4W0AGE.

SWANSEA ARS, G4W4CC. Meets at the Applied Sciences Building, Swansea University. Details from Frank Burrow G4W8ME. Tel: (01792) 390233.

SCOTLAND WEST & WESTERN ISLES

CENTRAL REGION

FALKIRK & DARS, G4W0FRK. Meets in the 62nd Forth Valley Scouts Hall, Denny Road, Larbert, Nr. Falkirk. Details from Brian J. Waddell G4M4XQJ, QTHR or E-mail: g4m4xqj@btinternet.com

STIRLING & DARS, G4W0NKC. Meets at Banderath Industrial Estate, Trook, Nr. Stirling. Details from John Sherry G4W0AZC. Tel: (01324) 824709.

DUMFRIES & GALLOWAY

WIGTOWNSHIRE ARC, G4M4RV. Meets at the Aird Unit, Stranraer Academy, Stranraer, (entrance from Cairnport Road). Details from Neil Macdonald G4M4LQS.

STRATHCLYDE

AYR ARC, G4M4YR. Meets at the University of Paisley, University Campus, Beech Grove, Ayr KA8 0HN. Details from John Shankland M4M1JAS. Tel: (01292) 445599.

CENTRAL SCOTLAND FM GROUP, RS38728. Details from Thomas Stalker G4M7TZU. Tel: (01698) 816793.

DALRY ARC, M4W0ARG. Meets at The Turf, in Dalry, Clackmannanshire. Details from Alex McKeenan M4W0ABM. Tel: (01294) 823295.

DUNOON & DARS, G4W0CCD. Meets at the Edward Street Community Centre, Edward Street, Dunoon. Details from A.B. Horton G4M0BUL. Tel: (01369) 840217.

HELENSBURGH ARC, G4M4HEL. Details from G. Capstick G4W0QAF. Tel: (01436) 675922.

INVERCLYDE ARC, G4W0GNC. Meets at the Cardwell Bar, Cardwell Road, Gourcock, Strathclyde. Details from Andrew Gains G4M3YOR. Tel: (01475) 638226.

KILMARNOCK & LOUDOUN ARC, G4W0ADX. Meets at the Hurlford Community Centre, Cessnock Road, Hurlford. Details from Steve Campbell G4M4OSS. Tel: (01560) 483800.

LARGS & DARS, G4W0MVE. Details from Mr J. Clough G4W0MDO. Tel: (01475) 585884.

LORN ARS, G4M0LRA. Details from T. Olsen G4M0EQW. Tel: (01866) 2580.

MID LANARK ARS, G4M3P4K. Meets at the Newarthill Community Ed. Cent., High Street, Newarthill, Motherwell, Lanarkshire ML1 5GU. Details from John Neary G4W0XPK. Tel: (01698) 822860.

MILTON OF CAMPSIE ARS, G4W0MOC. Meets at The Red Cross Hall, Kirkintilloch. Details from John MacKenzie G4W0HJU. Tel: (01360) 312954.

PAISLEY ARC, G4W4M. Meets at the Paisley YMCA Hall, 5 New Street, Paisley PA1 1XJ. Details from John Quigley G4M0TQA. Tel: 0141-889 6860.

SCOTTISH DIGITAL COMM. GRP, G4W7VSR. Details from Stuart Clark G4M1VBE. Tel: (01698) 884803.

WEST OF SCOTLAND ARS, G4S4AG. Meets at the Multi Cultural Centre, 21 Rose Street, Glasgow. Details from Hon. Sec.

SCOTLAND EAST & HIGHLANDS BORDERS

BORDERS ARS, G4W0BRS. Meets at the St. John Ambulance Hall, Berwick-upon-Tweed. Details from A.M. McCreadie G4M0BPY. Tel: (018907) 50492.

GALASHIELS & DARS, G4M4YEQ. Meets at the Focus Centre, Galashiels. Details from Jim Keddie G4M7LUN.

KELSO ARS, G4M4HHS. Meets at the Abbey Row Community Centre, Kelso. Details from Margaret Chalmers G4M4LX. Tel: (01573) 226372.

FFFE

GLENROTHES & DARC, G4M4GRC. Meets at the Football Pavilion, Station Road, Thornton, Fife. Details from Alexander Adam G4M0FVD. Tel: (01592) 874374.

GRAMPIAN

ABERDEEN ARS, G4B38SQ. Meets at the Red Cross HQ, 22 Queens Road, Aberdeen. Details from Robert Duncan. Tel: (01224) 896142.

BANFF & DARC, G4M0PYC. Meets at the Princess Royal Park Football Ground, Conference Room (Deveronvale F.C.), Banff. Details from Steve Roberts G4M4HWS. Tel: (01888) 551377.

MORAY FIRTH ARS, G4M3TV. Meets at the Grant Arms Hotel, Fochabers. Details from Geoff Crowley G4M7SJC. Tel: (01542) 882818.

HIGHLAND REGION

FORT WILLIAM ARS, G4M0FRS. Details from R. Johnstone G4M1KGV. Tel: (01397) 703046.

INVERNESS ARC, G4M4TFP. Meets at The Emergency Operations Centre, Inverness (except July and August). Details from R.F. Goodall G4M0OZG. Tel: (01463) 811701.

LOTHIAN

COCKENEE & PORT SETON ARC, RS177035. Meets at the Throntree Inn, Lounge Bar, Old Cockenzie High Street, Cockenzie, E. Lothian. Details from Mr Bob Glasgow G4M4UZY. Tel: (01875) 811723.

LOTHIANS RS, G4M3HAM. Meets at the Holyrood Room, Royal Ettrick Hotel, Ettrick Road, Edinburgh. Details from Toby Sigaun M4M0TSS on (07739) 742367.

ORKNEY

ORKNEY ARC, RS181749. Details from Mrs Terry Penna. Tel: (01856) 741233.

SHETLAND ISLANDS

LERWICK RC, G4M3ZET. Meets at the Islesburgh Community Centre, King Herald Street, Lerwick, Shetland. Details from Ian C. Millar G4M7RDK. Tel: (01950) 480306.

TAYSIDE REGION

DUNDEE ARC, G4M4KAF. Meets at the Dundee College, Graham Street Annex, Dundee. Details from Martin Higgins M4M0DUN, c/o Dundee ARC, 60 Duns Crescent, Dundee DD4 0RZ.

PERTH & DARG, G4M4EAF. Meets at the Perth Sports & Social Club, 18 Leonard Street, Perth. Details from Ron Harless G4M3THI. Tel: (01738) 643435.

STRATHMORE & DARC, G4M3GBZ. Meets at 2231 Soth ATC, 1 Lochside Road, Forfar. Details from Graham Scattergood M4M0GSX. Tel: (01307) 468824.

N. IRELAND

CO. ANTRIM

ANTRIM & DARS. Meets at the Greystone Community Centre on the Bailiory Road in the town of Antrim. Details from David Hutchinson G4M4JUM or visit www.g4m4ju.co.uk

BALLYMENA RC, G3IFF. Meets at 70 Nursery Road, Gracelli, Ballymena, Co. Antrim. Details from Jeffrey Clarke G4HCN. Tel: (01266) 595769.

CARRICKFERGUS ARC, G4OLX. Meets at the Downshire Community School, Downshire Road, Carrickfergus. Details from John Harrigan G3YRL. Tel: (01980) 367208.

GLENGORMLEY ELECTRONICS ARS, G4N0YZ.

International Radio Clubs

AMSAT-UK (GOAUK)

Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: g3wgm@amsat.org or visit www.uk.amsat.org

British Amateur Radio Teledata Group (BARTG - G4ATG, GB2ATG)

Contact Membership Secretary Andrew Thomas G8GNI, M5AEX, Dame School House, 103 High Street, Stony Stratford, Buckinghamshire MK11 1AT, E-mail: members@bartg.demon.co.uk or visit www.bartg.demon.co.uk

British Amateur Television Club (BATC - RS38114)

Enquiries to Dave Lawton GOANO, 'Grenehurst', Pinewood Road, High Wymcombe, Bucks HP12 4DD. Tel: (01494) 528899. E-mail: memsec@batc.org.uk or visit www.batc.org.uk

British DX Club (BDXC-UK)

Enquiries to Club Secretary Colin Wright, 126 Bargery Road, London SE6 2LR. E-mail: secretary@bdxc.org.uk or visit www.bdxc.org.uk

Danish Shortwave Club

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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 Bill Mackie G-9137/G4AIE, 23 College Park, Horncastle, Lincs LN9 6RE. E-mail: bill.mackie@zetnet.co.uk or visit www.iswl.org.uk

Military Wireless Amateur Radio Society (GOPTZ)

Further details from John Taylor-Cram, 7 Hart Plain Avenue, Cowplain, Waterlooville, Hampshire PO8 8RP. Tel: 0239-225 0463.

Radio Amateurs Invalid and Blind Club (RAIBC - G4IBC, GB0IBC, GB1IBC)

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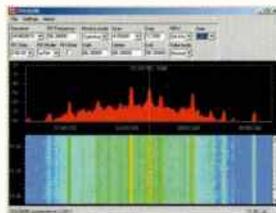
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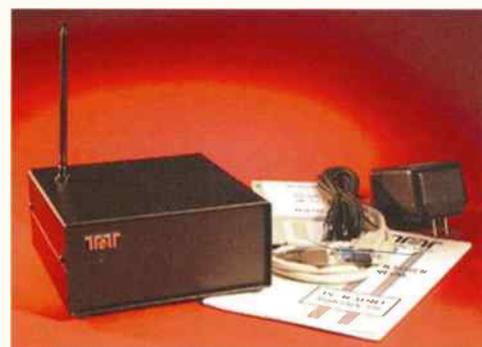
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