

Scanning Scene

EXTRA

**The
World of
Scanning**

**Scanning
Antennas**

Your guide to
effective
antennas

**What
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The at-a-
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Traffic is largely unheard of in Chertsey. It's a small town about half a mile from Thorpe Park (drop off the family?) with quiet roads and virtually no rush hour

Opening August 23rd 2004

We've been successfully selling radio equipment from Ealing since 1978, so why are we now moving to Chertsey, West of London? **The quick answer is - easy parking and no traffic!**

When Martin Lynch first started trading from Ealing, you could drive direct to the showrooms, park outside, spend as long as you wanted trying your new radio or accessory and then go home with little fuss. Then, around five years ago, traffic and parking got so difficult that instead of customers looking forward to their trip into London, they began to view it as a necessary evil to get to London's only Radio Store. We've listened to the complaints and now we're doing something about it by moving to Chertsey.

So how will customers benefit from our move to Chertsey?

The biggest single benefit is obviously parking. We have our own dedicated car park right in front of the showroom. That means you can drive to the store, park

outside and walk straight in. Bliss! This may not sound like much to those of you used to shopping outside London but to anyone living near a city, it's a real luxury.

Also, traffic is largely unheard of in Chertsey. It's a small town about half a mile from Thorpe Park (drop off the family?) with quiet roads and virtually no rush hour. It also has some excellent local shops including an Italian Deli called Carlo's - to die for and bang opposite the showroom too!

What can you expect when you visit the new Showroom?

Naturally, there's the usual bunch of smiling faces and helpful staff but now they're in an air conditioned showroom that's LARGER than ever before. It has three dedicated sections for Yaesu, Icom &

Kenwood along with racks of MFJ, Maldol, Diamond, CT-Keys, Miracle Products, SGC, Linear Amp UK, Avair, MyDEL, BHi and a full range of antennas and associated accessories. There's also a huge selection of famous USED equipment too.

So when is the new super-store open and how do I get there?

We should be open for business on Monday the 23rd of August, assuming the builders, electricians, plumbers and assorted other tradesmen have vacated the premises by then - please call first. There's no need to update your phone book - the telephone and fax numbers are the same.

When we say "easy access", we really mean it.

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73 Guildford Street, Chertsey, Surrey, KT16 9AS and it's located between junctions 11 & 13 of the M25. By car, it's just 1.2 miles from junction 11 or you can come off at junction 13 (Staines turn-off) and follow the signs to Thorpe Park. Follow the first sign past Thorpe Park to Chertsey Town Centre then, after a sharp right bend, Guildford Street is on the right. It's split into three sections and if you enter the street from the Windsor/London Street end, you turn right opposite the Royal Mail sorting office.

By rail, Chertsey Railway Station is literally only 800 yards away in the same street.

By plane, Heathrow is just 6 miles away.

Our customers have allowed us to become one of the oldest Short Wave Radio outlets in the country and investing in far larger premises in Chertsey shows our commitment to the hobby. Please come along and support your local emporium.

73, Martin G4HKS and the gang

We will be trading at the new premises from the 23rd of August.

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editorial



It just keeps getting better! I am of course referring to the prize count in our excellent SSE competition. This issue of *Scanning Scene Extra* brings you over £4000 worth of prizes. I really appreciate the support of those in the radio trade who have consistently supported *Scanning Scene Extra*. Thanks go to the newcomers this time too. In this fourth edition of *Scanning Scene Extra* - a free magazine from *Short Wave Magazine*, we take a look at antennas for scanning, describing what they do and how to build some simple examples. Also Dave Roberts brings some of his pearls of scanning wisdom.

Are you considering buying a new scanner, or perhaps updating? We've got an at a glance scanner selection chart to help you choose in this dedicated scanning publication.

If you don't have a radio but you're still curious, perhaps a look at some of the scanning websites presented on page 26 will provide edification. Alternatively, you may just want to enter the *Scanning Scene Extra* Bumper Scanner Competition and possibly win one of the many amazing scanning prizes. We hope you read and enjoy. Be careful and enjoy.

Kevin Nice - Editor

Presented free with *Short Wave Magazine* September 2004

ScanningScene

EXTRA



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Bumper Scanner Competition!

Win one of our fantastic scanning prizes. See page 16 now! £4000 of prizes to be won.

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SWM

introduction

ScanningScene

In this supplementary magazine produced by the *Short Wave Magazine* Editorial team, we aim give you a quick look at the world of scanners and scanning. *Scanning Scene Extra* is a magazine for both newcomers and old hands alike. Hopefully there is something within its pages for all of you. Unfortunately, it is beyond the scope of this short form magazine to explain all the intricacies and details of a subject so vast as scanning. This short introduction is intended to answer some of the most fundamental questions.

There are books dedicated to the subject and these include frequency guides, explanations of radio communication systems in general and specifics related to monitoring specific services. What we intend to do here is provide a starting point. I hope to enable you to quickly get an idea as to what the hobby of scanning is all about.

Also included in this guide is 'What Scanner', a tabular at-a-glance guide to what the current range of scanning radios, hand-held and base stations have to offer.

Is Scanning Legal?

You can legally buy and own a scanner. You can use it to listen to programmes from the world's many broadcasters, both radio and TV - though you won't see a picture with most of the radios listed. You may legally listen to radio amateurs in conversation with each other around the world on a variety of bands ranging from long waves to microwaves. For most of the population - that's it! Generally speaking, everything else is against the law.

What you can legally listen to is simply stated on that form: "Transmissions meant for General Reception. The services that you can listen to include Amateur and Citizen's Band transmissions, licensed broadcast radio and weather and navigation broadcasts".

A useful guide to the law governing radio monitoring was produced by the now defunct RadioCommunications Agency who's function has been taken over by Ofcom. The guide *RA169 (Rev 7) January 2001* is still current and very useful. A copy can be obtained from Ofcom by post or downloaded from the now frozen ex-RA website



www.radio.gov.uk/document/ra_info/ra169.htm

There are two offences under law: Under Section 5(1)(b) of the WT Act 1949 it is an offence if a person "otherwise than under the authority of a designated person, either:

(i) uses any wireless telegraphy apparatus with intent to obtain information as to the contents, sender or addressee of any message whether sent by means of wireless telegraphy or not, of which neither the person using the apparatus nor a person on whose behalf he is acting is an intended recipient;

This means that it is illegal to listen to anything other than general reception transmissions unless you are either a licensed user of the frequencies in question or have been specifically authorised to do so by a designated person. A designated person means: a) the Secretary of State; b) the Commissioners of Customs and Excise; or c) any other person designated for the purpose by regulations made by the Secretary of State.

or:

(ii) except in the course of legal proceedings or for the purpose of any report thereof, discloses any information as to the contents, sender or addressee of any such message, being information, which would not have come to his knowledge but for the use of wireless telegraphy apparatus by him or by another person".

This means that it is also illegal to tell a third party what you have heard. With certain exceptions, it is an offence under Section 1 of the *Regulation of Investigatory Powers Act 2000* for a person to "intentionally and without lawful authority to intercept, at any place in the United Kingdom, any communication in the course of its transmission by means of: a) a public postal service; or b) a public telecommunication system".

Similarly, it is an offence to intercept any communication in the course of its transmission by means of a private

telecommunication system.

This means that it is illegal to listen to telephone calls, including mobile 'phone networks which are designated as forming part of the public telecommunications system.

The *RA169* document is not about being a killjoy to those of us who enjoy radio at its best. What it does is appraise us all of the law, in an almost simplistic way so that we are aware of what will happen if we step out of line by behaving recklessly or stupidly with what we hear. It certainly was not published to stop people listening.

There have been many cases at Law concerning those who dared to be reckless. The size of the fines levied as punishment, coupled with the almost mandatory confiscation of equipment, sometimes worth considerable sums, is a statement of what the Law makers require of us, and what those who apply the Law consider serious if the line is crossed.

Discretion

The key to this hobby is discretion. If you don't tell anyone what you've 'accidentally' picked-up, then no-one will know! Using your scanner discretely and wisely allows you to gain maximum enjoyment and return on your investment from the latest radio technology.

It is also worth noting that, technically speaking, sharing information with others can be considered as incitement to commit an offence. So, the utmost care is required with this particular hobby but this need not restrict your enjoyment of radio listening.

It is worth noting however, that those who would bring a prosecution about, have far better things to do than hunting down casual users of scanners and other monitoring equipment.

If, on the other hand, your interest in interception is somewhat more sinister and you wish to turn anything you may hear into personal gain, then watch out!

So, everybody with an interest in radio monitoring, please take this advice - be careful and happy listening!

VY 73 Kevin

Mobile Control

Hot summer days, a farmer's field and some old steam engines, ice cream, and stalls selling cakes and junk, sorry bric-a-brac. Public conveniences that would make Vlad the Impaler shudder, the smell of steam coal and the sounds of traction engines puffing their way around an arena. The picture of the country fair wouldn't be complete without a few St. John Ambulance people enjoying the day and, of course, the Police Van marked up 'Mobile Control'.

On Site Communications

Yes, the Mobile Control. In years gone by, it would be a Commer Van or a Ford Thames. In latter years it's been a Ford Transit or a Sherpa Van. These little vehicles provided on-site communications for the officers and 'specials' performing duty around the show ground and behind the beer tent. As the Airwave network coverage is completed these four wheeled relics of a bygone policing age are making their final appearances this summer at fairs and events throughout England and Wales. Usually, the vans tend to be around 20 years old and few have covered more than 40000 miles during that period. Most of them are showing some signs of rust due



The interior of the Scottish Ambulance Service (very expensive) mobile control room.

almost entirely to the fact that they have been washed so often during their years of service.

Their contents varied little from area to area. There is always a pump-up mast on top of which sits a u.h.f. antenna. These

masts caused a fair bit of trouble in the early days as their drivers would often forget that the mast was extended to about 7.5m and would drive off with the thing aloft. Invariably this ended in tears and a lot of form filling because the tower would usually get tangled up in a tree or under a bridge thus removing a fair bit of the roof. Eventually, it became standard practice to fit a switch to the tower that disabled the ignition until the antenna was retracted. There would be at least one v.h.f. antenna on the roof, often two u.h.f. antennas would also be routed there to operate the v.h.f. to u.h.f. repeater system that could also operate as a secondary u.h.f. talk-through radio. The primary

Special events call for mobile communications - enter Mobile Control. Dave Roberts looks at the genre.



The interior of the Scottish Ambulance Service (very expensive) mobile control room.

system would be fed to the antenna aloft on the pole. The vans would contain u.h.f. hand-held radios to be handed out to staff at the event together with spare batteries and a charging system. A small generator was also loaded up to be deployed in the event of mains power not being available.

The essential completion of paperwork was not forgotten, with a Control Room logbook having to be completed by staff manning the truck. Other administrative paperwork and area maps were kept inside. By far the most important technology installed in the vehicle was, the kettle! In the 1960s this was heated on a small and what would be considered by today's increasingly paranoid society, dangerous gas ring. Thereafter electrical power fuelled this important gadget. In earlier times the radio equipment would generally consist of a Pye Westminster u.h.f. system with talk-through. In effect

this meant two Pye u.h.f. Westminster sets were controlled via one remote control cable.

A separate v.h.f. set such as a Pye Whitehall or STC set would enable contact with the force control room on the main v.h.f. radio scheme. A desk and small chair was provided for the operator. Other seating for about four people on a small bench was also fitted. Communication with patrols was never a real problem for these units as they generally only had an area the size of a couple of fields to cover.

But this year the last remaining few are making their final appearances. Some have been preserved by individuals interested in police vehicles or radio and others may be sold to commercial vehicle enthusiasts who have expressed interest in owning them.

Many readers will have memories of





Interior shots of a recently decommissioned Police Mobile Control built into a Ford Transit van. The vehicle was from an 'East of England' force and you can see the Burndept v.h.f./u.h.f. repeater control and the Marconi RC690 sets together with speakers and other useful stuff including Anglepoise lamps that give a kind of 'X-Files' lighting effect.



these vehicles. In the sixties and seventies they had rather eclectic callsigns. One such Ford Thames possessed the call 'Busy Lizzie' but as computerisation of force control rooms spread they received alpha numeric identification. Most divisions would have had one of these vehicles. Much of their use was in summer months but should a major incident occur they would be wheeled out on site to provide communications and a focal point for officers deployed at the scene.

Some police forces replaced the old vans with Portacabins that could be deployed from the rear of a lorry and left at the scene of an incident to be collected later. These tended to have

more accommodation than their predecessors often including a control room area and separately a briefing/rest area. The radio equipment, however, remained largely unchanged.

Old Analogue Frequencies

The other emergency services also utilised similar units and some still do as the onset of digital communications has not yet permeated throughout the ambulance or fire and rescue services. These new vehicles tend to be much larger than before and come complete with computer systems and all the services that one would expect in a modern office environment including fax, photocopier with computer mapping and logging facilities. Video briefing and Internet access are also available on many of these wagons. Yes - it's come along way from Alpha 23, the 'Busy Lizzie Control'.

The mobile controls that are currently being used will still be using the old analogue frequencies.

As previously noted the police mobile controls are on their last legs and this is entirely due to the onset of the Airwave network. Any service using Airwave has no need for mobile 'on-site' controls as it is just as easy (and much cheaper) to control the incident from the main control facility, or alternately from any other remote location.

As an example of this the Thames Valley Police recently held a three day exercise called 'Red Signal' to test their response to a major incident. The 'incident' took place at two locations in Oxfordshire (the former RAF/USAF station at Upper Heyford and at Piddington). Airwave was the communications system used and the 'Strategic Co-ordinating Centre' was at their training centre at Sulhamstead, south of Reading in Berkshire, some 80km away.

Trust me, it can only be a matter of time before the police decide to out source their control operations to India.

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- Locate unknown and hidden transmitters
- Great for sporting events, air shows etc...

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- Beeper and vibrator alert
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OPSEC



Have you ever been burgled? Did they get into your radio room, shack, den, study, ops room or whatever you call it?

This isn't a crime prevention article, but an overall view of the Operational Security (OPSEC) of your set up, including the place where you live and the way that you manage the information that you may have in your radio equipment, on your computer, if you have one, or in paper files.

Won't Necessarily Know

Initially criminals have to be kept out of the home and radio room. There are many publications that cover this aspect of life, but as a keen radio monitor you don't want anyone you are unsure of in the parts of your home or office where you monitor radio traffic. Burglars and thieves will want to steal all types of property that you own,

money, jewellery and the DVD player. They won't necessarily know a complex radio receiver from an expensive toaster but they'll look at the display on the front and know that it's saleable.

Don't believe for a minute that the Government have any interest in 'cracking' crime as they tell us. They don't and here's why.

Some 'druggie' moron with an expensive habit that will kill him in a few years needs some cash to pay his dealer. While you and your wife/girlfriend or boyfriend are out at work to pay for the happy home and scanners, the 'low life' is out of cash waiting for his next hand out of your tax money. He nips around the back of your place, banjos a window, opens the catch and lets himself in. Then it's B&Q time. He'll grab whatever he can as quick as he can. Having gone through all the rooms and popped your hard earned effects into one of your pillowcases or suitcases, he's away.

Happy For Crime To Increase

Damage to your place is probably likely to amount to at least £300 - say for new windows or door and frame - the VAT on that lot is £52.50. Replacement costs for whatever he pinched are, of course, also subject to VAT too, so possibly another £50. Your insurance will go up by £20 (plus the 5% insurance tax). The thief flogs your kit to pay for his next fix and makes £50 on it. Therefore, profit to thief £50 - profit to HM Government £103.50

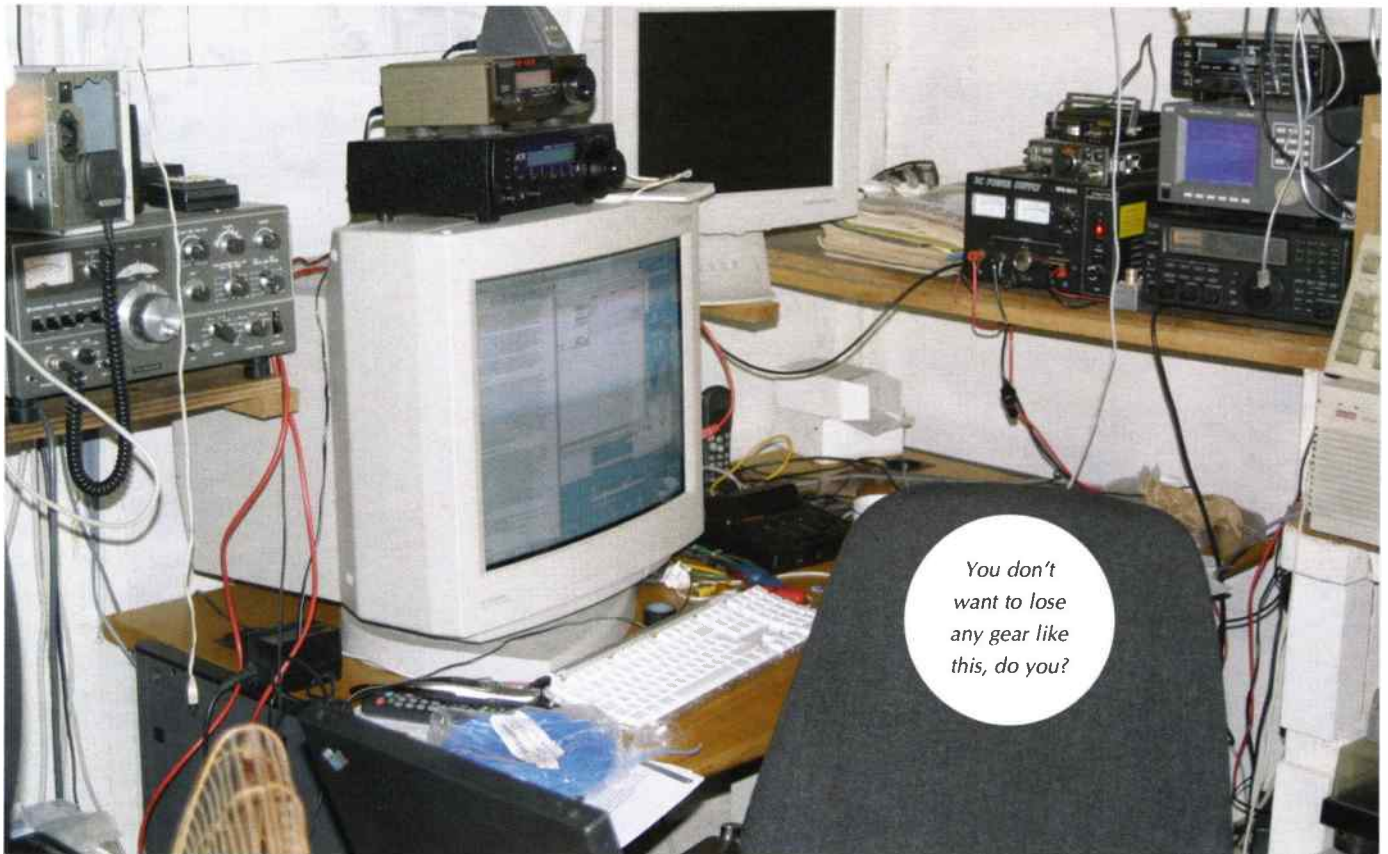
That's why the Government are all too happy for crime to increase.

You can make it harder for the burglar by fitting window locks and having dead bolts on external doors that will make it more difficult to get out quickly via a front or back door. If you have decided to fit a burglar alarm then ensure that it is set up with tremblers on ground floor windows and contacts on external doors at least. If the alarm goes off before he gets in then he'll shove off.

Don't have expensive kit visible from the outside. If you go out for the day, consider closing the curtains or blinds at the rear of the property. The front drapes will be open but the thief will not be able to see in easily as it will be dark inside. He'll have to go right up to your front window to take a peek. He may be spotted doing this and he knows it. Have a table lamp and perhaps a broadcast radio on a timer too. The radio playing softly on a talk radio channel will sound like someone is at home. If you are at home always keep the doors locked. So many folk are burgled while they're working in the house. If you have an alarm set it at

We can accumulate a high value of gear following our radio interests. Dave Roberts considers what could happen if others attempt to nefariously acquire your hard won kit.

OPSEC



You don't want to lose any gear like this, do you?

night when you hit the sack. Get an ultra-violet pen and write your postcode and surname or other identifier on items that are large enough.

I don't have newspapers or milk delivered to the house. The less people that have a reason to be at your place the better. A closed circuit camera trained on your front door is handy. Set it up just so that you can see who's there. If you aren't expecting someone or you don't know the caller, just let 'em knock.

It helps to have the camera inside the porch looking out of the window but on view. The potential caller then knows he's been watched and he doesn't know whether or not there's a tape running somewhere.

Not Out of the Woods

If you are burgled and the police attend, having been informed by a neighbour that your place has been entered, you may not be out of the woods. If the 'baddie' hasn't nicked all your radios the officer may turn on the scanner and (if in a non Airwave locale) hear his sergeant or colleague out of the speaker. That is a worse case scenario but he still may not be too chuffed if he recognises radio traffic from the local army base, fire control or a cordless phone from down the road. In the extreme you can dump all frequencies from the radios by resetting them each time you leave the property but this makes hard work of the hobby.



In most cases, disconnecting the antennas, locking the keypad and unplugging the kit from the mains will be enough to prevent unauthorised use of your radio gear. Likewise any paperwork such as frequency lists should be kept out of sight. Also consider computer security. Have you got audio files stored on the PC from your scanning? When you are monitoring is the volume such that others outside the room, or the property, may hear the radio and cotton-on what you are listening to?

Finally, don't let **anyone** into your radio room that you don't trust implicitly.

May you be free from intrusion.

Scanning as a hobby can be a fairly inexpensive business. For a couple of hundred pounds a new listener can be set up with a basic receiver and a ready-made antenna. Then it's just a matter of applying some time to the equation. Next, all of a sudden, interesting results are likely to be achieved.

If you happen to get paid to monitor the airwaves, and there are people who actually make a living out of it, do you think the activity is still known as scanning? You bet it isn't - it's called Signals Intelligence or as more often the case SIGINT.

Now, if you thought that the Icom R20 you want to buy is a tad on the pricey side, then you should check out the 'toys' that the 'full timers' get to play with.

Spectrum Monitoring

Want to cover 9kHz to 3GHz? No problem! Well, it's no problem if you possess a Rohde & Schwarz ESMB monitoring receiver. The receiver is designed for spectrum monitoring, analysis and also for radio investigation work. The set boasts a digital i.f. section with eighteen i.f. filters. It provides facilities to measure frequency and frequency offset, field strength, modulation and spectrum occupancy. Of course the ESMB is also ideal for radio investigation tasks.

It will search for, and monitor, signals (any mode). It will detect interference and characteristics of signals. All these functions can be accessed without hooking the radio up to a computer. The built-in liquid crystal display shows full visual details of all the functions being carried out by the unit. The receiver has 1000 memory channels and all of them can be specifically tailored for specific purposes dependant on the target being monitored. Of course the tailoring includes mode and squelch level to name but two parameters.

If you connect the ESMB monitoring receiver to a PC, that's when things really start to 'hum'. This radio can be remotely controlled via an interface and there are tailor made software packages designed for specific applications. ARGUS is the civilian software package. ARGUS is intended for spectrum management and enforcement. ARGUS MON provides the software to remotely operate the receiver. The RAMON program is the military version and this tinker allows very fast frequency detection and data transfer to other monitoring receivers. Due to its size the ESMB monitoring receiver can be deployed in a vehicle.

Of course the accessories for this radio run into mega-bucks (I'm not going to tell

you the cost of this system as you'd probably sue SWM for counselling costs!) but you can imagine that there are very many available. Although the antenna impedance is 50Ω it would be a shame just to connect it to a G5RV or your trusty Scanstick. It would work...well, sort of - but the same company offer antenna systems that would make you drool. But Rohde & Schwarz are not the only manufacturer of high-end scanning 'toys'.

Elements Of Apollo

Rockwell-Collins are a company that have been involved in high technology for decades. North American Rockwell built elements of the Apollo spacecraft and now they make scanners - sorry SIGINT equipment. One little gadget that they turn out is the CX-7438 receiver. Coverage is from 50kHz to 3GHz, again it boasts d.s.p. Intermediate Frequency filters but the CX-7438 only demodulates a.m., f.m., s.s.b. and c.w. Equipped with both i.f. output and video output the CX-7438 receiver can be controlled remotely. Again as you've probably guessed this is a fairly expensive unit.

If there's one thing that amazes me it's

the fact that pirate communicators on h.f. bands, for instance 6.6MHz and thereabouts, and also v.h.f./u.h.f. frequencies have not been closed down for good. The technology certainly exists to capture them utilising a minimum of time, trouble and manpower. These days equipment is available to find the signals, record both the audio and their characteristics, direction find (d.f.) the signal and display the location on a built-in map on the receiving unit. Spread spectrum signals and burst transmissions can be dealt with similarly. Equipment is easily available, (not at the sort of prices we hobbyists would be comfortable with though), to locate individual cellular 'phones purely by their transmission without recourse to the service provider. Yet still we hear unlicensed operations on most frequency bands day after day.

Lotto Win!

Oh well, just to whet your appetite, in case that elusive lottery win comes your way. You can start thinking about a Rhode & Schwarz ESMB monitoring receiver basic system at about £15000 - yep, that's fifteen thousand pounds and that's without the quarter-wave 'mag' mount for the DB9!

ProScan

Dave Roberts reports that there are those who actually earn a living by 'scanning' - can you believe it? Get back in the queue - me first!

The Rohde & Schwarz ESMB receiver.



Rockwell Collins
CX 7438 receiver.





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- ◆ **AR7030** high performance short wave receiver
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- ◆ **AR7030-DRM** special version with 12kHz IF output
- ◆ **SDU5600** spectrum display unit
- ◆ **LA350 / WL500** short wave loop aerials
- ◆ **DA3000 / DA5000** discone aerials
- ◆ **SA7000** passive twin element wide band aerial
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Antennas -

What type?

The question that's asked more than any other by those interested in radio, both listening and transmitting, is "what type of antenna should I use?".

It's a simple question and the answer can be quite simple too, though there is much scope for lots of maths and unnecessary complication.

Two Types

Being simplistic, there are two types of antennas. There are those that receive equally from all directions and those that you have to point at the source you are trying to receive.

Both types have their value. To the general scanning enthusiast one is essential the other although highly desirable does not have to feature on the scannists near

Kevin Nice takes a quick look at the selection of antennas on offer to scanner owners.

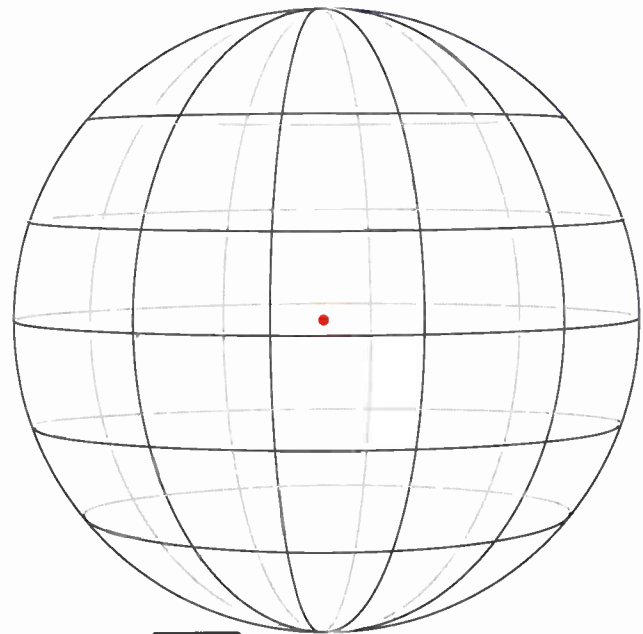
skyline.

If you are searching for all signals of interest, then it is preferable to have an antenna that is considered to be omnidirectional. In other words one that receives (picks up) signals equally well in all directions. Your average scanning enthusiasts tend to be interested in mobile signals. It is customary for vehicle and person mounted radios to use vertically polarised antennas - you know the ones that stand on end.

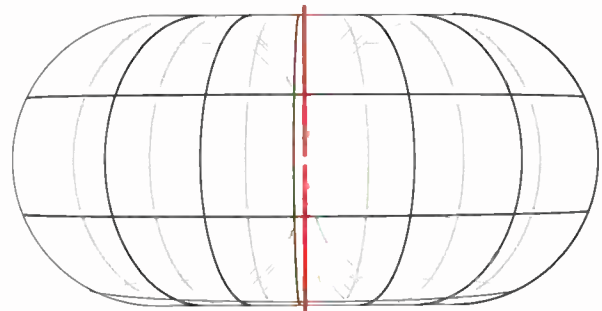
To receive these signals, you should seriously consider a dipole, a ground plane, a colinear, a disccone or a 'nest of dipoles'. All of these types offer omnidirectional performance.

Unfortunately, there is more to it than that. Each type has both advantages and disadvantages.

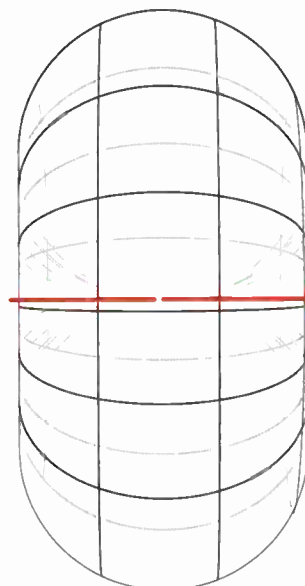
If you look at the diagram **Fig. 1**, you can



ST10047



ST10048b



ST10048a

Fig. 1 (top): The sensitivity (radiation) pattern of a theoretical isotropic antenna.

Fig. 2a (middle): The sensitivity (radiation) pattern of a vertically polarised dipole.

Fig. 2b (left): The sensitivity (radiation) pattern of a horizontally polarised dipole.

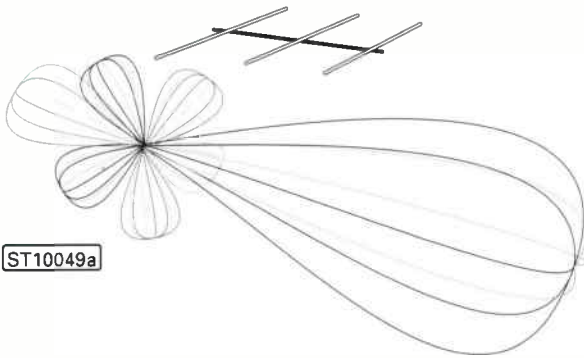


Fig. 3a (left): The sensitivity (radiation) pattern of a low gain beam antenna.

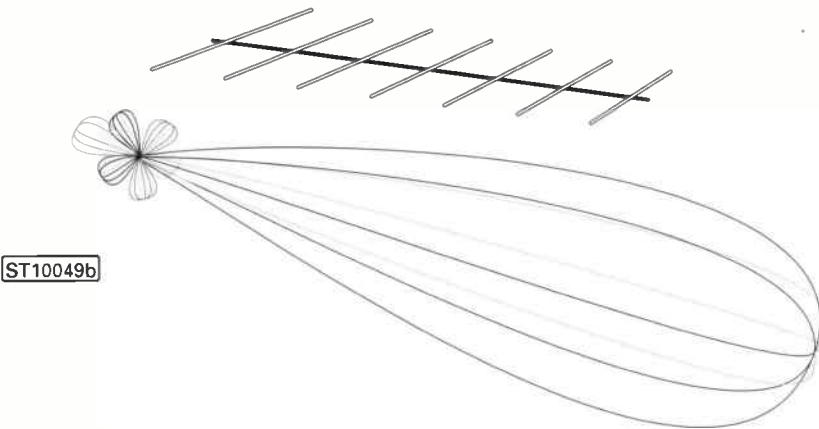


Fig. 3b (below): The sensitivity (radiation) pattern of a high gain beam antenna.

see a theoretical antenna known as an isotropic radiator. This physically impossible antenna produces the perfect solution it receives equally well from all directions.

The best alternative that can be realised has a sensitivity pattern like that in Fig. 2a. This is the dipole, which in this case is polarised vertically. Fig. 2b shows the same antenna's sensitivity pattern when it is mounted horizontally. As you can see, although the response isn't as good as that in Fig. 1, there are advantages for little loss. A dipole has 'gain' over the isotropic antenna, i.e. signals transferred to a receiver are stronger. But, only around it's resonant frequency and every third multiple thereof. It's this resonance issue that is the downfall of the dipole and other resonant antennas such as the ground plane and collinear. All fine antennas for use with a narrow band of frequencies. If however, you wish to cover a wider range typically encountered by we scanning enthusiasts, then a wideband antenna, such as the discone, is the antenna of choice.

All antennas are a compromise, the discone, although offering a fairly flat response over a wide frequency range, offers no gain over the antenna in Fig. 1.

Additionally, it has a higher visual profile, a bigger wind load and it's harder to home construct. As they say - there is no free lunch!

If I had to choose only one antenna to cover a wide range of frequencies, then the discone would be, and in fact is, my choice.

However, if your interests lie in small chunks of spectrum, then a dipole cut to the centre of that band may well be your best bet. They are lots more discrete visually, easier to mount and construct at home. You only need stiff wire and a screw down connector block and some coaxial cable.

Actually you don't even need more than just the coaxial cable as you can construct a vertical dipole simply by pulling the braid back down the length of the cable to the desired dimensions. Simply apply some tape or heatshrink sleeving and you have a rough and ready antenna to go. The only additional requirement is some non-conducting stiffening material such as doweling, cane or plastic piping to provide the ability to mount the finished antenna. If you wish to make an antenna in this manner then you'll need to know how long to make the elements. This can be calculated with this formula:

$$143/F \text{ (in MHz)} = \text{length (m)}$$

Using this formula the lengths shown in Table 1 are produced for key frequencies of interest.

More Complicated

If you require to extend the range of signals you can hear or just increase the signal-to-noise ratio of those you can already hear, then you need an antenna with more gain.

I've already mentioned the collinear. This is an antenna which remains omnidirectional, but has a modified sensitivity pattern by the use of multiple elements being mounted in a vertical stack. They can be quite long and they end up having very narrow frequency responses. They do though have the benefit of not needing to be pointed at the signal source. Unlike the next antenna type, the beam.

Beam antennas, such as Yagis, quads and log-periodic arrays, offer good gain, but with the cost of being directional, have a look at Fig. 3 to see what I mean! Most beams with the exception of log-periodics also tend to be very narrow band.

Beams are mechanically more complicated, offer large wind loads, have a high visible profile and need pointing in the desired direction. Plus they're more difficult to construct. They are unfortunately, difficult to live without for really serious monitoring.

So, there are choices and compromises to be made - only you can decide which antenna is for you. Happy listening.

Table 1:

MHz	m	mm
31	4.61	4613
50	2.86	2860
70	2.04	2043
100	1.43	1430
128	1.12	1117
145	0.99	986
155	0.92	923
166	0.86	861
175	0.82	817
300	0.48	477
410	0.35	349
450	0.32	318

Competition PRIZES

Fairhaven RD500VX Worth £899.00



Coverage: 0-1750MHz (gap at 36-46MHz)
 Modes: l.s.b., u.s.b., c.w., a.m., sync a.m., n.b.f.m., w.b.f.m., stereo w.b.f.m., video o/p (TV sound 6MHz carrier)
 Tuning steps: 5Hz, 100Hz or user definable, Step size increases with spin-wheel speed.
 Memories: 54,700 (each with 20 characters of text)
 Scan speed: 50 steps/s max.



Icom IC-R5 Hand-held Scanning and Communications Receiver Worth £159.00

Wideband Coverage: 0.15 - 1309.995MHz
 Steps: 5, 6.25, 8.33, 9, 10, 12.5, 15, 25, 30, 50, 100kHz
 Architecture: Triple Conversion Superhet
 Intermediate frequencies: First: 266.7MHz
 Second: 19.65MHz
 Third: 450kHz
 Modes: a.m., f.m., w.b.f.m.
 Channels: 1000 (10 banks of 100)
 Scan: 50ch/s
 Search: 47 step/s
 Size: 86x58x27 (without knob)
 Weight: 185g with battery and antenna



Alinco DJ-X2000 Worth £399.00

Frequency Range: 0.1 - 2149.999950MHz
 Modes: n.b.f.m./w.b.f.m. (mono/stereo) a.m., c.w., u.s.b./l.s.b.
 Channel steps: Auto, 50, 100, 200, 500Hz, 1, 2, 5, 6.25, 8.33, 9, 10, 12.5, 15, 20, 25, 30, 50, 100, 125, 150, 200, 250, 500kHz,

Antenna impedance: 50Ω BNC
 Supply voltage: 4.8-6V on batteries, or 10-16V on external power source.
 Current consumption: approx. 150mA in normal reception, approx. 50mA with 1:4 battery saver at 6V d.c. power source user-programmable
 Memory channels: 2000 (50 banks of 40)
 Priority watch memory: 1
 Dimension without projection: 57x150x27.5mm
 Weight: 200g
 Architecture: Triple-conversion Superhet.
 First i.f.: 304.3 or 814.5MHz
 Second i.f.: 45.05MHz

Yupiteru MVT-7100 Hand-held Scanner Worth £229.49

Frequency:	0.530 - 1650MHz	Size:	65x155x38mm
Modes:	f.m., w.b.f.m., a.m., l.s.b., u.s.b.	Memories:	1000 (10 Banks of 100)
Memories:	1000	Step Size:	50, 100, 500Hz, 1, 5, 6.25, 9, 10, 12.5, 20, 25, 30, 50, 100kHz
Antenna Connector:	50Ω BNC	Scan search speed:	30ch/s
Audio Output:	100mW		
Power supply:	4 x AA cells or 13.8 V external		
Weight:	320g (without antenna)		



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- Fairhaven RD500VX multi-mode base scanner worth £899
- GRE PSR-225 base scanner worth £229.99
- Icom R10 hand-held scanner worth £289
- Icom R5 hand-held scanner worth £159
- Kenwood TH-F7E dual-band transceiver with wide-band receiver worth £289
- OptoElectronics X-Plorer nearfield receiver worth £659.95
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- Yaesu VR-500 worth £199.95
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To enter our massive 14 prize competition, you need to answer the six questions on the entry form and tick the box to show which prize you would prefer.

Our sincere thanks go to AOR, ASK, Computer Aided Technologies, Fairhaven, Icom (UK) Ltd., Kenwood, ML&S, Nevada, OptoElectronics, The Shortwave Shop and SRP for their generous donation of the prizes for this most spectacular prize draw.

Good Luck To Everyone Entering!

ENTRY FORM

To enter this prize draw, please fill in your details on the entry form, (photocopies can be accepted with the original corner flash attached), answer the six questions and post your entry to: SWM - SSE September 2004 Draw, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Name

Address

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Tel:

E-mail:

Do you have a computer?:

Q1: How many hand-held receivers feature as prizes?

Q2: Which prize would you run on a computer?

Q3: Which prize can tune a receiver?

Q4: How many of the prize radios can be computer controlled?

Q5: Which prize was the first to be reviewed by SWM?

Q6: How many base receivers feature as prizes?

- | | | | | |
|-------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|
| <input type="checkbox"/> AR8200 Mk3 | <input type="checkbox"/> DJ-X2000 | <input type="checkbox"/> Scancat | <input type="checkbox"/> TH-F7E | <input type="checkbox"/> Icom R10 |
| <input type="checkbox"/> X-Plorer | <input type="checkbox"/> VR-500 | <input type="checkbox"/> MVT-7100 | <input type="checkbox"/> PSR-225 | <input type="checkbox"/> Icom R5 |
| <input type="checkbox"/> RD500VX | | | | |

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 Architecture: Double Conversion Superhet
 Intermediate frequencies: First: 45MHz
 Second: 455kHz
 Modes: a.m., s.s.b., f.m., w.b.f.m.
 Channels: 1000 (10 banks of 100)
 Scan: 50ch/s
 Search: 47 step/s
 Size: 95x59x24 (without knob)
 Weight: 220g with battery and antenna

OptoElectronics Xplorer Worth £659.95

The OptoElectronics Xplorer sweeps the range of 30MHz to 2GHz in less than one second, automatically locking on any active f.m. analogue frequency in the nearfield and demodulating the audio. The two-line l.c.d. displays the frequency of the transmitted signal on one line. The second display line may be changed to indicate either decoding of any sub audible tones or codes (CTCSS, DCS, LTR or DTMF) or Signal Strength.

Operation allows for manual v.f.o. tuning, manual skip, frequency lock out, auto or manual hold, and recording of 500 frequencies to memory. The memory can also store such information as frequency, time, date, signal strength, CTCSS, DCS, LTR, and DTMF.

The Xplorer has a built-in PC Interface that provides for direct download from the unit to the PC using the included download cable and software. A CI5 jack is also available for the purpose of Reaction Tuning many different receivers.

With its amazingly quick measurement speed, the Xplorer is the most sensitive nearfield instrument of its kind. Lock onto normal two-way communications from up to 0.5km away.



AOR AR8200 Mk3

Worth £199.00

The AR8200 quickly established itself as the 'top notch' hand portable receiver providing unsurpassed features. As technology has advanced, so the AR8200 has evolved through the AR8200 MK2 drawing from the successful award winning AR5000 base receiver and more recently from the AR8600 MK2 transportable receiver, resulting in the AR8200 MK3 with an upper frequency coverage of 3GHz coverage. Along with an extended receive frequency coverage, the illumination has been further enhanced and high capacity (1500mAh) NiMH batteries supplied.



Icom IC-R10

Worth: £289.00

The R10's 'Bandscope' function allows visual indication of activity up to ± 100 kHz either side of the frequency the receiver is tuned to. This equates to approximately five channels either side of the centre frequency, however the i.f. filter bandwidth is so great that half the screen is filled when a strong local signal is being received. The Bandscope circuit is also used to provide a fast search facility which Icom call 'Signal Navigation'. The idea of this is that during a search when an active signal is found and the receiver has stopped on a channel, the Bandscope circuit checks 100kHz higher or lower in frequency (depending on the direction of the search) for other signals. When the scan resumes, the receiver can jump directly to the next active channel without wasting time trundling through the other inactive frequencies. In theory this is a great idea, but the limited search range means that unless you are monitoring a very busy chunk of the spectrum you are not likely to notice any great improvement in search speed.



Kenwood TH-F7E Worth £289.00

The radio tunes from 0-1300MHz on receive on the B band. The TH-F7E being a true dual-band radio has two bands displayed for use. Both can be used simultaneously if required. The A band only tunes in UK amateur v.h.f. and u.h.f. bands and allows transmit in these bands. The B band tunes right across the entire range, however transmit is only possible in the 2m and 70cm segments.

This means that if you have an amateur licence you can monitor the calling channel on v.h.f. and perhaps your local v.h.f. repeater at the same time. Or you can monitor one frequency at v.h.f. and one at u.h.f. Or if you prefer to scan around or perform a search you can do this on the B band while monitoring your local repeater on the A side. Or listen to Radio 4 while waiting for a call on 'two' or 'seventy'. Pretty impressive!



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Range 0.150 to 1309.995 MHz

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Digital civil air-band receiver.
Marine band in channel numbers.
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Power: 2 x AA cells or DC adaptor

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SKY SCAN

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Memories

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Full Civil Coverage

Includes

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£29.95 + £5 p&p



ALINCO DJX3

Full Civil + Military Aircraft Receiver

100kHz - 1300MHz

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700 Memory Channels

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Steps: 5/6.25/8.33/10/12.5/15/20/25/30/50/100kHz

Size: 56w x 102h x 23d mm

Supplied : 3AA dry cell battery case, carrying strap

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Range: 66-88 MHz (FM), 108-137 MHz (AM),

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Modes: AM, FM. Step Sizes: 5, 12.5, or 25 kHz

(range dependant). NEW 8.33 KHZ

Power: 6AA size cells or 9V DC @ 160mA;

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Scanning

Scene

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

Things livened up in the north West of Scotland during the last two weeks of June. The area was witness to the Joint Maritime Course held around the north of the country. Much of the radio traffic obviously involved military aviation and made pretty exciting listening. There were plenty of naval radio communications to monitor as 13 nations were involved in the course.

Highlight of the event was the massive aircraft carrier, USS *Enterprise* (CVN-65) that was operating in the Minches together with its protective fleet of vessels. This monster weighs in at 95000 tonnes when laden with aircraft and fuel. It is powered by eight nuclear reactors and has a crew of 5500. They even have one guy whose only job is to keep the Coca-Cola machines filled up! The whole carrier group is an intimidating sight and must surely induce high laundry expenses in the inhabitants of nations that are unfriendly to the USA.

Of course a beast of that size has radio communication systems that only exist to provide on-ship service. The *Enterprise* has an on-board General Electric trunked system called 'Hydra' operating to hand-held radios throughout the vessel. The range of the system is deliberately kept extremely short for security purposes but communications are in clear f.m. Frequencies in the 406, 407 and 409MHz range have been reported but I actually heard almost constant communications on 412.475MHz as the flotilla cruised past my

location (unfortunately the weather was too murky for me to take any photographs suitable for publication – sorry) at about 14Kt. Other spot channels are 407.200, 408.450, 409.200, 410.050, 415.925, 416.650, 418.025, 418.175 and 419.850MHz.

An E2C AWACS plane, engaged on the course, developed a hydraulic problem and had to make an unscheduled landing at Stornoway in the Western Isles, on 22 June, as the driver reported that he couldn't make



*JMC
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 radio traffic!*

Dave Roberts takes his regular look at the scanning scene with news of O2 pagers, silent channels and PRR buys on eBay.

it back to Prestwick. The craft landed safely and was later spied by a mate who called me to say that the craft was sporting a Mexican flag on the tail. Later in the Lewis bar in the town customers were amazed to find two Mexicans in full flight gear including dark glasses. These two characters then set about drinking the place dry with a considerable amount of success.

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02 News

O2 (that's BT to you and !!) has announced that they are to cease offering pager services from the end of this year. They have offered to put their customers in touch with Page One Communications who will continue to provide such a service, as does Vodafone.

The first pager systems were introduced in the UK in the 1950s. These worked over only a short range. St. Thomas' Hospital in London had one of the first pager/alerters in place and used it to summon doctors. In 1977 the introduction of wide area paging in the London area took place. The system then grew.

Some monitors will be pleased that those awful paging sounds will disappear from the 153MHz band and therefore will no longer 'break-through' every scanner and receiver within a few km. Others will find they have to download a screensaver in place of the pager decoding program that they have been running. I, for one, will miss BT paging.

Strange Antennas

In July's 'Scanning Scene' I featured a photo of a strange group of three antennas that were employed on the roof of Builth Wells Police Station and wondered what they were for. (I've shown them here again to remind you). Two readers have kindly supplied the answer.

Steve Cannon has these antennas on his office roof. They are used to send CCTV images from other industrial units in the same estate to his office block. He believes that they have four channels available for use and reports that range is around 150m line-of-sight. The system is believed to have been manufactured in New Zealand.

John in Cheltenham has seen identical antennas in Tewkesbury on the roof of the police station. They seem to be pointing in different directions and upon investigation they seem to be aimed at CCTV cameras, fitted with similar antennas, in the streets and car parks around the town. John says that the cameras' associated equipment housings have 'rubber-duck' style antennas around 150-200mm long. His educated guess is that these antennae receive control signals to pan, tilt and zoom the cameras. I bet he's right.



I've no specific details on frequencies and anyway the signals maybe digital but if I had one or two of G1MFG's video scanners I'd park up in one of those car parks and start tuning between 1240 and 1320MHz (23cm band) and 2.310 and 2.700GHz (13cm band) to see if any pictures appeared.

Silent Channels

If you happen to be in the Thames Valley Police (Bucks, Berks and Oxon) area with your receiver you may have noticed that the force's v.h.f and u.h.f. channels are now all silent. Yes, the Airwave 'roll-out' was completed in that region on 22 June.

Don't be in too much of a rush to give up on analogue though, as it's conceivable that some of the old frequencies may be in sporadic use, especially the simplex, i.e. back-to-back, channels. Channels 21 (147.875) and 22 (147.9125MHz) may still see some traffic in a few police areas. Modulation can be either a.m. or f.m. It may be worth listening to the u.h.f. simplex channels, although their use is less likely.

Buy it Now!

It had to happen... Someone was selling four UK Army Personal Role Radios (PRR) on the eBay Internet auction site. The finish date was 6 July and the 'buy it now' price was £1000. I'm sure that they were worth it.

It appears, thanks to help of two readers, that these 'strange' antennas are used to send CCTV images between industrial units, car parks, etc and local police stations (see text). If you know different let me know...

Army PRR sets are just a little larger and chunkier than a small size PMR446 transceiver. With many hundreds of these units in use it was only a matter of time before some were 'liberated' and began a new life in civvy street. They didn't make the reserve and so presumably the vendor still has them.

The sets are part of the 'Bowman' contract and boast fully digital operation with 256 channels available. The idea is that they replace shouting loudly and hand signals thus enabling troops on foot to communicate more safely and securely. The maximum range is about 500m in open terrain and they enable voice communications to take place through up to three storeys of a building. Power is provided by AA cells as, at a pinch, these are available in most conflict areas.

Small, lightweight and easily portable with headsets and other accessories including a carrying system, they would have proved an interesting and useful accessory to anyone interested in radio. The price was, however, far too much for me. The quartet on eBay no doubt formed the vanguard of PRR equipment to appear on the market.

It seems difficult to reconcile this nation's preoccupation with all matters regarding security to the availability of the latest military radio technology to absolutely anyone, anywhere, with the ready cash to pay for it.

My continued thanks to all the readers who very kindly take the time and trouble to write to me either by post, or E-mail. I very much appreciate your comments and questions and I'll always reply as swiftly as my commitments allow (hopefully with the correct answers).

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The RD500VX

is a new kind of wideband receiver with sleek, robust styling, ...only 8 inches wide!



Its massive memory can store information equivalent to several scanning directory books. Any word such as "Fire", "Air", "Voice Of America", or even your local town can be searched for. It can hold 54,682 entries, each with 20 characters of text, mode, and frequency. A 45 key TV style remote is provided for text entry and control, and a PC keyboard can be plugged into the receiver.

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The RD500VX gives wideband coverage with auto memory, skip list, priority channel, pause/hold, AFC, world time clock, and S-meter, and its HF performance is complemented with pass band shift, notch and peak filter, noise blanker, and smooth 5Hz tuning steps.

Modes include USB/LSB, AM, sync AM, stereo CW, NBFM/WBFM and stereo FM, with TV sound and video output as standard.

We include Windows software to make it easy to gather information from document scanners, the Internet and other sources. The RD500VX can be linked to your PC to backup or download information, and a database is loaded into the receiver before shipping.

It also has a built in digital sound recorder and editor so a news flash or rare DX can be recorded. Up to 4 minutes of sound can be permanently stored!

Specifications:

Sensitivity (10dB S/N) HF SSB 0.2uV. IP3 +10dBm.
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7. Stereo CW filters with 3 bandwidths.
8. Noise Blanker.
9. Clock and timers for recording programs etc.
10. Cassette switch controlled from squelch.
11. RS232 computer interface.
12. Data Slicer for decoding.
13. FM output for pocsac etc.
14. Tuning meter (centre zero)
15. Signal strength meter.
16. Notch and peak filter (Variable).
17. Peak hold AGC, user controllable.
18. 26 VFO's for temporary frequencies.
19. 55 thousand memories, (54 thousand more than the competition).
20. 234 groups.
21. 20 Text characters per memory.
22. Clear 'plain English' menu's on-screen.
23. Text searching with review of matches - find any station by name.
24. 99 Band set-ups with start and end frequencies.
25. Skip list.
26. Easy memory store and retrieve.
27. Edit entries, move groups, tag/untag, move/delete entries, without PC.
28. Priority channel.
29. PC Keyboard socket.
30. 8.33kHz, 9kHz, 12.5kHz steps etc., or user definable.
31. 5Hz minimum steps. (Not 5 kHz!), really smooth tuning.
32. Hold, pause, Stop or continuous scanning.
33. Auto tuning (AFC)
34. Auto memory write.
35. Definable pause and hold times.
36. Sound recording and playback with start and end point editor.
37. Whip antenna i/p for HF.
38. Mains Power supply.
39. Separate antenna inputs for different band ranges.
40. Antenna changeover output.
41. Stereo headphones and loudspeaker output.
42. Great HF (Shortwave) reception.
43. PC remote control software.
44. Database software, for backing up and editing.
45. File converter software, for importing files from the Internet etc.
46. Ability to import files from paper documents.
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48. Large example database pre-loaded.
49. 20kHz to 1750MHz tuning range, superb sensitivity.
50. 2 year guarantee.

The RD500 is still the only wideband scanner that can store entire scanning directories in it's massive memory, and its HF performance, features and sensitivity are excellent. No other radio comes close to its 55 thousand internal memories, and it has a great suite of Fairhaven PC software on CD

Support British electronics and get great technology for your £, this is one great piece of radio equipment that is made in the UK !

What the Press Say...

"Sometimes, when you pick up a piece of equipment for the first time, you know your handling quality kit. It's the nearest thing to perfection in a receiver that I've ever had the privilege of operating. In use, the Fairhaven is an absolute joy to operate. Putting it simply, it just plain works: it does what you'd expect it to do, and it does it very well. The Fairhaven RD500VX Radio Database is a truly great radio. It really is an insult to its massive capabilities to just call it a scanner: it makes a perfect main base station all-band, all-mode receiver, yet is small enough to fit under a dashboard for mobile use." - Giles Read, *Radio Active Magazine*.

"If you're after a 'do-everything' receiver having the advantage of a massive built-in frequency and user database, then take a very serious look at the RD500, you'll be pleasantly surprised. It's a receiver I'd be happy to use as my own." - Chris Lorek, *Radio Today*.

"I was impressed with the RD500 at our first meeting, and I'm even more impressed now. This is really innovative design and deserves success. I know of no other receiver which combines all the features found in the RD500." - John Wilson, *Short Wave Magazine*.

"A singular vision of how radios of the future might be conceived" Star ratings for sensitivity, dynamic range, RF intermodulation, IF filters, IF performance and audio quality:- 23 stars, - *WRTH Handbook*.

SSE Websites Guide

The Internet, as we all must know by now, contains a wealth of information, which is invaluable to the keen radio monitor. Here we present a few websites that are packed with essential information plus user forums and specialist discussion groups that can be very helpful to those of you with an interest in some of the more esoteric areas of the hobby.

A Scanning Radiouk
www.scanning.radiouk.com
A list of frequencies in use in the UK.

ACARS
www.acarsonline.co.uk
Authoritative page on ACARS.

Aero documents
<http://164.214.2.62/products/digitalaero/index.html>
US Dept of Defence supplements and Flight Information documents downloadable on here.

Air Radio Ltd
www.air-radio.com
Airport and Airline comms company info.

Airscene UK
www.airscene.co.uk
Dedicated to Aviation in the UK - airshow dates, museum guide, airband monitoring.

Andy's Web-page
www.ajpotts.fsnet.co.uk
Very good site for primarily the south Wales region though it covers others too.

Artsci Radio Publications
www.rfsearch.com
RF search site for related companies and information.

Barton-On-Humber
<http://users.breathemail.net/barton0/>
Frequency site for Humberside.

Ben's Scanning & Shortwave
www.angelfire.com/my/scanner/
Radio Scanning and short wave listening from Herefordshire, UK. Main focus on MilAir communications.

BIGYUN2000
www.bigyun2000.co.uk
Specialist site from the Hull area.

Boltonscan
www.boltonscan.com
A site for Bolton Lancashire.

Burnley scanner site
www.burnleyscanner.co.uk
Frequencies from Burnley/Lancashire

CAA Database
www.caa.co.uk/srg/aircraft_register/ginfo/search.asp
UK Civil aircraft registration database.

CB/HAM Radio Forums
<http://ts.bright-byte.com/tsproject/index.php>
For all your CB, amateur, scanner and antenna needs!

Commsman USAF Comms
http://uk.geocities.com/milair_commsman/
USAF in UK.

DELTAWEB
www.deltaweb.co.uk/index.htm
An aviation website with a very good airshow and air event index.

Digital Sound Library
www.trunkedradio.net/digital/download_old.htm
Library of digital sounds in wav format - Trunking, Paging, GSM etc.

Duplex
www.franklin49.freemove.co.uk/wavesoft.htm
Small Windows program that calculates the duplex frequencies for various UK radio allocations.

DX-Tuners
www.dxtuners.com
A world-wide network of receivers you can control and monitor via your browser.

DXZONE
www.dxzone.com
Amateur Radio Internet Guide (search tool and data-base)

FCC
http://gulfoss2.fcc.gov/cgi-bin/ws.exe/prod/oet/forms/reports/Search_Form.htm?form=Generic_Search
USA FCC database for various USA type approvals, etc., manuals often included!

Free ICOM Radio manuals
www.marcucci.it/english/download/
Here you can download Icom radio manuals.

Frequency Monitor Centre - Netherlands
<http://home.zonnet.nl/huub.roem/>
Special Radiocomms (DVP/Crypto) and download centre for Icom, AR3000A, Kenwood config files.

FTrunk
www.tbsa.com.au/trunk.html
FTrunk MPT1327 monitoring solution.

Glossary
www.its.bldrdoc.gov/fs-1037
USA - Federal standards glossary of telecommunications terms.

Gommert Buysen
www.butel.nl
Dutch software author with detailed technical AOR information.

Icom IC-R2 PC interface
www.icominterface.ic24.net/
Instructions on how to connect the IC-R2 to a PC.

ILG short wave
www.ilgradio.com
ILG short wave frequency list.

Information Directory
<http://446.org.uk/info>
UK frequency list and northern England info.

Internet Key Word search
www.kwmap.net
Search the internet using key words (specialist).

Irish scanner
www.geocities.com/SiliconValley/Chip/5459/scanpxl.html
Irish scanner frequency website, lots of freqs.

Joint Frequency Management Group
www.jfmg.co.uk
This organisation allocates licences to outside broadcast, TV, theatre and some special events.

Kent Scanners
http://groups.yahoo.com/group/Kent_Scanners/
A group aimed at Kent and the south east of England for those who enjoy scanning.

MetRadio
www.metradio.co.uk
The Metropolitan Police u.h.f. Motorola Trunking System information.

MetRadio Group
<http://groups.yahoo.com/group/MetRadio>
This group is dedicated to exchanging information and ideas related to London's Metropolitan Police Service and its radio communication systems.

Microwave TV monitors
<http://groups.yahoo.com/group/MicrowaveTVmonitors/>
2.4GHz and other video reception forum.

Motorola Training Course
www.motorola-wls.com/CW_ACS002/cbt/course.htm
Motorola web based Trunking training course.

NAVTEX
www.navcen.uscg.gov/marcomms/gmdss/navtex.htm
Authoritative page on NAVTEX (marine).

No 1 AIDU RAF Northolt
www.aidu.co.uk
The best charts and freq. supplements direct from the RAF.

OFCOM
www.ofcom.org.uk
UK government. DT1, Radiocommunications Authority and Radiocommunications Agency were replaced by Ofcom in December 2003.

OptoElectronics
www.optoelectronics.com
Manufacturers of compatible frequency counters and near-field receivers.

Paul Marsh's pages
http://ourworld.compuserve.com/homepages/pjm_arsh/index.htm
Inmarsat, Satellite and Video Monitoring.

PMR446 Personal Mobile Radio
www.446user.co.uk
Many people now using the Internet gateway linking offered here to converse.

PROMA
<http://groups.yahoo.com/group/scanpromauk>
This group's purpose is to exchange frequency information of emergency, military and private mobile radio users in the United Kingdom.

Radio Communications Forum
www.nealparry.com
Free forum for those interested in radio communications and radio scanners.

Radio modifications

www.mods.dk

Extensive radio modifications website.

Radio World UK

http://groups.yahoo.com/group/radio-world-uk/

A group for UK radio fans.

Radproject

www.geocities.com/ResearchTriangle/System/5140/Radproject

Microwave video, Inmarsat and OB comms monitoring.

RADSCAN

www.radscan.co.uk

UK based scanning forum.

Rigpix

www.rigpix.com

Pictures of radio receivers and transceivers, often with manuals too.

Rockingham Speedway

www.rockingham.org.uk

Official Site of Rockingham Speedway Circuit.

SAR Watch

www.pickards.demon.co.uk/

Search And Rescue Frequencies and Callsigns.

Satellite tracking

http://liftoff.msfc.nasa.gov/RealTime/JTRACK/Amateur.html

Software site for tracking amateur satellites, Shuttle and WEFAX.

Scan Rec

www.davee.com/scanrec/

A free audio recorder that is primarily designed to record speech. It has a VOX control that allows the user to save disk space when no sound is detected. Works with Windows 95, '98, 'NT and '2000.

Scannerpage UK

www.geocities.com/scannerpageuk

UK frequency listing and scanner information. Site run by 12 year old Sam Crook.

Scanning, Ham and Public Safety Resources

**http://myweb.accessus.net/~090/resources-
ps.html**

Links to the various webpages with resources for the Ham Radio Operator and Scanning Enthusiast. Resources such as; Monitoring Police and Fire Communications, What Antennas to use, Secret Scanner Frequencies, Radio Programming Software, Radio Mods and Operating Tips, Professional resources for Public Safety Management, Guidance and Self-Help.

Scanwales

http://groups.yahoo.com/group/scanwales/

Scanning site for Wales.

Scottish Scanning

www.groups.yahoo.com/group/scottishscanning

Scottish based scanning group.

Short Wave Magazine

www.pwpublishing.ltd.uk/swm

Specialist UK monthly title covering scanning, other monitoring and much more.

Shortwave Logbook

www.shortwave.org.uk

On-line short wave DX logbook, off-line version also available and archive (UK).

Simon Collings G4SGI

www.scnt01426.pwp.blueyonder.co.uk

Software author - also interesting links & associated information.

Sound Snooper

www.sound-snooper.com/en/index.php

Sound Snooper, although not primarily designed with scanner use in mind can support multiple soundcards and works very much in the background. It has a very low system resource overhead and even works on an 80MHz Pentium.

South Cheshire Scanning

www.southcheshirescanning.freemove.co.uk

It's all in the name!

Stewart Aviation

www.stewart-aviation.co.uk/rs/

Stewart Aviation scanners/books and patches/badges/emblems, excellent mail order service see them at all the main airshows.

Strikalite

www.strikalite.co.uk

Replacement battery re-manufacturer, excellent for obsolete battery types.

Strong Signals

www.strongsignals.net

Rich Well's, considered by some to be the king of all scanner sites.

Surrey Scanner Site

**http://uk.geocities.com/jmdarkhorse/
surreyscanner.html**

A new site with scanner info/freqs for the Surrey area.

SWM-Readers

http://groups.yahoo.com/group/swm_readers

Tetra-Scanner

www.tetrascanner.com

Tetra/Tetrapol information for scanners, Frequencies, Audio samples, Base locations, modified Bearcat 3000XLT will scan, detect and stop, (not decode), Video-scanner 1000-2700MHz

The Secret Bunker

www.secretbunker.org.uk

An off-the-wall look at life and radio (some freqs etc).

The Wave

www.franklin49.freemove.co.uk

Lots of good international links/plus a good friend and publisher of PROMA files, and numerous other interesting things.

Time Team Freq Info

**www.jfm.co.uk/technical_and_frequency_
information/news_and%20background/
Newsletter/wavelength2.pdf**

See page three.

Transmission

www.transmission1.net

An all UK scanning site.

Trunked Radio

www.trunkedradio.net

An excellent site with information on all types of world-wide trunking.

Trunksniffer

www.trunksniffer.com

Trunksniffer Software Home page.

UK Midland Scanner

www.ukmidlandscanner.co.uk/

Website of the excellent UK Midlandscanner Yahoo group.

UK Scanner and Weather

http://users.whsmithnet.co.uk/colin.martin

Run by Colin Martin, the man behind southscanner@yahoo.com

UK/European Spectrum Guide

http://ukspec.tripod.com/spectrum.html

Does what it says in the tin!

UKSCANNER

www.ukscanner.co.uk

Scanning site concentrating mainly on the NW UK.

Weather Sat Images

http://groups.yahoo.com/group/ukawsig

This group is for people new to obtaining images from weather satellites.

XCORDER

**www.softpedia.com/public/cat/11/1/8/11-1-8-
96.shtml**

Voice activated (VOX) PC software sound recorder designed to work with a scanning receiver.

Yarmouth Radio Club

www.qsl.net/g3yrc

Great Yarmouth Radio Club, UK. Good general site for information covering callsigns, bandplans, contests, building antennas, etc.

RADIO TRADE

Air Supply, Leeds
www.airsupply.co.ukAmateur Radio Communications, Merseyside
www.arcoms.force9.co.ukASK Electronics, London
www.askdirect.co.ukbhi Ltd.
www.bhi-ltd.co.uk
DSP Noise cancelling products.Icom UK Ltd.
www.icomuk.co.ukJaviation, Bradford, West Yorkshire
www.javiation.co.ukKenwood Electronics
www.kenwood-electronics.co.ukML&S Martin Lynch and Sons Ltd., London
www.hamradio.co.ukNevada Communications, Portsmouth, Hampshire
www.nevada.co.ukPervisell Ltd.
www.pervisell.comRadioworld (West Midlands), Walsall, West Midlands
www.radioworld.co.ukSRP Trading, Birmingham
www.srp trading.comSurplus Radio and Test Equipment, Bradford.
www.johnsradio-uk.comThe Shortwave Shop, Christchurch, Dorset.
www.shortwave.co.ukWaters and Stanton PLC, Hockley, Essex
www.wspc.comWiNRADiO
www.radixon.com
UK distributor.Yaesu (UK) Ltd.
www.yaesu.co.uk

If you have a favourite Internet site please let us know and we'll share it with fellow readers next time.

If you're thinking of buying a scanner, new or used, then it is important that you can make your purchasing decision based on facts.

To help you spend wisely we've compiled the selection guide on the two pages overleaf. The radios that feature in the guide are those that are currently available in the UK. Hand-held, base station and solely computer controlled receivers are all featured.

Vital information, such as frequency range covered, modes available, numbers of channels, scanning speed and price are some of the vital information presented. Additionally, a reference to the review that has been published in an earlier issue of SWM is given to allow further in-depth information to be obtained on specific models of interest.

If you wish to obtain a copy of a full review, these are available from the SWM Book Store - contact information is given on this page.

Key to Which Scanner Selection Guide

- ✓ Included
- Optional
- * Transceiver

Which Scanner?

Your scanner selection guide

Model	Coverage		Continuous Coverage	Hand/Base/Comp	Modes					Memories				Scan Speed (ch/s)	
	Min. Frequency	Max. Frequency			a.m.	w.b.f.m.	n.b.f.m.	s.s.b.	c.w.	Banks	Channels	Lock-out	Total		
Alinco															
DJ-X2	0.522	1000	Y	H	✓	✓	✓				10			700	10
DJ-X3	0.5	1300	Y	H	✓	✓	✓				10			700	10
DJ-X10E	0.1	2000	Y	H	✓	✓	✓	✓	✓		10	40		1200	5
DJ-X2000	0.1	2150	Y	H	✓	✓	✓	✓	✓		50	40		2000	5
AOR															
AR5000A	0.01	3000	Y	B	✓	✓	✓	✓	✓		10	100		1000	45
AR5000+3	0.01	3000	Y	B	✓	✓	✓	✓	✓		10	100		1000	45
AR8200Mk3	0.53	3000	Y	H	✓	✓	✓	✓	✓		20	50		1000	37
AR8600Mk2	0.5	3000	Y	B	✓	✓	✓	✓	✓		20	50		1000	37
Bearcat															
UBC60XLT-2	66	512	N	H	✓	✓	✓							80	
UBC120XLT	66	512	N	H	✓	✓	✓							100	100
UBC220XLT	66	956	N	H	✓	✓	✓				10	20	10	200	100
UBC280XLT	29	956	N	H	✓	✓	✓				10			200	100
UBC3000XLT	25	1300	N	H	✓	✓	✓				20	20		400	100
UBC278CLT	29	956	N	B	✓	✓	✓	✓	✓		5	20		100	25
UBC780XLT	25	1300	N	B	✓	✓	✓	✓	✓		10	50		500	100
UBC9000XLT	23	1300	N	B	✓	✓	✓	✓	✓		20			500	100
Fairhaven															
RD-500VX	0.02	1750	N	B	✓	✓	✓	✓	✓		234			54682	50
Icom															
IC-R3	0.495	2450	Y	H	✓	✓	✓				8	50		400	15
IC-R5	0.15	1310	Y	H	✓	✓	✓				8	50		1250	15
IC-R10E	0.5	1300	Y	H	✓	✓	✓				18			1000	6
IC-R20	0.15	3300	Y	H	✓	✓	✓	✓	✓		18	‡	50	1200	15
IC-R8500	0.1	2000	Y	B	✓	✓	✓	✓	✓		20	50	50	1000	15
IC-PCR100	0.1	1300	Y	C	✓	✓	✓	✓	✓					Computer depends	
IC-PCR1000	0.1	1300	Y	C	✓	✓	✓	✓	✓					Computer depends	
Kenwood															
TH-F7E	0.1	1300	Y	H*	✓	✓	✓	✓	✓		8			410	
Maycom															
FR100	66	470	N	H	✓	✓	✓				5	20		100	
AR108	108	180	Y	H	✓	✓	✓							198	10
Yaesu															
VR-120D	0.1	1300	Y	H	✓	✓	✓				10		64	640	12
VR-500	0.1	1300	Y	H	✓	✓	✓				10	100		1000	12
VR-5000	0.1	2599	Y	B	✓	✓	✓	✓	✓		100	20	100	2000	15
Yupiter															
MVT-3300 EU	66	1000	N	H	✓	✓	✓				10	20		200	40
MVT-7100 EU	0.53	1650	Y	H	✓	✓	✓				10	100	500	1000	30
MVT-7300	0.521	1320			✓	✓	✓				10	100	500	1000	30
MVT-9000 EU	0.53	2000	Y	H	✓	✓	✓	✓	✓		20	50	500	1000	30

‡ Records up to 260mins of received audio
 § The IC-R20 features dynamic bank sizing

Abbreviations used in SSE

a.c.	alternating current
a.f.	audio frequency
a.f.c.	automatic frequency control
a.g.c.	automatic gain control
a.m.	amplitude modulation
B	Bell
c.w.	continuous wave (Morse)
d.c.	direct current
d.s.p.	digital signal processing
dB	decibel (logarithmic ratio)
dBd	decibel referenced to a dipole
dB _i	decibel referenced to an imaginary isotropic radiator (one dimensional antenna)
dBm	decibel referenced to 1mW into a 50Ω load (standard units for radio measurement)
dBW	decibel referenced to 1W
f.f.t.	fast fourier transform (mathematical function used by d.s.p.)
f.s.k.	frequency shift keying
h.f.	high frequency
Hz	Hertz (cycles per second) unit of frequency
i.f.	intermediate frequency (in a superhet receiver)
IM	intermodulation
IP	intercept point
K	Binary multiplier x1024
k	Decimal multiplier x1000
kHz	kilohertz
λ	lambda symbol for wavelength
l.c.d.	liquid crystal display
l.s.b.	lower sideband
l.w.	long wave
M	mega x1,000,000
m	milli /1000
m.w.	medium wave
MHz	megahertz
MW	megawatt (1,000,000 watts)
mW	milliwatt (one thousandth of a watt)
MΩ	one million ohms
n.b	noise blanker
n.b.f.m.	narrow band f.m.
n.f.m.	narrow band f.m. (alternative)
p.s.k.	phase shift keying
r.f.	radio frequency
RX	receiver
s.s.b.	single sideband
s.w.	short wave
SINAD	ratio of signal plus noise to noise (used for performance measurement)
SINPO	scheme for recording reception quality
SNR	signal to noise ratio
t.c.x.o.	temperature controlled crystal oscillator
TX	transmitter
V	Volt unit of electrical potential difference
v.c.o.	voltage controlled oscillator
v.h.f.	very high frequency
W	Watt, unit of power
w.b.f.m.	wide band f.m.
w.f.m.	wide band f.m. (alternative)
Ω	ohm (unit of electrical resistance)

Books of Interest

There are numerous books covering all aspects of scanning, which can be obtained from the SWM Book Store.

A selection follows, a full listing can be found on page 66 of this month's SWM.

LISTENING

AIRBAND

<i>Airwaves 2004</i>	£10.95
<i>Airband Radio Handbook</i> (Haynes).....	£12.99
<i>Air Traffic Control</i> (abc) 8th Edition	£9.99
<i>Callsign 2004</i>	£10.95
<i>Civil Aircraft Markings 2004</i> (abc).....	£7.99
<i>Airwaves Selcal Civil & Military</i>	£11.95
<i>Flight Routings 2004</i> Williams.....	£8.95
<i>Military Aircraft Markings 2004</i> (abc)	£7.99

FREQUENCY GUIDES

<i>PROMA Scanning Scene</i> CD.....	£4.75
<i>Ferrell's Confidential Frequency List</i> Kevin Nice 13th Edition.....	£21.50

GENERAL SCANNING

<i>Scanners 4 Scanning Into The Future</i> Bill Robertson ...	£9.95
<i>Essential Scanning Guide</i> Martin Peters.....	£6.00
<i>Scanner Busters 3</i> DC Poole.....	£5.00

ANTENNAS

<i>Antenna Toolkit</i> (inc. CD-ROM) Joseph J. Carr	£25.00
<i>More Out Of Thin Air</i> (PWP)	£6.95
<i>Receiving Antenna Handbook</i> Joe Carr.....	£17.50
<i>VHF UHF Antennas</i> I.D. Poole	£13.99

FURTHER READING

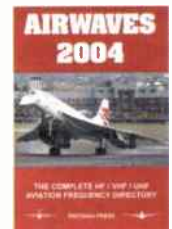
<i>Basic Radio Principles & Technology</i> Ian Poole.....	£15.99
<i>Foundation Licence Now!</i> R. Betts.....	£3.95
<i>Amateurs Radio World Atlas</i>	£8.00
<i>Radio Amateurs Map of the World 2002</i>	£7.00

To order any of the books shown here, call **0870 224 7830** (between 9am and 4pm - outside of these times orders can be left on voicemail). FAX Orders can be sent to **0870 224 7850**.

E-mail orders are also accepted and can be sent to

bookstore@pwpublishing.ltd.uk

Alternatively please use the postal order form on page 69 of September *Short Wave Magazine*.



		Features														Review			Model
Search Bands	Search Speed (steps/s)	8.33 Steps	Rechargeable	Charger	Rotary Tuning	Case	Battery Saver	Computer Control	Data Cloning	Trunking	Bandscope	AFC	Noise Blanker	DSP	Sync a.m.	Review	Current Model	Guide Price (£)	
	20 25 30	✓	✓	✓	✓	○	✓	✓	✓		✓					Aug-00 SSE 2002 Sep-96 Jul-01	Y Y Y Y	170 130 300 499	Alinco DJ-X2 DJ-X3 DJ-X10E DJ-X2000
20 20 20 40	45 45 37 37	✓	○	✓	✓		✓	✓	✓		✓	✓	✓		✓	Jun-96* Jun-96* Jun-98 Nov-00	Y Y Y Y	1799 1999 439 719	AOR AR5000A AR5000A+3 AR8200Mk3 AR8600Mk2
10	300 300 300 300 25 150 100		✓	✓	✓			✓	✓	✓						Apr-02 Feb-02	Y Y Y Y Y Y Y	80 130 150 180 200 159 329 325	Bearcat UBC60XLT-2 UBC120XLT UBC220XLT UBC280XLT UBC3000XLT UBC278CLT UBC780XLT UBC9000XLT
99	50				✓			✓								Aug-98	Y	899	Fairhaven RD-500VX
25 50 20 20	30 30 17 15	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓			Jun-01 Dec-02 May-97 May-04 Sep-96 May-99 Oct-97	Y Y Y Y Y Y Y	449 159 259 499 1549 185 385	Icom IC-R3 IC-R5 IC-R10E IC-R20 IC-R8500 IC-PCR100 IC-PCR1000
10			✓	✓	✓		✓									SSE 2002	Y	289	Kenwood TH-F7E
	25	✓			✓											Sep-99	Y Y	100 70	Maycom FR100 AR108
8 10	20 20 15		○		✓		✓	✓	✓		✓		✓	○		SSE 2002 Jul-01	Y Y	159 199 599	Yaesu VR-120D VR-500 VR-5000
10 10 10 20	50 30 30 30	✓	✓	✓	✓	○	✓	✓			✓					Feb-98 Apr-93 Oct-00 Feb-97	Y Y Y Y	180 269 259 369	Yupiteru MVT-3300 EU MVT-7100 EU MVT-7300 MVT-9000 EU

For the licenced Radio Amateurs - here's a

- ▶ Dual Band Transceiver ▶ Airband Receiver
- ▶ Scanner ▶ FM Radio that fits comfortably in your SHIRT POCKET!



Giving superb dual band performance in a handy package, this radio just feels 'right' from the moment you first hold it.

Features

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UHF: 380.000 - 511.995 MHz
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300mW (battery), 500mW (6V DC)
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- Full CTCSS encode and decode
- Four different tone bursts for European operation
- SMA antenna socket, rubber duck antenna supplied
- Complete with long life Li-Ion battery & fast charger
- Convenient 56 x 96 x 14.5 mm
- Lightweight at only 102g including battery and antenna



Our Gemma says:

'The DJ-C7 is a powerful radio in a compact package. Its surprisingly easy to use, with a simple menu system, but doesn't compromise on facilities. Airband receive with the new 8.33kHz steps is very handy, broadcast FM is a bonus, and the optional extended frequency range means for 99% of the time this radio will let you hear everything that's going on.'

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Optional Accessories

- | | | |
|---------|--------------------------------|--------|
| EMS-60 | speaker microphone | £19.00 |
| EME-24 | earphone microphone | £17.95 |
| EME-18 | earphone | £9.95 |
| EBP-58N | additional Li-Ion battery pack | £24.00 |
| EDC-126 | additional battery charger | £14.00 |
| EDH-32 | cigarette lighter cable | £6.50 |
| ESC-38 | soft case | £14.95 |

Alinco DJ-C7

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special

Dual Bander (144/430MHz) gives you
and prime performance - all in a truly
palm-sized design



BATT	MODE	DUAL	MEMO	
1 LOW	2 BAND	3 A/B	M-V	A
4 INFO	5 VOX	6 PRI	VFO	B
T-SEL	SHIFT	MN-IN	M-IN	C
7 TONE	8 REV	9 MN-f	MR	C
LOUT	STEP	0	C-IN	D
* MHz	0 FINE	# ENT	CALL	D

- Receives 2 frequencies simultaneously, even on the same band
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- Bar antenna for receiving AM broadcasts
- Special information memory channel RX mode (10 channels)
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- 434 memory channels, multiple scan functions

- 16-key pad plus multi-scroll key for easy operation
- 7.4V 1550mAh lithium-ion battery (std.) for 5W output and extended operation

- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Larger frequency display for single-band use
- Automatic simplex checker
- Battery indicator
- Internal VOX
- MCP software (Free download from Kenwood website)

144/430MHz FM DUAL BANDER

TH-F7E

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

E-mail: comms@kenwood-electronics.co.uk

Starting Out

Part 5

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.

Broadcasters use radio waves to convey information contained in the sounds produced by the human voice, musical instruments and other man-made or natural things. These sounds may vary in pitch (frequency) and intensity (amplitude) and the overall effect may be derived from more than one sound.

Because sound plays such a key role in broadcasting it is important to understand the nature of sound waves and the methods used to superimpose sounds onto radio frequency 'carrier' waves at transmitting stations, so that they may be received in distant places.

Sound Waves

Sound waves consist of alternating low frequency compressions and rarefactions on the air and travel at a speed of 1200km/h. A perfect human ear responds to audio frequencies (a.f.) which lie within the range 10Hz to 20kHz, however, some animals can respond to much higher frequency (ultrasonic) noises.

Differences

It is very important to appreciate that despite the apparent overlap in the audio and radio frequency (r.f.) ranges between 10 and 20kHz, the nature of the two kinds of waves is quite different. Radio waves consist of electric and magnetic fields and travel at 300,000km/s - see 'Starting Out' SWM May 2004). No wonder then, that even a person with very good hearing would not have heard the 16kHz signals broadcast by GBR from Rugby when driving past it on the M1 (before it was recently demolished)!

The sounds which originate in a studio of a BC centre, or at an outside event, are either picked up by a microphone or reproduced from sound information stored on disc, tape, or computer files. Like the human ear, a microphone responds to the compressions and rarefactions of the air, but converts them into tiny electrical currents, which are then amplified to a predetermined peak level before being sent along specially equalised audio lines to the transmitter.

Modulation

When the audio signals arrive at the transmitting station they are further amplified and then superimposed onto an r.f. 'carrier' wave generated within the transmitter by a process called modulation. The combined signal is then radiated by the station's antenna. The modulation process may take various forms, but two systems are often employed by broadcasters - amplitude modulation (a.m.) and frequency modulation (f.m.).

Each method has advantages and disadvantages, but on the crowded long, medium and short wave bands, the most important consideration is the amount of band space required by the modulated signal. The a.m. system is used on these bands because several a.m. broadcasts could take place in the amount of space required by a single wide band f.m. transmission. The much wider v.h.f. bands are well suited to f.m. transmissions and extensive use it made of them to provide a high fidelity broadcast service, but they will not be considered here.

Amplitude modulation is essentially a mixing process and is usually carried out at high power levels in the final stages of BC transmitters. When an audio signal (f_m) is mixed with an r.f. carrier (f_c) in a non-linear device, it can be shown that additional frequencies above and

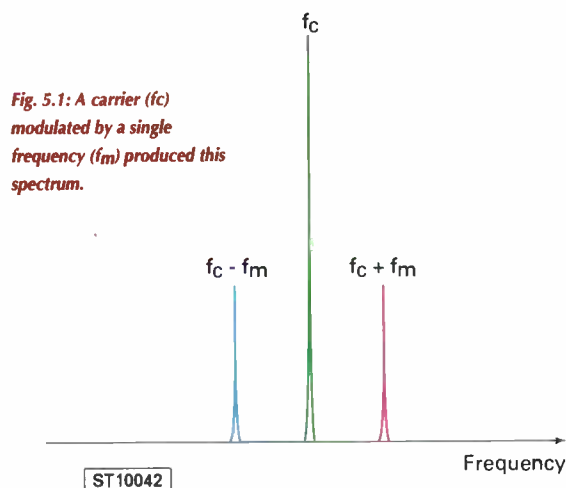


Fig. 5.1: A carrier (f_c) modulated by a single frequency (f_m) produced this spectrum.

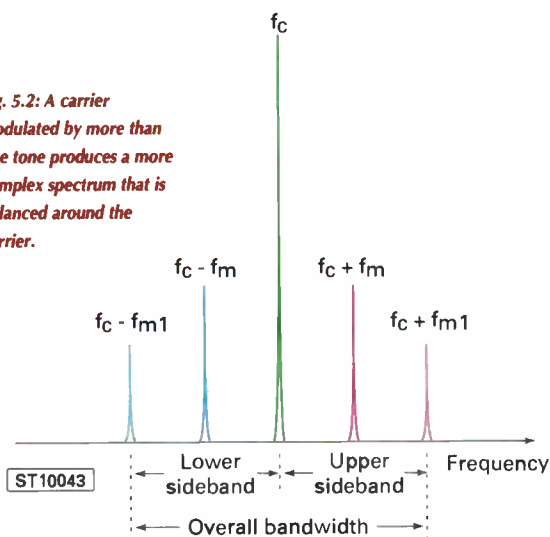


Fig. 5.2: A carrier modulated by more than one tone produces a more complex spectrum that is balanced around the carrier.

below the carrier are produced - these are called side frequencies and consist of $f_c + f_m$ and $f_c - f_m$ as shown in Fig. 5.1. Provided the amplitude of the modulating audio signal (f_m) does not vary, the amplitude of the side frequencies will remain constant.

Side-bands

If the frequency of f_m is increased, then the side frequencies move further away from the carrier. If more than one modulating frequency is present, then a band of frequencies results above and below the carrier - these are called the upper and lower side-bands - see Fig. 5.2. If the frequency and amplitude of f_m varies (as in speech) the amplitude and frequency of the side-band frequencies will also vary. It should be noted that the side-bands are actually mirror images of each other and that it is the side-bands which carry the modulation information.

Utilities for B

One of the great things about the 'Decode Special', says Mike Richards, is the opportunity I have to attract a few new listeners to this often forgotten aspect of listening.

Decode is all about trying to make sense of the all the non-speech signals that you'll find on the h.f. and v.h.f. bands. A quick tune around will reveal loads of the burbles, squeaks and grating noises - so what do these all mean?

Before you get too excited I ought to warn you that you won't be able to make sense of all the noises. Many are simply noises and contain no useful information at all. Modern technology can take the blame for lots of the noises, as we are surrounded by electronic goods that emit varying levels of noise.

This takes varying forms and ranges from detailed FAX charts and forecasts through to individual weather reports from monitoring stations around the World.

The FAX charts are produced primarily to aid shipping and provide a service to mariners wherever they happen to be on the planet. Whilst large ships are fitted with sophisticated satellite systems, smaller vessels still rely on good old h.f. FAX to deliver the goods. There have been continuing threats to suspend these services, but these have been resisted and the transmissions continue.

The detailed weather reports have a different purpose and are transmitted as part of the World Meteorological Organisation's (WMO) international communications network. This is the system that both broadcasts and collects a huge amount of data from across the globe. The data is captured and processed in the WMO's massive mainframe computers and aids sophisticated weather and climate modelling as well as providing the raw data for our local weather forecasts.

Despite the huge range of information available, there are software systems readily available that you can use to convert the information into a usable format - see my quick start article on page 43 for more information.

Aircraft

The next most popular data type is ACARS (Aircraft Communications Addressing and Reporting System) as the name implies this is a special data system that's used by aircraft the world over. The system works rather like a specialised E-mail system so the aircrew and ground teams can freely communicate without having to go via Air Traffic Control.

ACARS can also provide a whole range of automated information such as take-off and touch-down times. This is really helpful for the airline's admin department as they know within seconds when their aircraft take off and land. This is a vital tool for fleet management and also provides useful



Commercial PACTOR decoder.

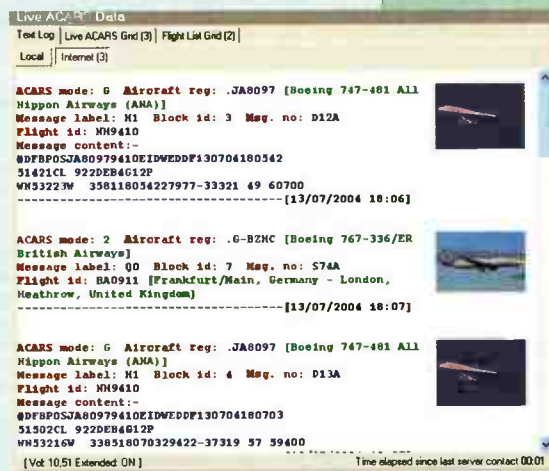
I have to say, things have improved significantly over the past 10 years, but there remains lots of general hash from TVs, switched mode power units and other common devices. A second reason for not being able to make sense of everything you hear, is encryption.

A number of the signals will be encrypted so you can't really expect to be able to make sense of the signal even if you have the basic decoding equipment. Having set out the warnings, I'm pleased to say that there's still plenty to listen to and resolve.

What's The Weather?

As we're a nation devoted to the weather, it's no surprise to find that there is a huge amount of weather related information freely available on the h.f. bands.

beginners



information for passengers.

Most ACARS systems are also linked into the aircraft's electronics so it's easy for ground based engineers to remotely interrogate the system and check how the aircraft is performing. In the USA most of the main commercial airliners are now fitted with weather reporting gear so they provide fully automated and detailed weather reports. This is proving to be a real boon to forecasters and will no doubt spread very quickly.

Whilst most ACARS is handled within the v.h.f. airband, there is a separate system known as HFDL (h.f. Data Link) that is transmitted on the h.f. bands by long range aircraft and provides similar information to ACARS. As with FAX, ACARS and HFDL decoding software is plentiful so you shouldn't have any problems getting going.

Amateur

Amateurs have always been at the forefront of the development of new modes and the h.f. bands are no exception. At the very basic end of the scale you have good old fashioned Morse code. I suppose this is an antique mode really, but it still has a strong following. Fortunately, you don't have to learn Morse to decode the transmissions, as there's lots of software around to help you.

AMTOR

Next up from Morse is Radio Teletype (RTTY), but this has been largely superseded by some of the newer text based amateur systems. The pioneer of the new-wave systems was AMTOR (Amateur Teleprinter over Radio).

This is a very clever and effective system where the two stations that are communicating become 'locked' together, alternatively sending and receiving information in short three-character bursts. This produces an easily recognisable chirping sound, making the signals particularly easy to find.

The interaction of the two stations is used to produce an automatic error correction system where each set of three characters is checked for accuracy before the next set is transmitted. The AMTOR system is extremely effective and enables error free transmission over very difficult paths.

In parallel with AMTOR was the development of Packet Radio that used modern computing techniques to send data over v.h.f. radio links at speeds of between 1200 baud and 9600 baud. A 300 baud version of packet found it's way onto the h.f. bands and can still be found today, but it's not the most effective system as there is generally too much interference on h.f. radio paths.

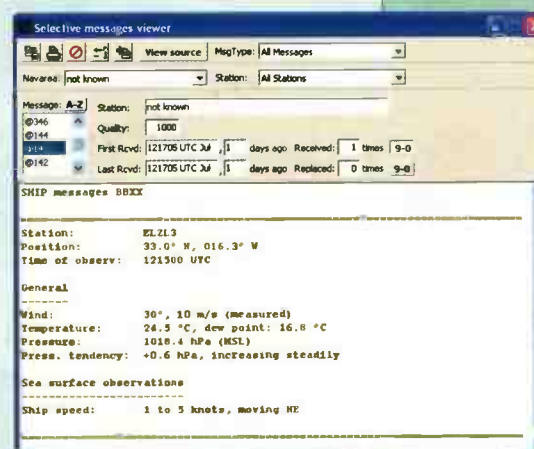
PACTOR

The most effective data system to date for h.f. radio is PACTOR which, as the name suggests is a hybrid of Packet and AMTOR. This system features characteristic AMTOR's bursts of data followed by an acknowledgement, but the data packet is much longer and faster than AMTOR. The data structure for PACTOR is also more sophisticated than AMTOR. The PACTOR system has really taken-off commercially and PACTOR II and III are used as the mainstay of commercial h.f. E-mail systems.

PSK31

Another important and very popular development has been the introduction of PSK31. This is a specialised, slow-speed, data system that has been designed specifically for hand typed or other low speed data

- AirNav system's ACARS decoder in Action.



Decoded weather synoptic reports.

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- 80 channels, 8 band coverage, 66-88 MHz VHF Low Band
- 137-144 MHz Land Mobile
- 144-148 MHz 2M Amateur Band
- 148-174 MHz VHF High Band
- 406-420 MHz UHF Band
- 420-450 MHz 70Cms Amateur Band
- 450-470 MHz UHF Public Service Band
- 470-512 MHz UHF TV Band
- 5 Pre-Programmed banks
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- Search Rate: 10 Steps per second
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FREE with this issue

DECODE SPECIAL

38 Utilities For Beginners



One of the great things about the 'Decode Special', says Mike Richards, is the opportunity I have to attract a few new listeners to this fascinating aspect of listening.

43 Utility Modes - A Quick Start Guide



Mike Richards has put together a selection of some of the more popular software packages to help you get started. The programmes have been chosen either because they're very easy to use, or offer particularly good performance for the mode in question.

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Mike's usual round-up of digital h.f. monitoring.



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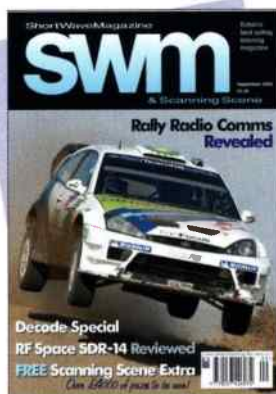
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Coming Up Next Month

In SWM October 2004 SWM

- Broadcast Special with Martin Peters
- SDR-14 Review concluded
- Beginner Series - Getting Started - Part 6
- Converting to DRM
- Numbers Stations - A Beginners' Guide - Final Part
- Keep on top of the world of monitoring with SWM
- and much more...

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ED's



comments

In spite of good intentions, I failed to make it to RIAT 2004. This was very disappointing indeed, as I was due to meet up with several people at the event and enjoy all that was on offer. Unfortunately, the 'office bug' - that seems to have struck everyone here - got the better of me. It rendered me nothing but bed worthy, a few days before the event and left me in a condition rather unsuitable to drive the 150km to attend the Tattoo - very bad timing indeed!

My eldest son, amongst others, tells me that this year's event was very interesting indeed. He got to have a hover in a Harrier on the day dedicated solely to school visitors. Not only did he get to fly, but he was chatting to the *Red Arrows'* pilots in the burger van queue - it wasn't like that when I was at school!

For more info on this year's happenings at the RIAT, see Peter Bond's report on page 56 of this issue.

SSE

This month's SWM includes the latest edition of *Scanning Scene Extra*. Continuing the tradition thus far of including a truly excellent range of prizes to be won, SSE also brings you a ready reference for choosing a scanner in the form of a tabular features reference. We also look at that alleged 'mystical art' - antennas.

Additionally, Dave Roberts brings his usual easily read informative gems. I hope you enjoy the latest SSE. Don't forget to show your friends.

Tony Allen

A few days ago I received a note from Peter Madison regarding the death of Tony Allen. Tony, who will be remembered by many for his distinctive style on many radio stations in the period between 1960 and 1980, died at lunch time, Friday 9 July, in The Marie Curie Hospice - Hampstead, after a long illness.

Tony (nicknamed "Doris") will be well remembered for his characteristic deep voice on many quality radio stations from the 1960s to the 1980s. Starting as a young DJ on Radio Caroline South, Tony moved to The Voice of Peace and back to Caroline in its 'Loving Awareness' period, he also made significant contributions to Radio Scotland, from The lightship *Comet* and Radio Noordzee International, off the Dutch coast.

His credits include several BBC local stations and Scottish Television before he returned to Ireland for the opening of Sunshine Radio in Portmarnock, Co. Dublin.

Tony was also in at the start-up of Radio Nova but will best be remembered as an excellent voice-artist, his self-produced commercials were aired on most of the Irish pirate radio stations and, through agencies, on RTE radio and TV.

Peter also mentions, it is fair to say that Tony could be a little temperamental at times but everyone who worked with him would agree that he was at all times a highly polished and professional presenter and a superb radio personality.

A famous anecdote from his pre-Ireland career originates at STV when he was duty presentation and continuity announcer on the day that Lord Louis Mountbatten died. Tony was given an incorrect note and appeared on camera solemnly stating that The Queen Mother had died. Quite soon after, he scripted and presented an 'Oscar winning' abject apology to the nation and to Queen Elizabeth, who had been alive and well, watching her TV in Balmoral at the time.

Peter says that he feels privileged to have worked with 'Doris' on Sunshine, Big Dee, Nova and South Coast Radio. He shares that Tony could aim and throw a NAB cart' and hit you at 50 paces but seconds later he would be the most generous of pals saying, "Right lads, lets go down the pub!"

Broadcasting in the UK and Ireland was enriched by Tony Allen's voice and all-round 'radio savvy'. One of the 'old school' has gone. Peter say' that, "I am proud that I knew him at his best". Thanks for the tribute Peter.

G3UNR

Those of you who pay attention to such things, will have noticed that as of last month the magazine masthead shows that I am now the holder of G3UNR. It's not that I've suddenly aged considerably, instead I've finally got around to applying for the callsign of one of my sadly deceased mentors of yesteryear. From the time of listening to Tony Allen referred to above. It is with great pride, that I now hold my mother's cousin Bob's former callsign. I wonder if I'll manage to repeat any of Bob's former contacts on air? It would be most excellent if I do - I'm sure that the former holder of G3UNR would approve. If you recognise the call from the past please give me a call.

WV 73 Kevin

QSL

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topqsl

Dear Sir

Just a note to say that I have recently returned to the hobby after a break of many years, i.e. since 1975, when I joined the professional radio engineers in the Royal Navy. After leaving the service in 1982 I had no more to do with radio until about a 18 months ago when, quite by chance, I saw a copy of *SWM* in a newsagents and bought it.

It was a shock because I thought it had long ceased to be published! Needless to say, although so much has changed from the 70s, I was hooked again and bought an AR5000A.

If you're now in your 50s and no longer have the facilities, eyesight or inclination to build stuff, what the hell, go for the top! I therefore enjoyed your review of the SDU5600 in March and am considering going for one.

The biggest change I have noticed since those days is the enormous drop in traffic on the marine bands, HM Coastguard stations and exciting 'mayday relays', Portishead Radio Ship/Shore telephone traffic, Shannon Air Radio, etc. Also there seem to be so few amateurs on a.m. DSB on 1.8 and 3.5MHz these days.

I am currently in an apartment on the 14th floor (top floor) of 'The Mailbox' in central Birmingham and fortunately have an outside area, so I have been able to put up a long wire with a 'balun'. Also I have a (cheap) Maplin 30-200MHz antenna comprising of various vertical metal rods. Unfortunately, although high up, it is a very noisy location with loads of TVs playing havoc with the 'marine band'.

The good side is a distant view of Birmingham International Airport and the ability to see the landing and take-off of aircraft while listening to them.

I must join the protests against the infamous letter on computer webs and outdated h.f. radio. For me its the reliability of Internet coms that makes it boring. I felt the same in the RN when Satcom started to supersede our long-haul m.f./h.f. teleprinter links. It is the precarious nature of h.f. which gives it its fascination.

I was for a time in charge of Portland Bill Wireless Station on a shift basis where we had m.f./h.f./v.h.f. and u.h.f. transmitters. But I loved the h.f. transmitter 'hall' with the huge world map lit up on the far wall opposite the desk, with its MUF/LUF and OUF curves. I'll never forget winter gales up there and the noise of the wind in the antennas.

Thanks for the articles on Woofferton and Rampisham. I really enjoyed them. More please! I am looking forward to learning more about the present day scene and re-learning a lot of what I have forgotten! Keep up the good work. Regards.

Terry Chapman
Railway Signal Design Engineer
Westinghouse Rail Systems Ltd
Birmingham

Welcome back to the hobby Terry. Many thanks for your kind words regarding SWM. Quite a lot has changed over the years, as you point out there is much last maritime voice traffic.

Most European traffic is now data either GMDSS or SITOR. There is still much eastern European voice traffic to be heard with a little dial spinning. For that matter quite a significant amount of c.w. traffic too.

I'm sorry to say you won't hear Portishead any more as they've shut up shop a fair few years ago now. I do recommend that you do invest in an SDU5600 as it will be invaluable for seeing activity on both h.f. and higher bands.

I think you'll find I'm not alone in believing that h.f. has seen a recent increase in activity, though this is data traffic initiated largely by MIL-STD 188-141 ALE - see last month's 'Decode' and this month's 'Decode Special' for more info. These links can be fascinating to monitor and assemble a picture of their users with patient monitoring.

I share your feeling regarding the fascinating atmosphere within a room of high power h.f. transmitters. I do intend visiting some other of the famous sites who's names we all know and love. - Ed.

Dear Sir

Having recently re-kindled my interest in all things radio for the first time since my teens in the 1970s I thought I would write and add my views to what seems to be a 'hornets-nest' opened by a letter from Ronald Evans back in February's issue of *SWM*.

I listen to s.w. radio for the sheer pleasure of what can be found there and the enjoyment of using the equipment to achieve this end. I have two Sony s.w. radios, one simple analogue, which I find useful for simply combing the wavebands and a double conversion pll unit for use actually to listen to what I stumble across that I like. Some days you get an interesting 'haul', other days less so. Whatever the case, the enjoyment from what is simply a hobby is immense.

Like many other of your readers, I too have a computer - it has its uses but for me certainly not for listening. Radio station websites are fascinating and useful tools but the actual listening has to be for real!

The June issue of your magazine is only the third I have taken, the 'LM&S' pages are an excellent guide to what can be found 'with a little effort and skill' - surely that is what real listening and hobby radio is all about?

Nigel Moyes
West Sussex

Dear Sir

Peter Bond's otherwise excellent feature 'Getting Started - Airband' in last month's airband supplement is marred for me by his repetition of a previous assertion in the August 2002 issue that aircraft spotting evolved from the activities of the Observer Corps during the Second World War. I challenged that and consequently on page 53 of the October 2002 issue there were quotes from my letter, concluding with the acknowledgement by Peter. "So, it would be fair to say that the hobby originated from a general interest in aviation and our countries need to defend itself in time of war". Then he, unequivocally, repeats his original statement two years later!

Though not wanting to repeat myself and reluctant to go too deeply into the parentage of today's aircraft spotter, prominent in the family history is the birth of *The Aeroplane Spotter*, which the authoritative magazine *The Aeroplane* launched in about 1940. I bought it from its inception and it immediately gave a new voice, status and a disciplined approach to aircraft spotting (*The Aeroplane/Aeroplane Spotter* went on to produce dozens of aircraft recognition books, which sold by the thousands, some of which I still have). It was then that one felt part of a fraternity! The *Aeroplane* nurtured spotting: the Observer Corps stood aloof.

John Fenton
Tyne & Wear

Dear Sir

I am just writing to say how delighted I was to be the winner of two tickets in your recent International Air Tattoo competition, though at one point I did wonder why I had entered a competition that saw myself and my wife

Continued on page 8

Continued from page 7

leaving home at 0300 and standing in a Gloucestershire country lane for an hour waiting for the entrance gates to open! However, if you want a 'front seat' on the crowd line, then this is what you have to do!

There weren't perhaps as many aircraft in the static line-up as in years gone by (it's ten years since I last went to the International Air Tattoo), but the way the aircraft had been arranged in themes such as D-Day and the First World War RFC settings was excellent as was the D-Day 're-enactment' at the end of the day.

It was announced over the public address system that pick-pockets were operating at the show - with all the armed police about I'm surprised they dare! Thank you again.

**Mr L. Standley
Manchester**

Dear Sir

Please be informed there appears to be a new source of interference on the h.f. bands. This appears to be virtually continuous from 4-24MHz, especially during daytime, and sounds like a metronome or just ticking, it is not my receiver, as I have tried others. I suspect it might be some kind of radar - any observations?

**P. Burrill
Leeds**

Dear Sir

I have been reading *SWM* for some years, with a couple of breaks here and there. I had the breaks when I felt that too large a part of the magazine's contents was not what I wanted to read, but started again, partly because I couldn't do without 'LM&S' and partly because more of the balance of articles seemed to match my interest again.

I am 41 years old and so probably somewhere in the middle of the opposing age related views displayed in your QSL page. When disagreement began relating to what new information should be included, and what old information no longer appealed to the majority of readers, it only related to two or three articles, and was largely a matter of opinion. But scanning and general DX have grown into separate hobbies following different interests and using different equipment.

The instruction side of articles, needed on both sides for the benefit of new readers as well as the interest of regulars, has suffered from lack of space. This could cause problems for the future of *SWM*.

DX is my major interest. I use the computer a lot particularly I use sites such as www.rnw.nl/realradio/hitlist/html/radio_eu.html which is very handy for programme schedules, etc. There are also many sites providing access to live broadcasts, which has made several stations feel there is no need for the same European service.

Dear Sir

I have just finished reading the March 2004 *SWM* and I enjoyed every page! Actually, I was able to purchase this number of *SWM* way back in early May (!) but have only just gotten round to reading it today!

As I am typing this, we are listening at 0935 to China Radio International on 15.210MHz, beamed to Australia in English. Reception is only fair and fading fast! Anyway, the main reason that I took so long to read *SWM* is the fact that recently I returned from an all-expenses-paid trip to China courtesy of China Radio International.

Unfortunately, time did not permit much exploration of the 'electronic' scene there but a visit to a department store in Beijing found the Electronics Department and we saw a number of Chinese made radios and some imported Sony ones, including the Sony ICF-7600G. In Beijing, CRI is transmitted on two medium wave frequencies, with 1008kHz being the best in our location. As you can imagine, short wave reception in our hotel was not too good (I took along a little Sony ICF-7600D portable) so band scanning was off the agenda.

The main receiver here is an EAC R-390A/URR and can hear the short wave transmissions of the Chinese domestic transmitters often at a very good strength. In Beijing I was able to purchase a Tecsun BCL-200 portable radio. Coverage is medium wave, short wave and v.h.f./f.m. A large set, no memories or b.f.o./product detector - just a good old fashioned radio! It's a bit drifty, but the audio is remarkable and there are two bandwidths giving good selectivity.

Sensitivity seems to be pretty good too. During a lull in our wintry weather yesterday, I ran up a long wire and connected the end to this receiver. Switching to short wave, the first station we received was a domestic ABC transmission from Alice Springs on 4.835MHz. This was during the day here and it was strong and clear! I am impressed!

**Terry Robinson
Australia**



One thing that I was surprised at, on first use of the Internet, was the mass of interest in short wave shown on it. To suggest that there is a slope towards the end of the hobby is simply not right.

In the 1999 issue of *WRTH* (which itself is still more quick and easy to use than the 'net') there were 22 international broadcasters from USA, two from the UK. In the 2004 edition, there are 46 from USA and eight from the UK. In Israel, Kol Israel previously thought no longer needed, is back on the air. The person who wants to hear the station from a particular country will probably prefer to listen to it on the 'net' - assuming that is possible. Such a person is most likely not a buyer of *SWM*.

Although the contents of *SWM* are constantly changing, the idea that it is ending is simply not true. There will always be a willing audience for unmonitored international broadcasts and I hope to get my first QSL from another planet before I die. There is plenty of future of radio to look forward to.

The problem with *SWM* is that what started as an interesting addition has now developed into a separate hobby, now too big to fit everything in and satisfy everyone. But what has also changed is that there is now plenty of subject matter to fill two magazines. Unlike Anthony Barrett in your June issue, I do not have a scanner, nor have any interest in buying one.

Although I enjoy much excellent reading in *SWM*, I these days always feel I am also buying information about another hobby that I do not want, and missing out on information I would prefer, that no longer fits. I expect many interested in scanners feel the same. Perhaps this is the ideal point for a happy split between *SWM* & *Scanning Scene* with two happy sets of readers?

**Mike Casey
Manchester**

Mike - thanks for your interesting comments, I guess we just need more pages per issue! - Ed.

Vintage Success

This year, the **National Vintage Communications Fair (NVCF)** celebrates its 12th successful year. Since its inception in 1992, the NVCF has been recognised as the UK's leading vintage communications fair aimed specifically at collectors of early radios, Bakelite and Candlestick Telephones, fifties television sets, old wind-up gramophones and classic valve audio equipment, etc., all saved from a bygone era and lovingly restored.

As well as supplying the needs of collectors, the NVCF caters for those interested in furnishing 20th century period homes and interiors and supplying the film and TV industry with authentic and genuine props.

The fair is held twice a year at the NEC and is supported by over 300 stallholders from all over Britain and as far afield as Europe, America and the Far East, who may be anything from full time specialist dealers to people selling surplus items from their collections. Several collectors' clubs and magazines also exhibit at the fair and are available to give helpful advice on the practical side of the hobby.

The NVCF are also very pleased to announce that a unique exhibition celebrating the 'One Hundredth Birthday' of the thermionic valve will be staged at the event, including rarely seen exhibits. Charting the development of the device that was instrumental in the start of the electronics age, The Fleming Diode, patented in 1904 was to be the first step in the electronics communications race.

The date for the fair this year is **Sunday**



10 October 2004 in Hall 11, National Exhibition Centre, Birmingham. Doors open from 1030 to 1600 and admission is £5 (under 14s free). Contact the organisers **Terry Martini/Peter Yates at 122b Cannon Street Road, Whitechapel, London E1 2LH, Tel: (07947) 460161, E-mail: info@nvcf.org.uk** or visit **www.nvcf.org.uk**

New Club Secretary

Toby Sigouin MM0TSS is the new Club Secretary for the **Lothians Radio Society**. Meetings take place on the 2nd and 4th Monday of each month at 1930 in the Holyrood Room, Royal Ettrick Hotel, Ettrick Road, Edinburgh.

Membership costs £12 per annum (£6 for scholars) and is available on the night of meetings. The club offers training for all levels of licence and have a very active contest group with all members welcome to join in. They are actively



Club members about to enjoy a Dinner Dance Cruise on the Maid of the Forth in June 2004.

seeking new members and they will be made very welcome.

Meetings cover lots of different topics and they also hold popular surplus equipment auctions twice a year and have an annual top band DF hunt. Contact Toby Sigouin MM0TSS on **(07739) 742367** or E-mail: **toby@onetel.net** for more details.

Mini Rally

The Worthing & District Amateur Radio Club

are holding a mini rally at Newhaven Fort Museum from 1030 till 1600 on **Sunday 26 September 2004.**

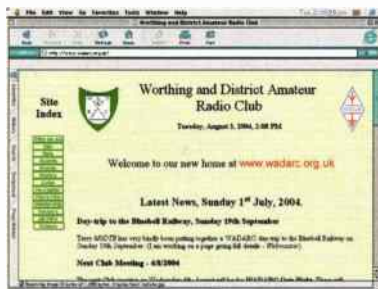
The main purpose is to raise funds for the Museum by selling excess equipment, which has been donated to the club, but is not suitable for display.

In addition, tables, which will be under cover if the weather is bad, are available at £10 for individuals, or £15 for traders - a number of whom have already agreed to attend. The charge includes admission to the Fort with all its usual attractions, including the display of vintage radio equipment and GB2NFM, which will be active on h.f. for general contacts and on 145.550 for mobile talk-in. The club will also provide a Bring & Buy.

Admission to Newhaven Fort

Museum for those who are not taking a table is £5, but parking is free. The Museum provides a unique way to experience our defensive past for the whole family and is the best preserved and restored of Britain. The military style canteen provides a wide range of modestly priced food and drink in an authentic atmosphere, so why not bring the family for a fun day out?

For more information or to book a table, telephone **(01903) 753893.**



Phillystran Guying Cable Now In The UK

Phillystran is an electrically transparent guy cable for towers and masts. It offers complete guy line isolation

eliminating the need for insulators. It is constructed with a core of Kevlar fibres covered with a copolymer jacket to provide excellent resistance to sun, weather and abrasion.

Since its introduction in 1973 Phillystran has been installed on more than a thousand commercial broadcast towers in the USA. It is very light yet enormously strong and provides a maintenance free installation ideal for amateur radio towers or masts.

Nevada have been appointed UK distributors and will carry a range of sizes with breaking strains from 550 up to 3000kg. They will also have the fixing kits for the cable ends.

More information is available from the Nevada website - visit **www.nevada.co.uk** or call the Nevada sales line on **(02392) 313090.**



GB3FK Now On Air!

GB3FK is the new 2m repeater on 145.750 - in Folkestone, Kent. Pictured at the repeater site for the grand 'switch on' is: on the right at the back, Repeater Manager and Keeper **Matt M1CMN**, to the left at the back is Vice Chairman of the Folkestone Repeater Group, **Stan G6ZNW**. To the left at the front is Technical Manager **Tony G4IMP** and to the right is **Anne G4RJZ**. For more information visit **www.gb3fk.com**



New Pocket Transceiver



Nevada are pleased to announce the release of the New Alinco DJ-C7 - a 'true' shirt pocket hand-held dual-band transceiver. It also receives the v.h.f. f.m. broadcast band - with optional airband receive and v.h.f./u.h.f. scanning!

The DJ-C7E is housed in a rugged package around the size of a credit card and is just half an inch thick so it fits really comfortably in your shirt pocket. Combining versatile features in an easy to use format, this radio just feels 'right' from the moment you first hold it.

High performance features include:

- Full 2m & 70cm transceiver coverage
- Airband receive (optional*)
- Wide v.h.f. and u.h.f. frequency coverage (optional*)
- Broadcast (f.m.) receive
- 200 memories
- Memory, Scan and v.f.o. operation
- Full CTCSS encode and decode
- Tone burst with four different frequencies
- Split frequency operation
- Programmable automatic repeater offset
- Cloning feature (with optional cable)
- Standard SMA antenna socket
- Supplied complete with lithium-ion battery and charger

This radio will be on display for the first time at the Donington Show on 1/2nd October 2004 and will sell for £149. Contact Nevada at **Fitzherbert Spur, Farlington, Portsmouth PO6 1TT** for more information, or visit www.nevada.co.uk

Icom Sponsor Blind Boat Display

Icom (UK) Ltd. sponsored a very special display at RIBEX, the world's only international boat show dedicated solely to Rigid Inflatable and Inflatable Boats. Back on the 4-6 June, Icom not only gave half of its stand to St. Dunstons, the charity that provides lifelong care for blinded ex-Service men and women, but it also sponsored Mark Threadgold Challenge Display, an extraordinary display of boatmanship aboard his record holding RIB - all the more remarkable for the fact he is blind.

Mark pitched a 6.5m Humber RIB solo around the Cowes Yacht Haven receiving directions through an Icom IC-F51 commercial v.h.f. hand-held radio, together with HS-94 headphone set. Mark demonstrated his coxswain skills for the Icom display five times over the three day show. The display included a range of manoeuvres such as deck turns, reversing the boat, turning it left and right and general manoeuvring.

Icom can be reached at **Sea Street, Herne Bay, Kent CT6 8LD**, Tel: **(01227) 741741**, FAX: **(01227) 741742** or visit www.icomuk.co.uk



rallies

August 29: The Torbay Amateur Radio Society are holding their Communications Fair at Churston Ferrers Grammar School, Churston, Brixham, Devon. There will be a free car park and it's just £2 entrance free. Contact **Anna M3LMG** on **(01803) 812117** or via E-mail at rally@tars.org.uk

August 30: The Huntingdonshire Amateur Radio Rally is to be held on the Annual Bank Holiday Monday at Ernulf Community School, St. Neots, Cambridgeshire (near Tesco superstore on A428). Doors open at 1000 and admission is £1.50. Hot and cold refreshments will be available. There will be a hall and car boot sale on hard standing. Talk-in on S22. Further information from **Peter Herbert M5ABN** on **(01480) 457347** (between 1800 and 2200) or E-mail: peterherbert@aol.com

September 12: The Vintage Valve Technology Fair is to be held at Haydock Park Racecourse, Near Wigan, Merseyside WA12 0HQ, on the A49, five minutes from M6 junction 23 & A580. Why not clear your shed, shack, cellar or garage of those unwanted radios, valves, gramophones, etc.? Over 200 stalls available, everyone welcome. Public entry charge only £2 per person! Car parking for up to 5000 cars free! See www.myciunka.supanet.com/VVTF2003 for the latest up-to-date information or telephone **(01274) 824816**.

September 19: The Lincoln Shortwave Clubs' annual Hamfest is taking place at the Showground, Newark, Nottinghamshire. Doors open 1000 and entrance is just £2 per person. There will be all the usual radio rally attractions, plus craft stalls, classic cars and a 'fly-in' from a WWII Auster V reconnaissance plane. Lots to see and do for all the family. Visit www.hamfest2004.secretbunker.org.uk or contact **Baz Matthews** on **(01636) 612440** or E-mail: m3dmv@btopenworld.com

September 26: The Worthing & District Amateur Radio Club are holding a mini rally at Newhaven Fort Museum from 1030 till 1600. The main purpose of this rally is to raise funds for the Museum by selling excess equipment which has been donated to the club, but is not suitable for display. Tables are provided at £10 for individuals or £15 to traders - a number of whom have already agreed to attend. The charge includes admission to the Fort, with all its usual attractions, including the display of vintage radio equipment, etc. For more information or to book a table, call **(01903) 753893**.

September 26: The Suffolk Data Group - SDG Radio & Computer Rally is taking place on the raceway centre green at the Foxhall Stadium, Foxhall Road, Ipswich, Suffolk IP4 5TL. Traders and booters admission from 0800 where there will be plenty of boot pitches, pay on the day, and only £5. Doors open at 0930 and the entrance fee is just £1 - accompanied under 14s go free. There will be a large free car park adjoining the stadium and hot refreshments will also be available. Talk-in on S22. Everybody welcome! Telephone **Peter** on **(01473) 631313** or E-mail: peter@sdgrally.org

* **October 1&2:** The Leicester Amateur Radio Show will be at Donington Park International Exhibition Centre, near junction 23A M1. Opening times 0930 to 1730 on Friday 1st and 0930 to 1630 on Saturday 2nd October. More information from **Geoff G4AFJ** on **(01455) 823344**, FAX: **(01455) 828 273** or E-mail to: g4afj@argonet.co.uk

October 3: The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester-le-Street, County Durham. There will be free parking, plus easy access, good, inexpensive food and drink, a Bring &

Buy and lots more. Doors open at 1030 for all, including disabled visitors. Admission is just £2, free of charge to under 14s accompanied by an adult. More details from the Rally Organiser **Nancy Bone** on **0191-477 0036 (home)** or **(07990) 760920** (mobile) or E-mail: nancybone2001@yahoo.co.uk

October 17: The Northampton Radio Rally. Tables for exhibitors free of charge (one table per exhibitor). More information from **Gary**, E-mail: g6nyh@aol.com or call **Andy** on **(07780) 842602**.

October 17: The Blackwood & DARS Rally is to be held at Newport Centre, Newport. Doors open 1030 for disabled visitors, 1045 for all others (traders from 0800). Entrance fee is just £1.50 and parking is free. The centre is one mile from J25A on the M4 or J26 travelling west to east. Refreshments and bar facilities will be available. There will be the usual attractions, traders and a Bring & Buy, etc. More information from **George 2W1JLK** on **(01495) 724942** or **Dave GW4HBK** on **(01495) 228516**.

October 24: The Galashiels & District Amateur Radio Society are holding their annual rally at The Volunteer Hall, St. Johns Street, Galashiels, Scottish Borders. Doors open from 1100. There will be traders, a Bring & Buy and refreshments. More details from **Jim GM7LUN** on **(01896) 850245** or gm7lun@qsl.net

November 6/7: The 18th North Wales Radio, Electronics & Computer Show will be held at the North Wales Conference Centre in Ulandudno. Doors open at 1000 on both days. More information at www.nwrcw.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 two miles 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 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN** on **(01226) 716339/(07984) 191873** between 1800 and 2000.

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 GOGFG** on **(01388) 745353** or Deputy Rally Organiser **Brian G7OCK** on **(01388) 762678**.

* **PW Publishing Ltd.** will be in attendance.

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.

Vintage Valve Technology Fair

The Vintage Valve Technology Fair is to be held at the Haydock Park Racecourse, near Wigan, Merseyside WA12 0HQ, on the A49, just five minutes from M6, J23, A580 on **Sunday 12 September 2004**. Public entry from 0930-1430. Anyone can have a stall for only £12 - stalls are 1.8 x 0.75m - table provided. Why not clear your shed, shack, cellar or garage of those unwanted radios, valves, gramophones, telephones and hi-fis, etc. Over 200 stalls available and everyone is most welcome! Public entry charge per person of only £2! There will also be free car parking for up to 5000 cars. Visit www.myciunka.supanet.com/VVTF2003 or 'phone (01274) 824816 for more information of this event.

A Licence Free Solution For Cricket Umpires

PMR446 licence free hand-held radios are now assisting the traditionally conservative stronghold of sport - county cricket. Radio Communications Company **MRS** has supplied four Icom IC-4088SR licence free radios to the **Glamorgan Cricket Club**. These radios will assist the umpires in the scoring of county cricket matches.

The IC-4088SR radios are being predominantly used to make sure that the scoring decisions are clear and correct. One radio has been supplied for the scorer and the other for the umpire. If the umpire has not been clear with his signalling, the scorer can call the umpire to clarify the situation. The radio ensures that a match is accurately scored and reported, which is vitally important because Glamorgan Cricket Club publish the scoring straight onto teletext.

The Glamorgan Cricket Club are already supplied by MRS with 25 Icom IC-F4GS p.m.r. u.h.f. hand portables radios. Caryl Watkin, Cricket and Office Manager at Glamorgan Cricket Club said, "PMR radios are now an important communication tool with everybody in the ground. Our management team uses the first set. The second set is for our security team and stewards and is used, for example, to co-ordinate traffic on match days".



Icom Winner

Congratulations to **Mr K.R. Park** from Seaford in East Sussex, who is the winner of the Icom R20 competition, which appeared in the June 2004 issue of *SWM*. The prize will be on its way shortly. Thanks to all those that entered and don't forget to check out our *Scanning Scene Extra* supplement **free** with this copy of *SWM* to be in with a chance of winning some more fantastic prizes!

New Antenna Tuner

Nevada are pleased to announce the release of the **NEW PALSTAR AT1K - BAL** - a 'true' balanced Antenna Tuner. This tuner will be on show for the first time at the Donington Show in October.

The Palstar AT1K - BAL has been designed to overcome the losses associated with conventional tuners that use a 4:1 balun at the antenna side of twin feeders. Under some circumstances this method is very lossy. By using a 'true' balanced tuner with a 1:1 balun on the output side of the tuner the balun always 'sees' a correct match and is much more efficient.

The AT1K BAL is designed to work with doublets and all types of open wire or twin fed antennas. It will match a wide variety of impedances very quickly and easily.

With its high power capability (1000W) and a suitable doublet, the Palstar AT1K - BAL will enable access to all the current h.f. bands, including the soon to be expanded 40m band. Features include: Power rating 1500W p.e.p. 160m to 10m; Dual custom ceramic rollers (Balanced L design); Switchable fixed and variable high voltage capacitors up to 1400pF; High power balun; Wide Z-matching range 2500Ω +/-j2500Ω; New dual transformer r.f. coupler; Single ended coaxial input and balanced output; Cross needle metering with backlighting (wall transformer supplied); Powder coated front panel and top cover. Dimensions: 294 wide by 122 high by 367mm deep and weight is just 5.45kg.

The Tuner will sell for £499 inc. VAT. More information is available from the Nevada website www.nevada.co.uk or by calling the Nevada sales line direct on (02392) 313090

QSL Holding

Here at the *SWM* Newsdesk we have received an E-mail from the RSGB's new QSL Sub-Manager for the G7AAA-ZZZ series, **Marc Litchman G0TOC**, who has recently completed a comprehensive audit of all the QSL cards and s.s.a.e.s which are currently in his possession and Marc says he would like to take this opportunity to invite enquiries by E-mail to: g7qslman@lefars.org.uk to all current and ex-G7 callsign holders to check on how many, if any, QSL cards and/or s.s.a.e.s he is holding on your behalf.

Club Night Changed

Please note that the **Wigan-Douglas Valley ARS** has changed the night of its meetings. Meetings now take place on the 1st and 3rd Wednesday in the month instead of Thursday. The time is still 2000, and the meetings still take place at the Wigan Sea Cadet HQ, TS Sceptre, Brookhouse Terrace, off Warrington Road, Wigan.

Members are on-the-air with the 2m club net on Tuesdays at 2045. Join-in if you can on 144.240MHz. Members are also on-the-air from the club's radio shack h.f. or v.h.f. most Wednesdays. Contact **D. Snape G4GWG** on (01942) 211397 for more information.

Bromley's Courses

Members of the **Bromley & District Amateur Radio Society** meet on the 3rd Tuesday of each month at the Victory Social Club, Kechill Gardens, off Hayes Lane, Hayes, Bromley, Kent. Meetings commence at 2000.

The Society has already conducted a number of Foundation Amateur Licence courses and is preparing to conduct an Intermediate Amateur Licence course during October and November. A further Foundation Licence Course is planned for late November. Please visit the Society's website at www.bdars.org for the latest details of meetings and course dates. An 'Introduction to RAYNET' and a 'fun' construction project evening are just two of the events planned for the near future.

Charles Forsyth

We at PW Publishing Ltd. are seeking the whereabouts of the next of kin or any relative of Mr Charles Forsyth, former Editor of *Short Wave Magazine*. If you have any information that may be of help, we would ask you to contact **Alan Burgess** (Personnel Manager) in writing at **PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**.

LM&S

Long, Medium & Short Wave Bands

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

This month's look at radio-related hobby groups focuses on the World DX club. Formed in 1963 by students of Sudbury Grammar School, the Sudbury Communications Club evolved into the World DX Club five years later; a consequence of its expanding membership.

The club covers many aspects of broadcast listening with a slant towards short wave DXing. They produce a monthly, 64-page, A5-format magazine, *Contact*, which is mailed out a mere seven to ten days following the publication deadline, ensuring that the news remains fresh and up-to-date.

The sample copy sent to me included DX news in country order; club news and members' correspondence; QSL report; a clandestine radio column; highlights from Glenn Hauser's DX listening digest; a list of DX and media programmes on short wave

and satellite; pirate radio news; a number of frequency schedules in full; tropical band and short wave loggings and a more in-depth look at a couple of schedules, this time, embracing programme content.

For those with access to a PC and E-mail, text versions of selected items from *Contact* are sent out to members immediately upon completion.

Additionally, a continuously updated, 12-page pamphlet, *Times and Frequencies in English*, lists the English schedules of over 100 international broadcasters in frequency

Long Wave Table

kHz	Service	TX Location	Country	Power (kW)	Listener
153	Deutschlandfunk	Donebach	D	500/250	A* B* C* D
153	Radio Romania	Brasov	ROU	1200	C*
162	France Inter	Allouis	F	2000/1000	A* B* C*
171	Medi 1	Nador	MRC	2000	D*
171	Radio Rossii	Bolsakovo	RUS	600	A* C* D
177	Deutschlandradio Berlin	Zehlendorf	D	500	C* D*
183	Europe 1	Saarlouis	D	2000	A* B* C*
189	Ríkisutvarpid	Gufuskalar	ISL	150	C*
198	BBC Radio 4	Droitwich	G	500	A C
207	Deutschlandfunk	Aholming	D	500	B* C*
216	Radio Monte Carlo	Roumoules	F	1400	B* C* D
216	Radio Rossii	Krasnoyarsk	RUS	150	C*
225	Polish Radio 1	Solec Kujawski	POL	1000	A* C* D* E*
234	RTL	Junglinster	LUX	2000	A* B* C*
243	Denmark Radio 1	Kalundborg	DNK	300	A* B* C* D
252	RTE Radio 1	Clarkstown	IRL	500/150	B* C* D
252	Algiers Radio 3	Tipaza	ALG	1500/750	A* C* D*
261	Radio Rossii	Taldom	RUS	2500	C* D*
270	Czech Radio 1	Uherske-Hradiste	TCH	650	A* B* C* D*
279	Belarussian Radio 1	Sasnovy	BLR	500	C* D*

* = dark

Listeners:-

A	Sheila Hughes, Morden
B	Thomas Williams, Truro
C	Eddie McKeown, Newry
D	Simon Hockenhill, Bristol
E	Noel Cosgrave, Republic of Ireland

Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL	kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	B D	1161	BBC 3CR	Bedford	0.1	B
603	Capital Gold	Littlebourne	0.1	B D	1170	Signal's Big AM	Stoke on Trent	0.2	B E*
630	BBC 3CR	Luton	0.2	B D	1251	Classic Gold Amber	Bury St Edmunds	0.76	C* D*
630	BBC Radio Cornwall	Redruth	2	E*	1260	Sabras Sound	Leicester	0.29	B
657	BBC Radio Cornwall	Bodmin	0.5	D*	1260	Classic Gold	Wrexham	0.64	C*
666	Classic Gold	Exeter	0.34	B C* D	1278	Classic Gold	Bradford	0.43	E
729	BBC Essex	Manningtree	0.2	B	1296	Radio XL	Birmingham	10	B D
738	BBC Hereford & Worcester	Worcester	0.037	A B D	1305	Premier	London	0.5	B
756	BBC Radio Cumbria	Carlisle	1	C E	1323	Capital Gold	Brighton	0.5	D* E*
756	Magic Maldwyn	Newtown	0.63	B D	1332	Classic Gold	Peterborough	0.6	B C*
765	BBC Essex	Chelmsford	0.5	B	1359	Classic Gold	Coventry	0.27	B
774	Classic Gold	Gloucester	0.14	B	1368	BBC Southern Counties Radio	Duxhurst	0.5	A*
792	Classic Gold	Bedford	0.275	A B	1368	BBC Radio Lincolnshire	Lincoln	2	B
801	BBC Radio Devon	Barnstaple	2	A B D E	1413	BBC Radio Gloucester	Gloucestershire	0.5	B
828	Classic Gold	Bournemouth	0.27	D	1413	Premier	London	0.5	C*
828	Classic Gold	Luton	0.2	A B D	1431	Classic Gold	Reading	0.14	B C*
837	BBC Radio Cumbria	Barrow in Furness	1	E	1449	BBC Asian Network	Peterborough	0.15	B
837	BBC Asian Network	Leicester	0.5	B C D	1449	URB Bath University RSL	Bath	0.001	D
855	Sunshine 855	Ludlow	0.15	A B D	1458	Sunrise	London	125	B D
855	BBC Radio Lancashire	Preston	1	C E	1458	BBC Asian Network	Birmingham	5	D
855	BBC Radio Devon	Plymouth	1	D*	1458	BBC Radio Devon	Torquay	2	D
873	BBC Radio Norfolk	West Lynn	0.3	B	1458	BBC Radio Cumbria	Whitehaven	0.5	C E
936	Fresh AM	Skipton	1	E	1485	BBC Radio Humberside	Hull	2	C*
936	Classic Gold	West Wilts	0.18	A B	1485	Classic Gold	Newbury	1	B D
945	Classic Gold GEM	Derby	0.2	B C*	1485	BBC Radio Merseyside	Wallasey	2	C* E
954	Classic Gold	Torbay	0.4	D	1503	BBC Radio Stoke	Staffordshire	1	A* B* C* D* E*
954	Classic Gold	Hereford	0.16	B D	1521	Classic Gold	Reigate	0.64	B E*
963	Asian Club	Hackney	0.95	B C* D	1530	Capital Gold	Worcester	0.52	D
963	Asian Sound Radio	Haslingden	0.2	E	1530	Classic Gold	Huddersfield	0.74	E
972	Asian Club	Southall	1	B D	1548	Forth 2	Edinburgh	2.2	C*
990	BBC Radio Devon	Exeter	1	A D	1548	Magic 1548	Liverpool	1	E
990	Classic Gold	Wolverhampton	0.09	B D	1557	Capital Gold	Southampton	0.5	B
999	BBC Radio Solent	Fareham	1	D	1557	Capital Gold	Northampton	0.76	B
999	Magic 999	Preston/Blackpool	0.8	C* E	1557	BBC Radio Lancashire	Dxcliffe	0.25	C* E
999	Valleys Radio	Ebbw Vale	0.3	D	1566	BBC Somerset Sound	Taunton	0.6	C* D
999	Classic Gold GEM	Nottingham	0.25	B	1566	County Sound	Guildford	0.8	B C*
1017	Classic Gold	Shropshire	0.63	B D	1575	Stoke Mandeville Hospital (RSL)	Aylesbury	0.001	B
1026	BBC Radio Jersey	Trinity	1	D	1584	BBC Radio Nottingham	Nottingham	1	A* B
1026	BBC Radio Cambridgeshire	Cambridge	0.5	B D	1584	BBC Hereford & Worcester	Woolferton	0.3	D
1035	Easy Radio London	Crystal Palace	1	B D*	1584	Tay AM	Perth	0.21	C*
1035	West Sound	Ayr	0.32	C*	1602	Desi Radio	Southall	0.07	B
1035	BBC Radio Sheffield	Sheffield	1	E*	1602	BBC Radio Kent	Rustall	0.25	C* E*
1116	Valleys Radio	Ebbw Vale	1	C*					
1116	BBC Radio Guernsey	Rohais	0.5	D					
1116	BBC Radio Derby	Derby	1	B C* D E*					
1152	Capital Gold	Birmingham	3	B D					
1161	Tay AM	Dundee	1.4	C* E*					
1161	Classic Gold	Swindon	0.16	B					

* = dark

Listeners:-

A	Sheila Hughes, Morden
B	Fred Wilmshurst, Northampton
C	Eddie McKeown, Newry
D	Simon Hockenhill, Bristol
E	Noel Cosgrave, Republic of Ireland

Tropical Band Table

MHz	UTC	Service	Country	Listener	MHz	UTC	Service	Country	Listener
9.000	0400	Trans World Radio	MCD/SWZ	D	4.890	0505	Radio France Int'l	F/GAB	D
3.210	0355	WWCR, Nashville	USA	A D	4.895	2225	Radio Ulan Bator	MNG	D
3.240	0410	Trans World Radio	MCO/SWZ	D	4.905	2130	Xizang Lhasa	CHN	A D F G
3.255	2115	BBC World Service	G/AFS	A D F	4.910	2130	ZNBC Radio 1	ZMB	A D F G
3.279	0430	La Voz Del Napo	VEN	D	4.910	0155	All India Radio, Jaipur	IND	D
3.306	0415	Zimbabwe Broadcasting, Gweru	ZWE	D	4.915	2130	GBC 1 Accra	GHA	A F G
3.320	2115	SABC Meyerton	AFS	A D F	4.915	2220	Radio Anhanguera	B	D
3.345	2135	Channel Africa	AFS	A D F G	4.915	0235	Radio Difusora, Macapa	B	D
3.350	0430	Radio Exterior Espana	E/CTR	D	4.920	0430	Radio Quito	EOA	D
3.915	2110	BBC World Service	G/SNG	A B C D F G	4.920	2145	Xizang Lhasa	CHN	A D F G
3.955	2114	Radio Korea International	KDR/G	C F G	4.920	0150	All India Radio, Chennai	IND	D
3.955	2120	Deutsche Welle	D	C	4.930	1942	Turkmen Radio	TKM	G
3.955	0435	WYFR	USA/G	A	4.930	2135	All India Radio, Shimla	IND	A F
3.965	1924	Radio France Int'l	F	G	4.950	1948	Voice of America	USA/STP	G
3.975	1926	Radio Budapest	HNG	G	4.960	0445	Voice of America	USA/STP	A
3.985	1928	Voice of Islamic Rep of Iran	IRN	G	4.965	2105	Christian Voice Radio	ZMB	D G
3.985	2120	Deutsche Welle	D	B F G	4.975	2115	Radio Uganda, Kampala	UGA	D
4.005	2100	Vatican Radio	CVA	A B F G	4.985	0205	Radio Brasil Central	B	D
4.765	0245	Radio Emissora Rural	B	D	5.010	0215	All India Radio, Thiru'puram	IND	D
4.770	2130	FRCN Kaduna	NIG	A D F G	5.015	2158	Turkmen Radio	TKM	G
4.783	2150	RTM Bamoko	MLI	A D G	5.015	2140	All India Radio, Thiru'puram	IND	A
4.800	2215	CPBS 2 Beijing	CHN	D F G	5.025	2155	Radio Uganda, Kampala	UGA	A
4.800	2200	CNR1 Shijiazhuang	CHN	A	5.025	2151	Radio Tashkent	UZB	G
4.800	0215	All India Radio, Hyderabad	IND	D	5.025	0400	Radio Rebelde	CUB	A D G
4.805	0150	Radio Dif Do Amazonas	B	D	5.030	2210	Radio Burkina	BFA	D G
4.815	0245	Radio Difusora Londrina	B	D	5.047	1932	rtt Lome	TGO	G
4.820	2210	Xizang Lhasa	CHN	A D F G	5.050	0235	WWRB, Manchester	USA	D G
4.830	2225	Radio Ulan Bator	MNG	D	5.070	0410	WWCR, Nashville	USA	A D G
4.835	2135	RTM Bamoko	MLI	A D E G	5.085	0405	WWRB, Manchester	USA	A D G
4.835	2141	VLBA Alice Springs	AUS	G	5.105	0415	WBCCO, Maine	USA	A D
4.840	0007	Radio Heilongjiang	CHN	E					
4.840	0215	All India Radio, Mumbai	IND	D					
4.845	2140	ORTM Nouakchott	MTN	A D E F G					
4.860	0155	All India Radio, Delhi	IND	D					
4.875	0230	Radio Dif Roraima	B	D					
4.885	0235	Radio Dif Acreana	B	D					
4.885	0235	Radio Clube Do Para	B	D					

DXers:-

A	Vic Prier, Seaton
B	Thomas Williams, Truro
C	Simon Hockenhill, Bristol
D	Jim Edwards, Wigan
E	Noel Cosgrave, Republic of Ireland
F	Eddie McKeown, Newry
G	Mike Casey, Manchester

surname I managed to get wrong a couple of months back.

Reports

Bernard Curtis has been keeping an ear on **1008kHz** as there had been reports that Radio 10 Gold were to relaunch on 1 July. Sure enough, right on cue, the station appeared and is a very respectable signal here in Berkshire. Radio 10 Gold lost out in a major shake up of frequency distribution in Holland last year. They have been looking for a suitable outlet ever since.

1008kHz had been assigned to RadLon, a UK-based outfit, hoping to launch a music-based retro station, beamed to this country. A couple of test transmissions were made last year but there has been no obvious progression with the project since. RadLon finally relinquished the frequency, sold the licence to Radio 10 Gold and says it will look for an alternative.

Closer to home, Bernard visited the West of England radio rally, which replaces the annual shindig at Longleat. The rally itself was a bit of a disappointment. However, whilst there, he used the occasion to take out a three-year subscription for *SWM*. Good man!

A couple of new services to listen out for in the lower limits of the 9MHz band: one up and running, one proposed (at the time of writing). First up, Kiss Radio on **9.290MHz**, beaming out of facilities in Latvia. The station's inaugural transmission went out at 0800 on 11 July. Their mission? To broadcast

soul music to Europe. Fine. They're anxious to receive reception reports via E-mail. Go to their website for more details - www.kiss9290.net

In the pipeline, according to a report carried by hard core DX website, is the Voice of New Sudan, which was slated to start testing on **9.310MHz** on 14 July.

Full time transmissions from the station, based in southern Sudan, were planned to begin around a week later. A communication from an insider revealed that the schedule was likely to be 0700-1500 from a 50kW and dipole combination. Reports welcome to voiceofnewsudan@eikmail.com

Two new stations to click onto if you have access to the Internet. Mid July saw the first live Internet transmission from Baghdad. The station, Radio Nas, broadcast a two-hour programme via www.streamtime.org in English, Arabic, German and Spanish.

Meanwhile, a live stream of Palestinian radio station Radio Isis is available through their website www.radioisis.net where news in English is broadcast at 1600 and 1800 each day from their studios in Bethlehem.

News

A press release from the Digital Radio Mondiale consortium details the Voice of Russia's successful implementation of DRM and their plans to roll-out the technology further. VOR currently broadcasts a multi-language DRM package to Europe from its short wave facility in Taldom, and a medium wave outlet on **603kHz** in Zehlendorf,

Germany. The intention is to expand their reach beyond Europe in the near future using additional, DRM-adapted transmitters, including senders in Irkutsk and Khararovsk. I'm still waiting for my first DRM report from you. I guess it may be some time in coming.

A news story doing the rounds right now is that YLE Radio Finland is to close its external service down with a view to cutting expenses. Satellite and Internet delivery would be expected to fill the void. However, a YLE response denies this, stating that transmissions would continue at least until 2006. That said, it may be time to get your QSL card, just in case.

Bargain Radio

Finally, those of you looking for a cheap and cheerful radio to throw in your luggage when jetting off to the sun may be interested to know that for under a 'fiver', Superdrug, and now Aldi UK may have just the thing. The Superdrug radio offers medium wave, f.m. and eight short wave bands and digital readout but with analogue, thumbwheel tuning, so no memories. There's an on-board alarm clock and a pull out stand. And if it gets stolen or immersed in the ocean, no big deal. Grateful thanks to those that have sent in their logs. Opinion was split 50/50 regarding the hourly block method of presentation so we'll keep it the way it is for now and have a review some time in the future. Have a great month and see you next time.

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:3.0dB 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.

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*FREQ:1-50 MHZ *LENGTH:200cm *SOCKET:SO239 *RADIALS:NONE

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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:3.0dB 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.

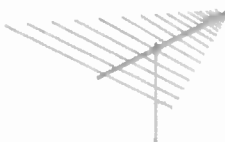


Beam Antennas

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

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*FREQ:50-1300 MHZ TX & RX *GAIN:10-12dB *LENGTH: 300c

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*TYPE: TWIN COIL *FREQ:25-2000 MHZ *LENGTH: 65cm
*BASE:MAGNETIC *CABLE: 4m WITH BNC

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*TYPE:4 WHIPS *FREQ:25-2000 MHZ *LENGTH:65cm *BASE:MAGNETIC *CABLE:4m WITH BNC

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*TYPE:DISCONE STYLE *FREQ:25-2000 MHZ *LENGTH:90cm *CABLE:4m WITH BNC

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*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

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*TYPE: ACTIVE PRE-AMP *FREQ:25-1800 MHZ *GAIN: 14dB *LENGTH: 140cm *CABLE: 4m WITH BNC

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MWA-HF MKII (EXTERNAL DELUXE HF ANTENNA)

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*TYPE:WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH: 25M
*CABLE: 10m WITH PL259



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*TYPE: WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH:25M
*CABLE:10m WITH PL259



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

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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

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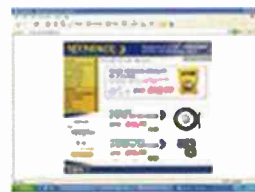
*FREQ:137.5 MHZ *GAIN:25.0dB *POWER:9-15v *CABLE:1m BNC-BNC

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★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

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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).

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Optional Case.....£17.99

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P/R **£419.00**
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FAIRHAVEN RD-500VX+

The best of British

Superb wideband receiver (all mode) with over 50,000 memories capable of holding text. 20kHz-1750MHz. Incl's remote control, power supply, PC lead and software. RRP: £899.00. Our in-house comparison tests have shown this unit to out perform those of double its price - a true professional receiver!

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£699.99

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YAESU VR-5000

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New comprehensive scanner (25-512MHz/806-1300MHz) Alpha Tag, PC cloning control. Smart scanner + trunk track facility. Includes power supply. ARC-780XLT "Butel-Software". (works 95/98/ME/NT/XP)£39.99

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GRE PSR-225

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✓ **£199.99** Del £10.00



NEW EUROPEAN VERSION

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ALINCO DJ-X10

Full-featured handy. 100kHz-2GHz all mode. Includes SSB/CW band scope, alphanumeric display plus loads more. *Simply a vast - great even at medium wave.* (Includes battery/drop-in charger).

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YUPITERU MVT-7100

Wideband hand-held scanner covers 500kHz-1650MHz. (All mode). Includes nicad/car charger/charger/antenna. Extremely user-friendly hand-held receiver with outstanding performance unmatched by its rivals.

Years of practice and this model still outsells almost any other handheld in its range.

Soft case for 7100EU/9000 - specify£19.99
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ICOM IC-R5

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ALINCO DJ-X3

Micro-handly scanner. 100kHz-1300MHz. 700 memories/stereo FM (earphones)/attenuator/bug detector/audio descrambler. AM/FM/WFM/Selectable tuning steps (incl's 8.33kHz).

You couldn't fit much more into this compact scanner if you tried

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Optional battery pack and drop in charger £39.99

Soft case£15.99
PC interface£42.95
Cigar light lead£19.99

Bandscan

Australia

- **Greg Baker** PO Box 3307, Manuka, Australia
- **E-mail:** greg@worldgraphics.com.au

The government has announced the merging of the present Australian Broadcasting Authority (ABA) with the Australian Communications Authority (ACA) to produce what will be known as the Australian Communications and Media Authority.

Coincidentally, or perhaps not, in the tangled worlds of media and politics, the much-maligned chair of the soon to be merged ABA, Professor David Flint, has resigned just months short of the natural expiry of his contract. Flint has been under great pressure for what media commentators see as a conflict of interest between his official duties to regulate the broadcasting sector and his private support for high profile media players under investigation by the ABA in what is called the 'cash for comment' scandal.

In this scandal, high flying radio personalities have been accused of not disclosing on-air their acceptance of large sums of money to promote major companies. Flint has been toughing it out, saying that his early departure was not forced, but to give the government freedom to develop the new merged body. That seems far-fetched to most commentators who say there is no rush to do this in the time before Flint's term would have expired. The new body will begin on 1 July 2005.

Olympic Flame

The Civil Aviation Safety Authority (CASA) has made much of a radio system it says has helped guide the Athens-bound Olympic flame into Ayers Rock airport in the Northern Territory. The airport there has no air traffic control because, CASA says, there is insufficient air traffic to warrant such a service. However, the airport does experience 'peak periods' during which a radio operator provides up-to-date information on air traffic movements and weather data to assist pilots in the vicinity.

The passage of the Olympic flame in an A320 aircraft has been an ideal opportunity for CASA to boast its service. Clearly Ayers Rock is

busy enough for such a service, but not busy enough for real air traffic control. CASA has been under great pressure from pilots over the past year or so because of its approach to airspace management. Much of Australia's vast airspace has become unregulated and many pilots believe that sooner or later there will be a mid-air collision.

Optus Satellite

Telecommunications provider Optus has signed with Arianspace to launch its D-series satellites, *D1* and *D2*. *D1* will be launched by Ariane rocket in 2005 and *D2* by Soyuz in 2007. Both launches will be from Kourou in French Guiana. The two satellites are being built by Orbital Sciences Corporation and are expected to have useful lives of around 15 years. Optus claims that the Soyuz launch will be the first from French Guiana for the Russian rocket, which is usually launched from the Baikonur facility in Kazakhstan.

Fourth Network?

There has been much speculation of recent days about the possibility of a fourth free-to-air commercial television network, making a total of six networks including the ABC and the Special Broadcasting Service. The spectre of the dilution of audiences and advertising revenue even further among free-to-air and pay television segments has been raised.

Opponents - mainly current media players - point to the fact that the USA has six networks servicing 270 million people and the UK has five networks for 60 million people. Australia's population is 20 million.

The speculation has come following the government announcement of a review of digital television policy. Commentators are puzzled at the government's wisdom in potentially upsetting powerful media interests in the lead-up to an election but are speculating that the opposition Labour Party, too, may have this in mind.

There has also been speculation that promoters of a fourth network would broadcast only Australian shows. In the wake of the

furor, the peak industry body, Commercial Television Australia has changed its name to Free TV Australia. Free TV Australia can be found via www.ctva.com.au

South Australia

The ten-year saga of the South Australian government emergency services network drags on. Having spent AUS\$226.5 million (£88 million) the government have now withheld a payment from telecommunications contractor Telstra following concerns about network service in the lead-up to the December 2004 completion date. The network covers over 220,000 square kilometres in South Australia's south and takes in all but about five per cent of the state's population. It is used by police, ambulance, emergency services, urban fire fighting services and country fire services.

A review last year noted dissatisfaction of some users and the great vulnerability of a single network solution for all these services. In addition, it is reported that network security could be easily breached by people possessing readily available software.

Reception Reports

Michael Beasley from Romsey in Hampshire is still using his Sony ICF-2001D and Sony ICF SW-100 with a loft-mounted random wire antenna. With this gear he has heard Radio Australia (RA) at 0500 on 15.160MHz rated 45444; 0430 on 13.630MHz, 55544; 0610 on 15.415MHz, 34433; 0615 on 17.750MHz, 14431; 1645 on 9.475MHz, 44333; 0450 on 15.515MHz, 35533; 2250 on 13.620MHz, 44433 and 1930 on 9.500MHz, 45544.

In addition, Michael has logged Radio New Zealand International (RNZI) at 0600 on 9.615MHz rated 44433; 0730 on 9.885MHz, 33533; 0445 on 15.720MHz, 35522 and 1930 on 9.845MHz, 24222. Michael notes that RNZI has been better this northern summer than most years. Finally, he has heard HCJB Australia at 0800 on 11.750MHz rated 33433. **Martin Gardiner** from Portsmouth has also pulled in a good signal from RA at 1900 on 9.500MHz using his Icom receiver.

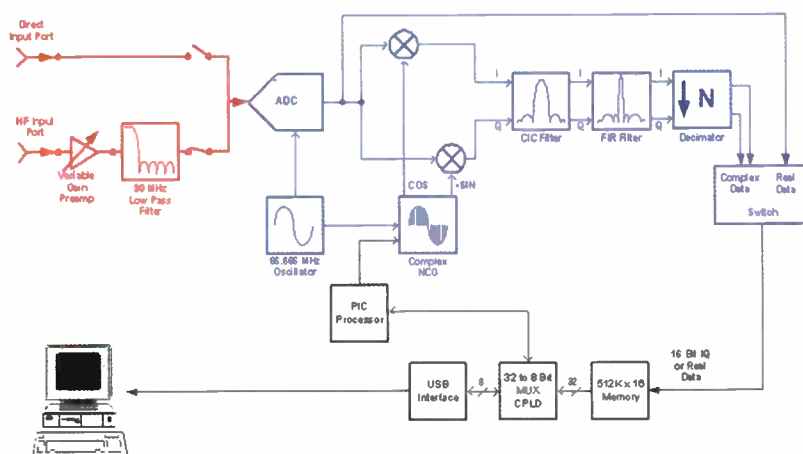
I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by SWM readers so I can chase up more details and interesting snippets from this end. My address is **PO Box 3307, Manuka, ACT 2603, Australia**. For personal replies please send two IRCs. Those with an Internet connection can get me at greg@worldgraphics.com.au

Another First from the UK's First RFSpace SDR-14

Kevin Nice takes us through the new SDR-14 software defined radio from USA based manufacturer RFSpace - here's the first part of his findings.

On initial examination the SDR-14 appears nothing like a conventional radio. There are no knobs, buttons or dials. Actually there are no user controls whatsoever. The only external features on the light-weight 235x27x190mm box are connectors and I.e.d.s.

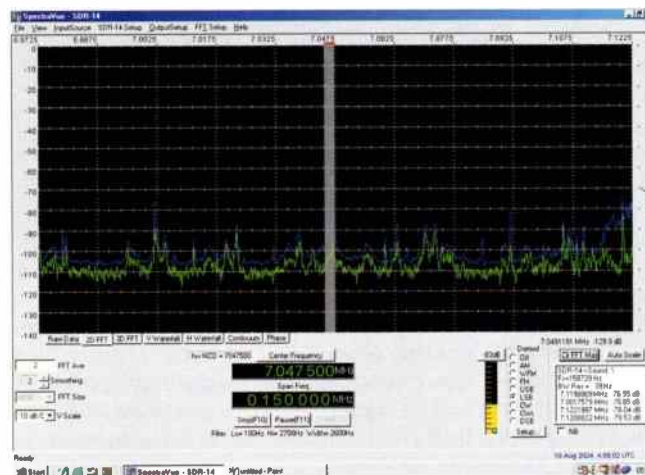
If you have fixed ideas about how h.f. receivers should look and operate, prepare to have your views changed. The SDR-14 really is nothing like a conventional radio. Since the SDR records all the data for the whole 150kHz all signals that were present during the record duration are captured - that's everything between the lower limit and 150kHz higher - in other



● Fig. 1: The SDR-14 schematic.

for the duration of the recording. The fidelity of the file is superb with over 96dB of dynamic range. The recording can be played back at any time with full tunability and choice of demodulation modes. The recording can also be analysed for hidden signals and carriers.

● Fig. 2: The main SpectraVue screen. Here the SDR is receiving around the centre frequency of 7.0475MHz. The whole of the 40m amateur band is visible in the 150kHz displayed. This is the view using the 2D FFT spectrum window. Along the top of the window is shown the graticule values in MHz. The data immediately below the FFT window to the right refers to the mouse driven cursor position. Both the frequency and level are shown. The 'S' meter is the vertical bar with the yellow lower fill. The meter is set by me to read in dBm and show that the signal seen at 7.0475 has a level of -83dBm. The small blue square represents the squelch level. If the signal level falls below this threshold, which is changed simply by clicking and dragging it up or down, then the audio is muted. The audio I could hear when the screen was captured was that of a German amateur calling CQ. The demodulation mode was obviously set to I.s.b. as per the band-plan you can see the filter width and position which is represented by the grey band to the left (l.f) of the centre, adjacent to the 'S' meter are the demodulation options.



words 30 5kHz channels on a short wave broadcast band or all of the 40m amateur band with some to spare!

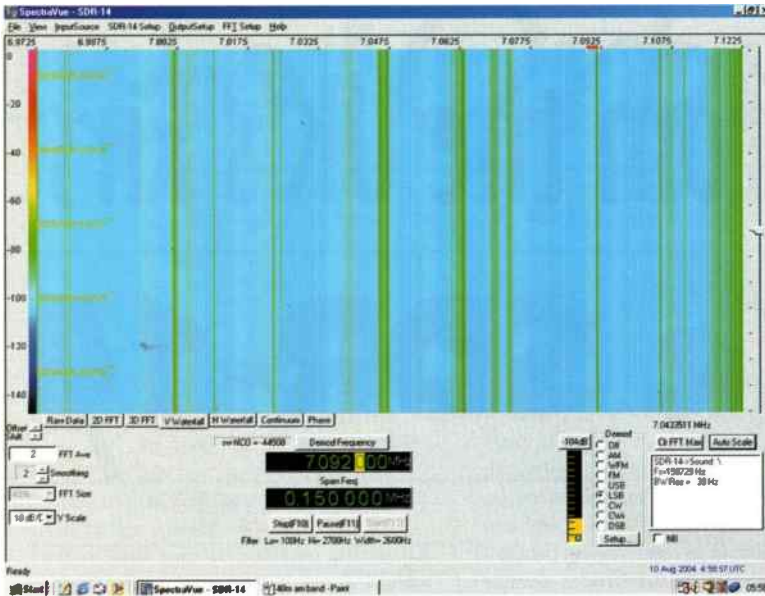
RFSpace themselves say that one of the most exciting features of the SDR-14 is the ability to record band segments of any band to your hard disc in real-time. This is done at a rate of 52GB/day for a 150kHz wide segment. The stored file contains everything that happened in that segment of the band

At the time of writing the SDR/SpectraVue combination can demodulate the following modes: u.s.b., l.s.b., a.m., n.b.f.m., w.b.f.m., c.w., c.w.r and d.s.b. Filter bandwidths are continuously adjustable. The vendor also says that DRM is now supported via special modes using third-party software (*DREAM*) by routing the demodulated audio through the PCs mixer control.

Unlike A Radio

Unlike the WinRADIO G-303i, which JW reviewed back in the February issue of *SWM*, the SDR-14

doesn't have any front-end filtering, but its performance seemed to be relatively unaffected by this absence. The architecture of the unit can be seen in Fig. 1. It's worth noting that the SDR-14 doesn't have any hardware a.g.c. either. I know John will be most unimpressed by this. Although, I don't have the test gear that JW developed to produce definitive results for the systems gain control, I experienced nothing to suggest that this was an area to cause concern. Over the period I've been using the receiver



● **Fig 3:** Here you can see the vertical waterfall spectrum display, which shows SP5XVY/1 working G6SFC on 7.092MHz then working a string of other stations. Now the demod filter is just represented by the red bar at the top edge of the screen. The frequency display is now in 'Demod' Mode. The 'S' meter no longer refers to the centre of the span, instead the demod frequency off to the right (h.f.). Note the time/date stamp up the left-hand-side of the spectrum display.

I've not spotted any signs of the system being overloaded

Getting Going

The installation process for the SDR-14 is pretty straightforward. It proved even simpler for me as I'd been running the software side of the receiver for a few weeks before the arrival of the SDR-14 hardware.

I'd downloaded and installed the *SpectraVue* user interface come d.s.p. back-end via the RFSpace website to get a feel of the facilities on offer. I recommend doing this as you can drop yourself right in the 'driving seat' by also transferring some of the huge sample files.

I checked versions and I was already up-to-date, plus I had all the samples painstakingly saved from the website as mentioned above. A warning - don't download the files with a modem - it will drive you mad!

The largest file is some 195MB+. This represents about five minutes of off-air, 150kHz wide spectrum, sampled and saved by an SDR-14.

The RFSpace SDR-14 is a 14-bit software defined radio receiver. It offers a broad range of spectrum analyser and demodulation capabilities. The hardware samples the whole spectrum between 0-30MHz using a sampling rate of 66.667MHz. The digital data from the ADC is processed into I and Q format using a direct digital converter (DDC). The I and Q data is then sent to the PC for processing using a USB 1.1 interface. All of the demodulation and spectral functions are done on the PC side. The connection between the SDR-14 and your PC is the limiting USB 1.1 connector on the rear panel. Why do I say limiting? You'll see why later.

When the hardware arrived, it was supplied with everything needed to interconnect with the PC and a CD containing the installation software to load drivers and the latest version of *SpectraVue* plus the off-air samples.

Connecting up the SDR-14 box was easy, find a space in the shack, route the data cable to the PC under the desk, find the SMA to BNC adapter. Half an hour later I



remembered it was in the car! Next job for me was to swap out the five-way splitter for an eight-way, 'cause it'd run out of ports. That done I had access to my shared h.f. antennas. Then it was the power supply. The SDR-14 is provided with a switched mode wall wart affair, small and lightweight. The input voltage limits are 100 to 240V a.c. so there's no problem with the UK mains supply.

Unfortunately, it has US style flat pins - no problem there thinks I - search out a 'shaver adapter' and I'm up and running. Not so! The fuse in the adapter can't take the supply's inrush current so 'pop' it goes. I'm getting impatient by this stage... More searching and I found a higher rated fuse and all's well. It's worth noting this problem, as the steady state current of the p.s.u. should easily be maintained by the 1A fuse that was present in my adapter. The supply's output current is 1A and that's at 12V so, even if the p.s.u. is only 50% efficient then the input current would be only 100mA. However, I suspect that it's much higher if you happen to catch the mains cycle in the wrong place when plugging it in.

Unlike the other consumer computer based radio the SDR-14 remains external to the essential PC that is required to perform the demodulation, display and storage functions.

You've probably realised that unlike the WinRADiO offerings, the SDR-14 doesn't use the soundcard. Instead it delivers digitised I and Q data straight to the PC's USB port. There are several benefits to this arrangement. Firstly, the PC has to perform less by way of d.s.p. calculations so you get more performance for £ of PC. Or, in other words, you can use a lower specification of PC. My testing utilised a 900MHz Pentium running *Windows 98* and this set-up performs perfectly adequately, providing both a smooth responsive display and introducing a just perceivable delay to received audio. It

has to be said that other tasks running concurrently does cause occasional ticks of silence - but that's what you must expect running a minimum specification machine. By way of contrast a G303i wouldn't be usable on that specification of PC. Then again, you can no longer buy a PC of such lowly capability - and it's only two years old!

Controls

I mentioned earlier that the SDR-14 has no controls. Every function of the receiver is

access via the *SpectraVue* software. This software is not entirely written for the SDR-14 and is available as a free-standing package that will operate in conjunction with a soundcard. That version can be purchased from the authors, Moetronix. The version supplied by RFSpace does not support soundcard input and is the users interface with the hardware. *SpectraVue* provides the front panel with seven optional windows to display the real-time spectrum captured by the system more of this in a moment.

As you'd expect the ability to tune the radio also features on this screen. Big shock! There is no tuning knob in sight! I can hear those JW screams as I type. What you do get though, is two digital displays stacked one above the other below just left of horizontal centre beneath the main spectrum display. The upper has 10 digits - though the two most significant are not usually



● The circuit board of the SDR-14.

illuminated. These windows very cleverly both display and control either the centre or demodulation frequency. The lower window allows the user to specify the viewable bandwidth (span) from a maximum of 150kHz all the way down to 1Hz. The minimum resolution for the tuning control is also 1Hz. Tuning via these controls is so simple it's a joy. Initially I found it frustrating that it's not possible to directly type in a frequency of choice. However, the solution provided really removes the need.

Tuning can be accomplished in two ways. Firstly, with the radio button above the upper - ten digit - window toggled to 'Center Frequency' rather than the alternative 'Demod Frequency', you simply use your mouse to align the cursor on the digit you wish to change. Alignment is confirmed by the digit's background changing from its normal black (this is the out-of-the box set-up, but the colours can be configured by the user if required), to yellow. By clicking above the digit's centreline the value is incremented, click below the centreline and it's decremented. This really is effective and can produce rapid changes with few mouse clicks. In no time at all, you're working out in milliseconds which is faster, incrementing the decade above and the stepping down to the desired value or incrementing the digit requiring setting. Usefully, the incrementing the digit a decade higher zeros all the less significant digits. For instance, say you are tuned to 11.175MHz it's possible with two mouse clicks to tune to 11.000. This is done by clicking on the upper half of the MHz unit which has the effect of tuning the SDR-14 to 12.000MHz, another click in the lower half of the same digit takes us to 11.000MHz. Pretty efficient eh? Clearly the span display works in the same way. It's obvious that there's been much thought been put into this arrangement. I've mentioned that there are two ways of tuning this radio, the second is achieved by simply 'clicking' in the spectrum display window. There are two outcomes to such an event. With the aforementioned 'Centre' or 'Demod' button still set to 'Centre Frequency', a click on any part of the Spectrum window will retune the receiver via the 'hw NCO' to the frequency represented by the cursors position in the window. When the SDR-14 is retuned in this way the displayed frequency correspond to the centre of the spectrum window. As the cursor is moved around the window this frequency is continually displayed along with a corresponding signal level below the window on the right hand side of the screen. Note that the cursor value is a multiple of screen resolution and seldom is replicated exactly by the tuned value. The

error is only in single Hz however. This method of tuning really lends itself to jumping to displayed signals of interest.

With the Centre/Demod button set to Demod, things work slightly differently and this can only happen when a demodulator has been selected - that's coming in a while. Instead of the spectrum shifting around a new centre point defined by the mouse click, the spectrum remains fixed and the demodulation point shifts away from the centre of the display instead. This time a second VCO, the sw VCO is utilised to program a positive or negative shift value from the main hw VCO. The demodulation point is shown by either the grey vertical line (in the 2D FFT window) or a filter shape representation. The demodulation point frequency is display in the 10 digit display.

Sadly, that's all the space used for this month. Next month I'll conclude my look at the SDR-14 by covering the demodulation options and configuration, plus I'll be looking at the performance. I'll be sure to let you know how well it performs in the 'JW 9kHz m.w.' test. **to be continued...**

Specifications

RF	
Input Port - Direct:	(0-230MHz) SMA socket
Input port - h.f.:	(0-30MHz) SMA socket
Impedance:	50Ω (1.5:1 VSWR Max)
MDS:	-136dBm (Typical) 500Hz BW (ATTN=0dB)
SFDR:	96dB (Typical)
Computer Interface:	USB (v1.1 or 2.0)
Sampling Rate:	66.667MHz
Demodulation: (Software Defined)	u.s.b., l.s.b., n.b.f.m., w.b.f.m., c.w., c.w.r., a.m., d.s.b. DRM Ready using 12kHz i.f. Mode (Requires two sound cards and DREAM or DRM decoding software)
Export:	Data in CSV formats Plot in BMP and RAW format Complex and spectrum in WAV format Real-time I/Q samples (150kHz wide)
Capture Memory:	512x16bit
FFT Size:	2048 - 262144 point
System Requirements	
Minimum Hardware:	Pentium III 800MHz, Pentium 4 or Athlon XP 1600
Operating System:	Windows 98, 2000, ME, XP 256MB or RAM AGP Video Card with 32MB of RAM 16-bit SB compatible soundcard and speakers CD-ROM drive for software installation
Recommended Hardware:	Pentium 4 2.2GHz, Athlon
Operating System:	XP 2000 Windows 2000, XP 512MB of RAM AGP 14x Video card with 64MB of RAM 16-bit SB compatible soundcard and speakers USB 1.1 or 2.0 port CD-ROM drive for software installation

radios

& rally cars

Clive Hardy takes a look at the radio communications used by the World Rally Championship and other similar events and in doing so provides an insight into these often breathtaking competitions.

The World Rally Championship (WRC) visits the UK this month with the *Wales Rally GB*, the current name for what most of us still know as the RAC Rally. The event will see decal covered cars, which look otherwise similar to their showroom counterparts being propelled along narrow gravel tracks at amazing speeds. Spectators get closer to the action than at almost any other motor sport. Drivers, backed-up by legions of technicians and administrators, each trying to be the quickest to get their car along those tracks.

Just like any other organised event, a car rally needs good communications to achieve a successful outcome. The bigger the event, the greater the number of channels of communication required. Any event where mobility is a factor, and rally cars are



certainly mobile, needs mobile communication - that means radio...

What is a Rally?

Although speed is of the essence, a rally is not a race but a time trial. The cars travel sequentially, starting at one minute intervals, along sections of the route, known as stages, from the start to the finish of the event.

Some stages of the route are on public roads and are un-timed. They are only there to link the other, timed, 'special' stages, where the important action happens. Special stages are not on public roads and can vary in length from a few to several tens of kilometres.

The crew of a rally car consists of a driver who drives the special stages and a navigator who also acts as co-driver for the un-timed



Picture courtesy of Subaru World Rally Team

stages. Whilst the WRC is the pinnacle of rallying, with its works teams and professional drivers, for the countries, which host one of its rounds, it is only one of many events in its annual rally calendar.

Every weekend thousands of car enthusiasts take to the hills and dales to watch, enter, or officiate in smaller rallies organised by local, regional and national clubs across the UK and beyond. Even a local rally organised by a small club can involve between 50 and 200 cars. Such events usually run for fewer than 24 hours.

This year's Wales Rally GB takes place over three days from Friday 17 to Sunday 19 September and has 19 special stages covering just under 400km. Winning this, as with any other rally, is achieved by the crew who get their car through all the special stages in a cumulative time that is less than that for any of the other cars.

Basic Communication

Outside of the WRC few rally cars have on-board communication other than a mobile 'phone in the co-driver's pocket. Occasionally competitors will use Private Business Radio (PBR) or Citizens' Band (CB), but as most drivers don't have any sort of support crew to talk to, the need for radio comms in the cars is almost non-existent. Radios are used by the officials and safety teams though.

The most visible of the safety personnel are the marshals and surprisingly, you may think, the 'foot soldiers' in the marshalling ranks are not equipped with radios. Instead they report to and receive information from radio cars placed strategically along the special stages.

The marshalling radio cars, ideally manned by two people, stay at a fixed pre-determined location for the duration of a special stage. They are in radio contact with the course controller on '81FM', the 10 watt f.m. simplex 'Safety & Medical' frequency of 81.575MHz. The radio sets used are mobiles connected to roof mounted antennas.

Long before the event begins the course controller has to find a place to operate from that is at a high enough position to ensure solid communication with all of the radio cars and the main Rally HQ. This requires careful planning as the start and finish of some stages can be several tens of kms apart.

As the name given to the channel implies, medical crews may well be on the frequency, either monitoring or in communication with the controller. The Motor Sport Association (MSA) requires CTCSS to be used and has currently authorised two tones, thus allowing radio cars on different stages running at the same time to operate without radio traffic for one stage being heard by radio cars on the other.

The Tait 2010 4-channel radio is popular with 81FM users and typically has the frequency with the two different CTCSS tones programmed to its channels 1 and 2, with 3 and 4 programmed to channels with the MSA designations 'Red Open' and 'Blue Open'. They are low-band v.h.f. channels in the UK General licence allocation. As well as the Red and Blue channels there are Orange, Green and Yellow channels, these are also low-band UK General frequencies around 86MHz.

The colour coding is MSA specific and not used by other UK General operators. Each colour has an 'open' channel, plus channels 1, 2, and 3, e.g. Green Open, Green One, and so on. All channels of one colour are on one frequency. The channel numbers are for different CTCSS tones.

The UK General licence allows the use of any number of 5W hand portable or mobile radios on 15 specific frequencies between 77 and 450MHz anywhere in the UK, and at a cost of just £60 for three years.

Official Channels

As well as 81FM, which is the primary safety channel, there are generally two administration channels available for use by officials in order to keep the 81FM safety frequency clear from unauthorised traffic. These can be duplex channels using repeaters with outputs around 86MHz, with either two separate channels being used, or all the traffic using one channel depending on the size of the event.

SWM Rally

Picture courtesy of Ford Rallye Sport



- The Tait 2010 4-channel radio is a popular choice with 81FM users.



If both are used, the first channel, designated 'A', is used by the Clerk of the Course to communicate with various officials such as the Stage Commanders and Chief Spectator Officer. The 'B'

channel is used by radio cars located at the start, finish and at intervals (typically 5km) along a special stage. The information passed on the 'B' link concerns the locations of competitors on the stage.

Two reporting systems are used, positive and negative. In both cases the start and finish cars report the number and time of competitors passing their locations. When positive reporting is used the radio cars' crews along the stages report the number of each car that passes them. For negative reporting, the numbers of the passing cars are noted by the crews of the radio cars and only 'missing' cars are reported over the channel.

A competitor stopping on a special stage is reported by marshals to the nearest radio car, which then inform control. If repeaters are not used, or cannot be accessed from

particular points along a stage, one or other of the simplex colour channels maybe used to pass information.

A short but extremely important radio link is between the finish and stop line officials. Whilst this may be on the 'B' channel, it may on occasions use PMR446 or some other *ad hoc* channel. As a car crosses the finish line, usually at considerable speed, its time is recorded by a timekeeper.

Before the event, the finish line clock used will have been synchronised with the clock used at the start line. Electronic devices

connected to the clocks are used to indicate the start time to the driver and the finish time to the timekeeper. Having crossed the finish line, the car has to pull-up at the stop line, which is likely to be some way further along the stage. As the car is arriving at the stop line, the finish line timekeeper radios the car's time to the stop line official who records it on the competitor's time card.

Callsigns

Operators on 81FM use callsigns approved by the MSA. The callsigns are usually numerical, prefixed by an abbreviation of the name of the club to which the user belongs. A callsign is allocated to an individual and is used by that person at all times. So, it is those calls, not ones relevant to their location or the event, which the operators use.

Because callsigns are not location specific it is obviously very important that the controller knows the relationship between the callsign and location of a radio car. To make life a bit easier for the controllers there are some exceptions to the callsign system.

Some clubs hold callsigns that aren't allocated to

individuals, but are allocated by the club to operators at specific locations on an event. For example, one club uses the callsigns 'Jupiter 1' and 'Jupiter 2' for the start and finish cars regardless of the operators' own calls. Senior officials, regardless of any individual callsigns any of them may have, commonly use the prefix 'Pilot', with alpha or numeric callsigns.

All doctors' callsigns, which are numeric, have the prefix 'Momo'. Rescue and recovery units, prosaically but functionally, use callsigns 'Rescue' and 'Recovery' prefixed with their relevant club identifier.

Rallitrak

At some non-WRC events competitors are issued with 'Rallitrak' radios, which are hand-held units using a trunked PMR system. Completely independent of any other system, their only use is for competitors to call for assistance when it is urgently required, not for routine exchanges.



● 'Rallitrak' radios are issued to competitors at some non-WRC events, these are hand-held units using a trunked PMR system.

The system enables competitors who have come to a halt on a stage to talk to the radio cars, which are fitted with mobile Rallitrak radios without interfering with radio traffic on the other channels. If nothing goes wrong then they aren't used.

Bristling With Activity

It's only when we get to the WRC itself that the cars themselves start bristling with r.f. activity. Lots of it, from v.h.f. upwards. Some of it voice, but mostly it's data as that's all that's needed to keep everyone who needs to know fully up-to-date with where the cars are and what they're doing.

Although the basic format of a World Rally Championship event is similar to any other rally, it's much much bigger. Cars are entered and supported by major manufacturers. The team budgets are huge, and as well as attracting armies of spectators, massive television audience tune in from around the world.

Some of the data is collected for the officials, some for the media and some for the team technicians. Data for the officials, collected via an on-board Global Positioning System (GPS) receiver, provide location and timing information, which is transmitted every ten seconds through a single u.h.f. time division multiplexed link, via an airborne repeater to ground based receivers. From there the data is sent over other Internet based networks to Rally HQ and elsewhere.



As part of the data tracking system the vehicles are fitted with sensors to detect and report opening of the vehicle's bonnet or boot, plus a couple of buttons for the crew to press should the car come to a halt on a stage. One button sends a signal indicating that the car's broken, but the crew's ok. The other that both are broken and immediate help would be very much appreciated.

Sky High Links

The airborne data repeater is fitted to a fixed wing aircraft that also carries all the major teams' v.h.f. voice repeaters. Whilst the cars are on the special stages the aircraft flies overhead, providing a reliable line-

of-sight link between the cars and the ground based stations.

Using airborne repeaters is the only option as the terrain and distances encountered on some WRC special stages can be very hostile to ground based radio communications. Creating a reliable terrestrial system for every stage would be prohibitively expensive. Putting all the repeaters in one aircraft not only reduces cost, it's a lot safer than having a squadron of light aircraft flying around quite close together.

As well as links from the cars to their team HQs and the service areas, some teams have additional links, which results in the aircraft sometimes being fitted with close to 30 repeaters. Like the u.h.f. data link, the frequencies will vary from event to event as dictated by the radio authority of the country where the rally is taking place, but they are usually somewhere within standard PBR bands.

Some of the cars maybe fitted with mobile 'phones as a second string of voice comms should the v.h.f. link fail, or as a secure alternative should the information that needs to be passed be too sensitive for a clear voice channel.

A separate GPS based system collects other data about the cars' place on the stage at any given time that are downloaded from the cars via a wireless Local Area Network (LAN) at the start and finish points. The data is used to produce images for the Virtual Spectator system, which overlays images of the vehicles over graphical representations on the stage. Cars can be made to appear on screen as if they are on the same part of the stage at the



continued on page 32

SWM RALLY

same time, enabling visual comparison of their progress. Great for the television fan and sports pundit!

Last but not least are the wireless LANs that are used to convey mechanical and engine management data collected by sensors on the car during the stages to a technician's laptop as the car drives up to a service area. This is only a very short range system, but it allows data to be collected just that little bit earlier than it could be if the car had to stop to enable a hard link to be made, and that's important in a sport where hundredths of seconds count.

Other Links

As well as all the methods of radio communications I've already mentioned, at larger events there are many Internet based links used between locations, plus other radio users such as the media, car park attendants, St. John Ambulance (which also has a UK General licence, but uses the frequencies around 170MHz so isn't likely to clash with the event comms), and caterers. The list goes on.

So, next time you look at a rally car there's no need to wonder what all those antennas are for and know you'll have some idea of who's talking to who when you see someone in a fluorescent jacket speaking into a radio as the cars hurtle by.

Happy listening!

SWM



Thanks to Dick Pease, Bath MC, Derek Machin, Silk Rally Radio and Nigel Lilley, MRTC and Mark Wilford of Ford BP Rallye Sport, Subaru World Rally Team and Mark Foster ZL1VMF for their valuable assistance with this article.

Useful Websites

www.fordrallyesport.com

www.taitworld.com

www.blakjak.net

www.silkallyradio.com

www.swrt.com

New Zealand Rallying

There are some UK events where radio amateurs, through the Radio Amateur Emergency Network (RAYNET), provide several of the comms links. In New Zealand there is a significant input from radio amateurs for its round of the WRC. For that event many of the 'A' and 'B' links are provided by a mix of h.f. and v.h.f. on amateur bands, augmented by 476MHz CB used by non

licenced officials. Known as Personal Radio Service (PRS) New Zealand's CB licence permits the use of repeaters on 16 (8 input, 8 output) of 40 u.h.f. channels. Helpfully, two of New Zealand's amateur v.h.f. repeaters provide good coverage of the area used by the rally. In addition, Amteur Radio Emergency Communications (AREC), the Kiwi equivalent of the RAYNET, sets up a temporary Short Term Special Purpose (STSP) cross band repeater to provide a link with rally HQ.

Motor Sport Can Be Dangerous!

Obviously, it's up to you if you go along to a rally and tune your scanner to 81FM or any other frequency. However, if you think that when you hear that something interesting has occurred on a stage you will be overcome with an overwhelming urge to rush to see it and in the process may:

a) decide to run full tilt across the rough ground found adjacent to special stages in an effort to give yourself a compound leg fracture
 b) drive your 4x4 across the same ground in such a manner that only fate decrees the number of spectators that you cause to leave the event horizontally

c) run along the special stage as a means of offering to unsuspecting competitors the chance of breaking open your head with their windscreens, but failing that, at least manage to distract the marshals from dealing with the original incident in order to maximise the risk to other people at a time when the safety resource in the vicinity is stretched.

If any of the above apply then throw your scanner away, stay at home and do a jigsaw!

Continuous Tone Coded/Contolled Squelch System (CTCSS)

The CTCSS system allows different groups of users to use a single frequency without hearing each others transmissions. With CTCSS equipped radios a sub-audible tone is transmitted along with the voice transmission.

There are currently about 40 tones which can be used. When the CTCSS is activated the radio will only allow received signals, which carry the correct sub-audible tone to open the squelch i.e. pass the voice signal to the loudspeaker. Transmissions with the wrong or without CTCSS tone will not be heard.

To minimise the possibility of an operator transmitting when the frequency is in use by someone using a different CTCSS tone, most radios with CTCSS have a 'busy' indicator, which shows when the radio is receiving a signal that isn't opening the squelch.

CTCSS	Hears	Heard By
Not fitted	All radios	Radios not fitted with CTCSS Radios with CTCSS inactive
Inactive	All radios	Radios not fitted with CTCSS Radios with CTCSS inactive
On	Radios using same CTCSS tone	Radios not fitted with CTCSS Radios with CTCSS inactive Radios using same CTCSS tone



Picture courtesy of Subaru World Rally Team



Airborne Repeater Plane

The type of aircraft used to house the airborne data repeater plane was designed in the early nineties as a regional airliner and corporate. Known as the Pilatus PC-12 it was certified in 1994 and began delivery shortly after.

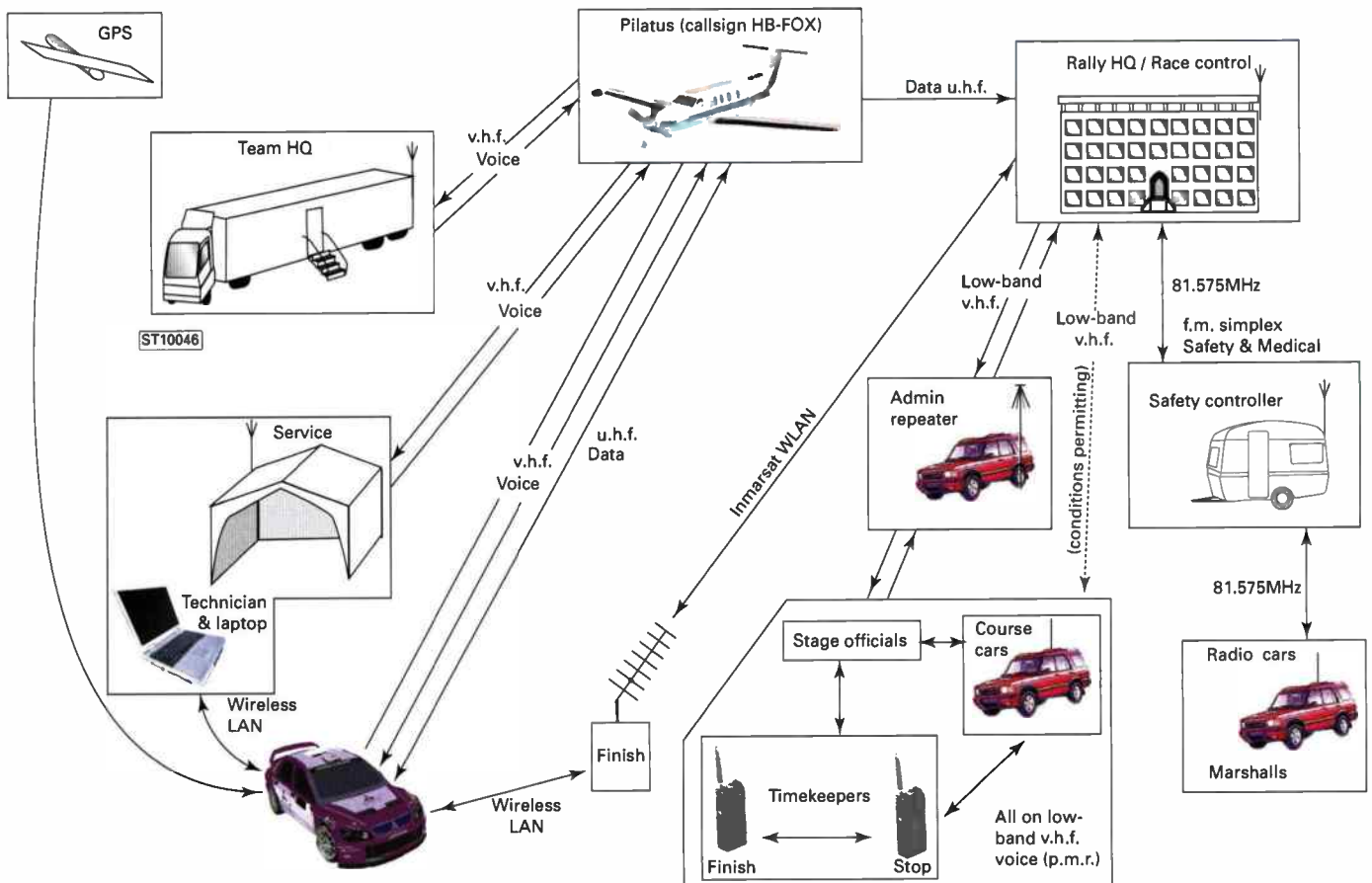
The 1998 versions and all since have smaller winglets. These wing tip airfoils clean up the air that tends to tumble off in vortex curls from the aircraft's wing tips. Aircraft with winglets tend to be more efficient with better fuel economy and better all round performance.

When used as a commuter airliner the PC-12 carries nine passengers and has been certified in Canada and the United States for operation with a single pilot.

The PC-12's performance is said to be remarkable. Powered by a Canadian made Pratt and Whitney PT6A-66 turbine that produces 1200 horsepower, driving a four blade Hartzell propeller it cruises at 25,000ft at 232Kt in economy cruise with a range of 1600 nautical miles.



● The HB-FOX is typical of the type of plane used to carry the airborne data repeater. This is fitted to a fixed wing aircraft that also carries all the major teams' v.h.f. voice repeaters.



● Overview of the communications set-up used in marshalling and tracking radio at championship rallies like the WRC.

Irrespective of whether or not modulation is present, the carrier remains constant and actually carries no information, but is required as a reference by the receiver for the demodulation process.

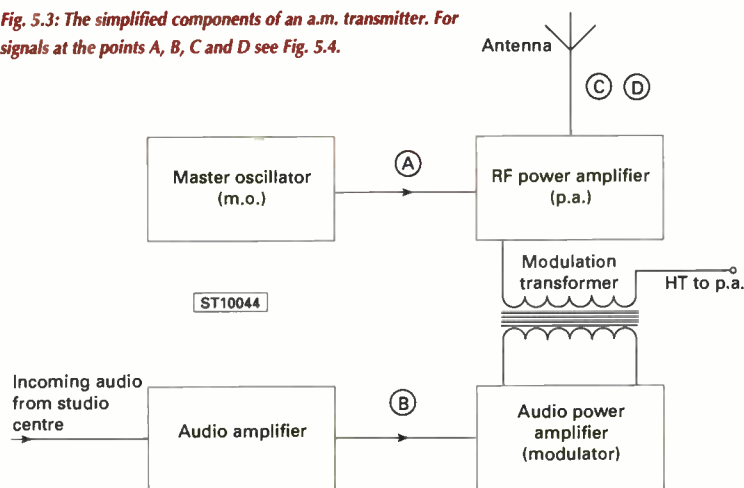
If all this seems a little confusing, consider a practical example with a carrier (f_c) operating on a frequency of 1500kHz. If the modulation frequency (f_m) is 1kHz, then the upper side-band frequency will be $(1500+1)\text{kHz} = 1501\text{kHz}$ and the lower side-band frequency will be $(1500-1)\text{kHz} = 1499\text{kHz}$. If a higher frequency of 5kHz is added to the modulating audio, that will result in an additional upper side-band frequency of $(1500+5)\text{kHz}$, and an additional lower side-band frequency of $(1500-5)\text{kHz} = 1495\text{kHz}$ being present.

The layout of a simple a.m. transmitter, Fig. 5.3 and the associated waveforms present at each stage, Fig. 5.4 can be seen. A master oscillator (m.o.) generates low level r.f. signal 'A' at the desired carrier frequency. The output from the m.o. is then amplified by a power amplifier (p.a.) before being passed to the antenna and radiated.

The incoming audio signal from the studio centre 'B' is amplified sufficiently to enable it to drive an audio power amplifier called the modulator. The audio output from the modulator appears across the secondary of the modulation transformer where it is applied in series with the high tension supply to the p.a.

When there's no audio signal coming from the studio centre, an unmodulated or plain carrier will be radiated by the antenna - note that the r.f. signal voltage shown at 'C' is constant. When audio is present, a combined waveform similar to that depicted at 'D' results, which contains the carrier (f_c) and the side-bands ($f_c + f_m$ and $f_c - f_m$) - it is called the modulation envelope.

Fig. 5.3: The simplified components of an a.m. transmitter. For signals at the points A, B, C and D see Fig. 5.4.



carrier, namely from 1495 to 1505kHz - thus giving a bandwidth of 10kHz.

When an a.m. signal is radiated into the ionosphere to some distant location, the paths taken by the upper and lower side-bands may be slightly different. This causes delays or phase errors in the components of the signal and results in a form of audio distortion in the demodulated signal called phase distortion. This type of distortion is most noticeable during periods of fading of the transmitted signal, so try listening to a s.w. signal which is fading and see if you can detect the phase distortion!

Starting Out continues next month...

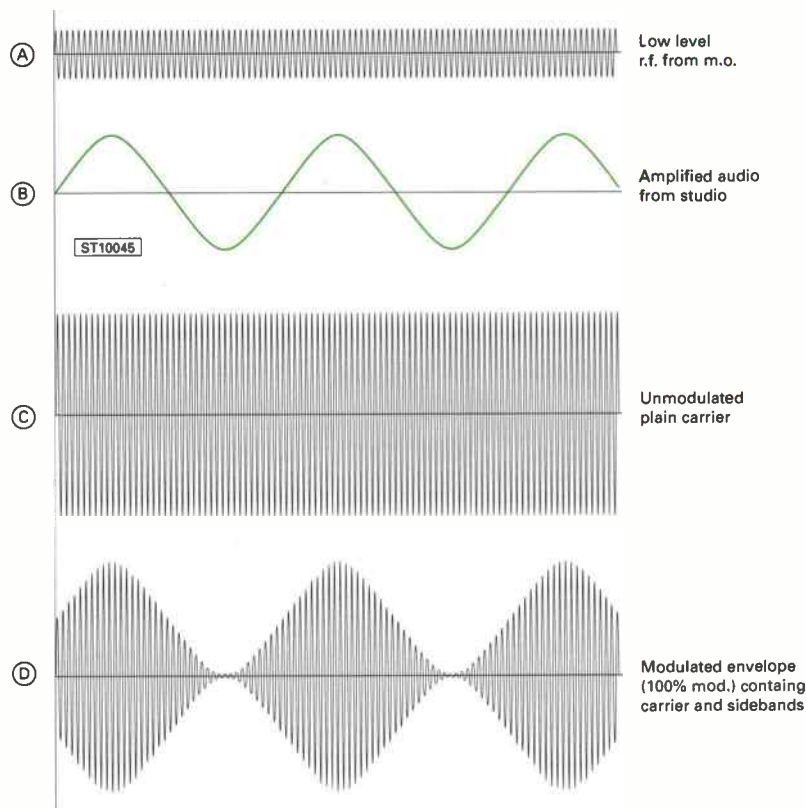
Modulation Depth

When the audio causes the peak r.f. signal voltage to vary from zero to twice its unmodulated value, the transmission is said to be fully modulated. The r.f. power (at any instant in time) will then vary from zero to four times the unmodulated value as power varies as the square of the voltage. Any further increase in audio drive would result in distortion and spurious side-band signals being generated - these would cause interference to broadcasters on adjacent channels. The degree, or depth, of modulation is usually expressed as a percentage of the change in transmitted signal level compared to its maximum value. The signal depicted in Fig 5.4 is said to be 100% modulated.

The audio output of an a.m. receiver is related to the depth of modulation, so it is desirable to keep the modulation percentage as high as possible in order to improve intelligibility. The ratio of the loudest and quietest audio at the studio centre is called the dynamic range and at any short wave (s.w.) transmitting stations the dynamic range of the incoming audio is compressed to improve intelligibility of the quiet passages. The loudest passages of audio are limited to a preset maximum level and any peaks that exceed this value are clipped off to avoid overmodulation.

The space in the r.f. spectrum taken up by a modulated transmission is called the bandwidth of the signal. In the case of an a.m. transmission this is equal to twice the highest modulating frequency. In the example, the highest modulating frequency is 5kHz, so the signal will occupy a band extending from 5kHz below to 5kHz above the

Fig. 5.4: Maximum modulation of a carrier wave. The letters refer to the locations in Fig. 5.3. Note: That the peak levels in plot D are twice those of plot C.



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over h.f. It is an incredibly effective system that is also very easy to receive.

SSTV

On a completely different line, amateur Slow Scan TV continues to be extremely popular and offers some interesting relief from the other data modes. The original systems were very crude, but the latest software based systems offer full colour pictures of remarkable quality when you consider the transmission medium.

Commercial & Military

A few years ago h.f. radio was being deserted in favour of the more predictable satellite based systems. However, things have changed and h.f. is now increasing in commercial popularity.

There are two main technologies we have to thank for the re-vitalisation of h.f. - ALE and PACTOR. ALE is an acronym for Automatic Link Establishment and is a computer based replacement for the conventional radio operator!

One of the main problems in running a sophisticated network of h.f. transmitters is knowing what frequency to use to for the most reliable connection between any two locations in the network. ALE handles this by arranging for all the transmitters in the network to transmit regular 'soundings' on all the available frequencies. These signals are monitored by all the receiving stations and used to determine the best frequency for any route.

When a request comes through to set up a connection between any two sites the system always knows the best frequency to use. The increased reliability delivered by combining ALE with modern error correction systems has completely revolutionised the use of h.f. radio in commercial and military operations.

Radio E-mail

Whilst ALE has enabled good quality commercial h.f. networks PACTOR is the backbone of h.f. E-mail systems. As we all know E-mail has its curses and blessings, but remains a very effective way of communicating.

Areas where it is a real benefit is in remote parts of the globe where simple and effective communications can be a real life-saver. Satellite is the obvious choice, but tends to be very specialised and costly. E-mail via h.f. originally started to boom in

the Third-world countries like Africa and India where operators would be mobile and using very limited facilities. Once established h.f. E-mail soon spread to mariners and the system has now developed into a world-wide network of competing E-mail providers.

Specialist

In addition to these 'mainstream' communication systems, there are a host of specialist data modes in use by military units throughout the world. You can get decoding systems for many of these transmissions, but you will usually find that the transmitted information has been encrypted so don't expect to receive much in the way of intelligible data.

Equipment Requirements

If you want to start receiving utilities you need to make sure you have the basic equipment. Let's start with the antenna and work our way through the system.

Antenna requirements are pretty much the same as for any h.f. listening, but it is perhaps even more important to keep the antenna away from sources of interference. The prime candidate to avoid is the dreaded TV. Not only do you need to keep away from the TV itself, but also the feeder and the antenna - all are sources of interference. Computers and the associated peripherals are also worth steering well clear of.

A particularly popular antenna system for utilities, especially if you have space restrictions, is the Active Magnetic Loop range from Wellbrook Communications. These have been extensively reviewed and tested and have been proven to work really well. I've used one for many years now and it's well established as the main station antenna.

The receiver can be just a general purpose h.f. receiver, providing it has the ability to receive s.s.b. signals. With today's modern software systems tuning steps have become less important, but 10Hz tuning steps are useful if you get into specialised, narrow-band, modes.

Decoding equipment is pretty much universally based on the PC nowadays. There are a few specialist standalone systems available, but the majority of the free/cheaper decoding systems rely on the user having a PC. In most cases the PC

doesn't have to be very sophisticated - something better than a '486 is often adequate. Ideally you want a *Windows 98SE* or *XP* based machine.

For software solutions, take a look at my 'quick start' feature elsewhere in this 'Decode Special'. In that feature I've listed some of the best and easiest to use systems for you to try out.



Amateur Slow Scan TV picture.

Commercial Automatic Link Establishment Kit (ALE).



Utility Modes

A Quick Start

Mike Richards has put together a selection of some of the more popular software packages to help you get started. The programmes have been chosen either because they're very easy to use, or offer particularly good performance for the mode in question.

You will find that many of the programs I've suggested cover more than the suggested mode - an added bonus. You will also see that most have fairly modest system requirements needing just *Windows 95* or later. I've also included a section on multi-mode decoders - this is not intended to be an exhaustive list, but does cover some of the most popular and readily available systems.

Multimode Software

RadioRaft: A DOS based, very capable multi-mode decoder system that features a stack of decoding modes, plus some very powerful analysis tools.

RadioRaft was one of the first affordable systems to offer fully automated utility decoding and analysis. This automated system remains very effective to this day.

One disadvantage of the DOS based operation is the need for a separate hardware interface between the computer and the radio. The interface is a simple comparator device that's used to 'square-up' the audio signal ready for processing by the computer's COM port. If you enjoy electronic construction projects the interface is quite easy to build yourself. Alternatively, Pervisell make the best value interfaces and these can be ordered on-line from their website at: www.pervisell.com

Skysweeper Lite, Standard, Standard Plus and **Pro:** This software decoding range has grown in popularity over recent years and they now have four main offerings from their 'Lite' version through to their full-blown **Pro** version. All the programs are *Windows* based and use a standard soundcard to process the audio from your radio.

As the range uses some very nice graphics to bring the decoding experience to light, the computing requirements are a little more demanding than many

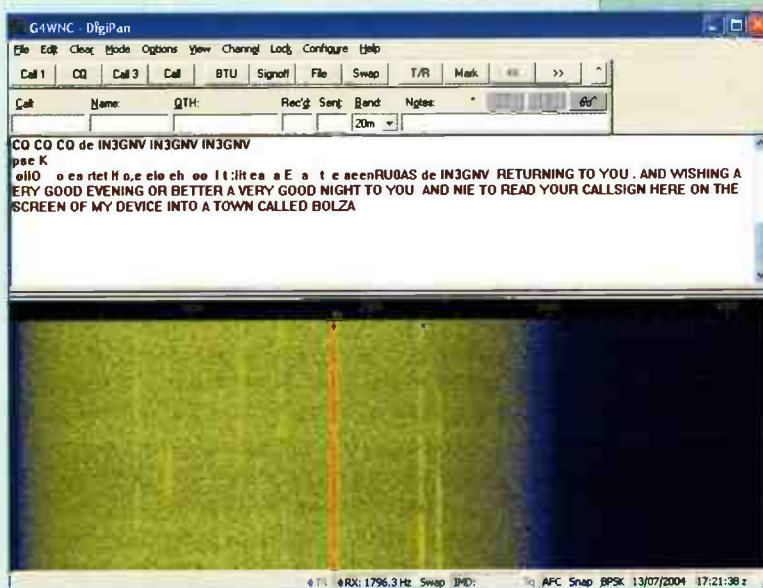
of the programs I've listed here. **Skysweeper** will run with *Windows 95* or above, but you will need a fairly fast, 600MHz+ processor, 64MB of memory and at least 30MB of free disk space.

One of the attractive features of **Skysweeper** is the clever graphic interface that effectively lets you build your own customised decoding system. All three programs come with a range of receive and transmit modes already configured with suitable decoders and tuning aids.

However, you can build your own system by inserting modules either in series or parallel with the main signal path. This makes it easy to insert filters and additional spectrum displays so you can really



CWGet Morse decoder in action.



Digipan makes light work of PSK31.

see what's going on inside the system. There's a huge range of options available and this range is well worth a look. I've added a screen shot or two so you can see what I mean.

Mode: FAX

Software: *MscanMeteo*

Link: www.mscan.com

System Requirements: *Windows 95*, a Pentium 100MHz processor, 32MB RAM and a video card with *Windows* accelerator.

Installation: Like many of the programs here, *MscanMeteo* is delivered complete with its own installation routine and all you have to do is confirm the directory and agree the licence - couldn't be easier really.

Operation: I chose *MscanMeteo* to wet your appetite for FAX because it is a very capable program, but also because it has been designed to appeal to mariners so CombiTech have put a lot of effort into making the operation as straightforward as possible. The ease of operation plus quality of results makes it a real

winner.

When you run the demo version of the program you will be prompted to enter the licence key - don't worry about this - just

click the 'x' at the top of this box and the program will run in demo mode. Whilst in this mode all functions of the program operate as normal except that a registration banner will appear in your received

usually marked on the soundcard panel - though often hard to read. If you're not sure, take a look at the connection information that came with the PC.

With the connections complete, you can head for your first FAX image. If you're based in the UK or Europe one of the most reliable FAX sources is Hamburg Meteo which can be found on 3.855, 7.88 or 13.8825MHz.

This station is active from around 0430 through till 2200 so you should be able to find some charts to receive.

With everything set-up and ready to go, press the FAX button on the menu panel followed by Manual Start and you will start to see an image appear in the main window. Tuning accuracy is very important with FAX signals and any errors cause the image to be either too dark or light. To help with tuning *Mscan* provides a useful spectrum display in the top right of the screen. You just need to adjust the tuning so it spreads between the two yellow markers.

The reception will automatically stop with the Stop tone at the end of the transmission and *Mscan* will switch to standby mode waiting for the next valid Start tone. If the software misses the start you just have to press Manual Start to get things moving again.

Mode: CW

Software: *CWGet*

Version: 1.4

Link: www.dxsoft.com/en/products/cwget/

Systems Requirements: *Windows 95/98/Me/NT/2000/XP* and an AMD 5x86-133 or Pentium 75MHz processor.

Installation: The package is delivered as a single 715KB Zip file that you need to unzip and then run the Install program to complete the automated installation process. If all goes well you should find the CWGet icon on the desktop and a new item in the program menu.

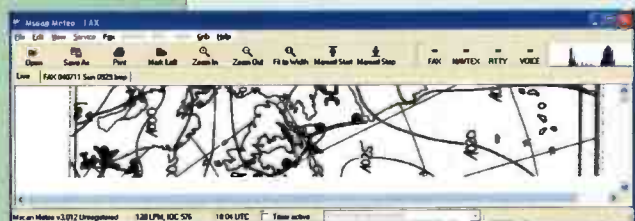
Operation: When you run the program it immediately starts trying to make sense of whatever signal is coming in through the 'line-in'. There shouldn't be any need to make any soundcard settings unless you have more than one soundcard installed. In this case you just need to follow the instructions in the Help file.

Receiving Morse with *CWGet* is very simple - just find a Morse signal and tune it to produce an approximate 1kHz audio tone. The best place to find Morse signals is at the low frequency ends of the amateur bands, two of the most active spots being just above 7 and 14MHz.

The decoding process is completely automatic and the software will lock onto the received tone and quickly calculate the speed and start producing decoded text. If you have several signals very close



RTTY & SYNOP decoding with JVCComm32.



HF FAX for mariners from Mscan.

FAXs and when you exit the program you have to wait for a timer to let you out! Despite these limitations it's an excellent program to start with and achieve some early success.

Once the program is running you need to check the configuration. Do this by selecting File - Configuration - Interface. Make sure that the Interface Type is set to soundcard and the Soundcard Audio is set to Line/Auxiliary Input.

Next job is to connect your receiver to the computer. To do this you will normally need a screened lead with a 3.5mm jack at each end. Connect one end to the 'line-out' or 'tape-out' of your radio and the other end of the audio band should go to the 'Line-in' on the computer's soundcard. This is

together, you may have to use the top display to spot your signal and click on it. The bottom display is used to control the threshold between noise and wanted signal. If you get a lot of errors you can try adjusting this by dragging the thin red line with the mouse.

Mode: RTTY/Synop

Software : *JVComm32*

Version : 1.3

Link:

www.pervisell.co.uk/ham/downloadfreesoftware.html#JVComm32

System Requirements: *Windows 95, Windows NT 4.0* or later with 16MB of RAM and at least a 486 DX2 66MHz processor. You will also need a high - or true colour graphics with at least 800x600 pixel resolution and a standard 16-bit soundcard or a serial port to connect to an external interface.

Installation: Download and run the installation file to start the automated set-up process. This will install the program along with all the supporting files. The final installation requires about 12MB of disk space.

When you run the program for the first time you should be directed to the configuration screen but if not you do still need to check your settings. To manually select the configuration screen either press 'Alt C' or select File - Configuration. You need to click the Interface tab and make sure the Interface Type is set to Soundcard and that Sound Cards Settings - Sound Card Select is set to your main soundcard or Auto.

Operation: Set-up the link to the receiver as described in the Connections Section and tune to a RTTY station that's sending SYNOP data. By far the most reliable source is Hamburg Meteo that can be found on (upper sideband) 4.583, 7.646 and 10.100MHz. Once tuned in, you also need to adjust the receive setting for this signal. In the Mode drop down panel set the mode to RTTY and in the other drop down set the mode to Baudot 50/450 - this sets the shift and speed of the signal.

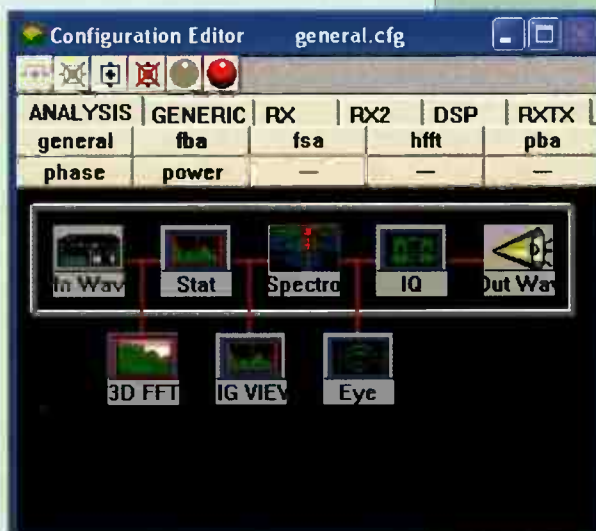
With the set-up complete you just need to adjust the tuning so that the signal peaks neatly align with the markers on the tuning display. If all is well you should soon see the decoded text start to appear. The initial messages will probably look like garbage as a SYNOP transmission in full flow comprises 5-digit groups of numbers - don't worry *JVComm32* can handle this.

The translation and capture of decoded weather messages is done in the background and you have to change to the selective message viewer to see the results. The selective message viewer icon can be found on the left of the main toolbar - just click this and the window will open. To see all the messages,

you need to set this so that the Message Type is set to All Messages and the Station is set to All Stations.

Once you have a few messages in the store you will find them all separately decoded and indexed by the

message number in the Message Box. When you have a valid message displayed, you can toggle the View Source/View SYNOP button to see how *JVComm32* decodes the message.



Skysweeper's excellent graphical configuration.

Mode: PSK31

Software: *Digipan*

Version: 1.7

Link: www.digipan.net/

Systems Requirements: 100MHz or faster '486 or Pentium processor and requires *Windows 95* or greater.

Installation: This is really simple and uses a *Windows* loader program to complete the installation. The only weakness I found was that it didn't create a menu item on the main Program menu. The software installs to C:\Program Files\digipan by default, so you can find it there quite easily.

Operation: I can promise that you will be amazed by the performance of PSK31! When you first tune to the appropriate frequency you will probably think that there are no signals around. This is because PSK31 doesn't sound like any other system - all you'll hear is a gentle whistle, usually buried in the noise! The noise immunity and narrow bandwidth of the system allows full recovery of near inaudible signals.

Digipan is remarkable easy to use and should be ready to go as soon as you run it for the first time. First of all tune to 14.07MHz - this is the most active PSK31 frequency I know of. You should find the program displaying a waterfall display system with the occasional lighter yellow vertical stripe. These stripes are PSK31 signals. To make life interesting *Digipan* features a two channel decoder so you can monitor two stations at the same time. To select a station for decoding, left-click on the stripe for channel one, or right-click for channel two. It really is as easy as that - no other adjustments to worry about just click and monitor. Other frequencies to try are 3.58, 7.03, 21.07 and 28.12MHz.

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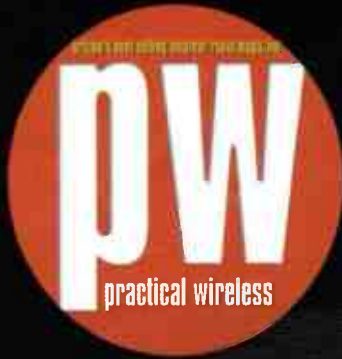
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REVIEW

Roger Cooke G3IDI looks at the data capabilities of the Icom IC-7800 h.f. and 50MHz 'super' transceiver

RADIO BASICS COLLECTION

Tried and tested simple radio circuits are collated by Rob G3XFD to help you get going on the constructor's path

ANTENNAS

Richard Marris G2BZQ shares his design for a utilitarian 3.5MHz band antenna

FEATURE

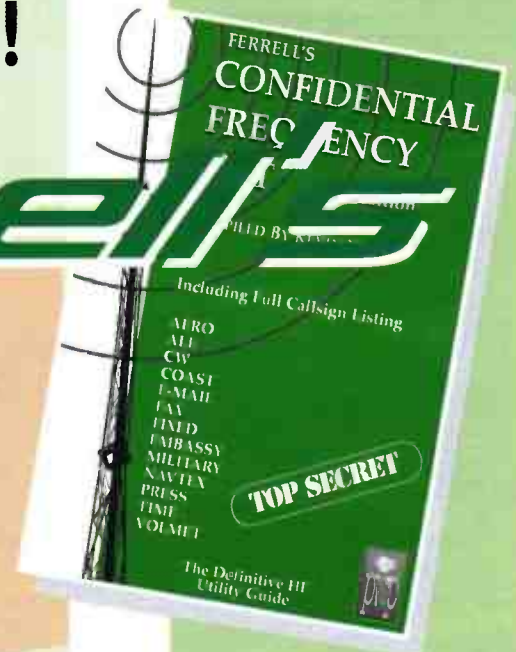
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Decode

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Something really different for this month - Sonobuoys! Never heard of them is probably what you're thinking right now, but they have been around for a very long time. A Sonobuoy is very well named because it is exactly what you might guess it is, i.e. a sonar system mounted in a buoy! However, modern systems have become very sophisticated and there's a stack of different types of Sonobuoys around, as you'll see later.

You're probably thinking, all very interesting, but why would decoders be interested? A number of reasons really, but in essence the buoys transmit their data on the v.h.f. bands in a variety of formats ready for us to decode.



DX Tuner Remote Receivers

Background

The Sonobuoy system was originally developed during WWII to help in the fight against U-Boats. The idea was that a sonar net could be set up around a protected area and the output from all the sonobuoys monitored remotely for signs of submarine activity. A clever system that, with the aid of 21st Century electronics, has been revolutionised.

The most basic system comprises a submersible sonar unit that sinks to a pre-determined depth and is connected to the floating surface unit by a cable. The surface

unit contains the power source and a v.h.f. transmitter and antenna system.

All the systems I've discovered so far are expendable so you could find them floating ashore at some time. The power source is normally a battery-based system that is activated on contact with salt water. The transmissions are all normally f.m. and universally operate in the 162 to 173MHz band, so they are within range of many v.h.f. receivers.

Buoy Types

There are a host of systems out there so I'll just run through the main ones here:

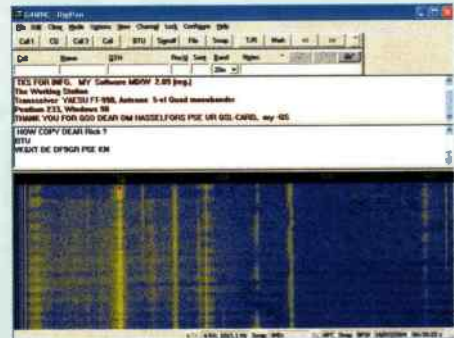
Bathymograph Sonobuoy - this is known as a BT buoy and provides a thermal gradient measurement of the surrounding ocean. Good for submarine detection, but not very interesting.

Directional Frequency Analysis and Recording Sonobuoy (DIFAR) - this provides a magnetic bearing to the signal of interest and can be used in combination with other sonobuoys to derive the precise location of the contact.

Low Frequency Analysis and Recording Sonobuoy (LOFAR) - this type is probably the most interesting as it is basically a submersible microphone. The interest comes from the range of sounds it can receive and you can expect to be able to pick-up Whale and Dolphin songs amongst other things.

Directional Command Activated System Sonobuoy (DICASS) - this one is primarily used in attack situations and can provide range, bearing and Doppler information on a submerged contact. The Buoy is activated by an incoming command signal.

Vertical Line Array Directional Frequency Analysis (VLAD) - a special type of Sonobuoy that provides similar information to the



PSK31 reception via DX Tuners

LOFAR device but is designed to cater for noisy environments.

Data Link Communications Sonobuoy (DLC) - this is one you won't hear as it's a receive only device. The DLC is a radio to acoustic repeater and is used to send messages to friendly submarines. Typically, an aircraft born transmitter will broadcast a message to the network of DLC buoys and they will store and repeat the message using underwater acoustic signals

Frequency Allocations

Allocations for Sonobuoys are to be found right through the 136 to 174MHz band. However, there is a restriction in the licensing that prevents frequencies below 162MHz being used within 80km of the UK coast in peacetime. So the best area to check is 162 to 174MHz if you want to try and spot coastal activity.

Because Sonobuoys are relatively low power devices and the antennas are very low, i.e. at sea level, the range is somewhat restricted. You should be able to manage 45-65km, so those living near the coast may be able to pick-up a few. If you have a portable v.h.f. receiver then the potential of listening out for Sonobuoys puts a whole new perspective on a trip to the sea!

If you've had any experience with Sonobuoy reception, particularly around the UK coast I'd like to hear from you so please drop me an E-mail.

Utilities & DX Tuners

You may have read Kevin's feature in the May issue about the excellent DX Tuners website

where you can log on and gain access to radio receivers around the world. This month I thought I'd take you a step further and show you how you can use these distant receivers to get at utilities and other signals that you couldn't possibly hear based in the UK.

Just a quick refresher on the DX Tuners site for those of you that missed the last article. You can find the site on the following web link: www.dxtuners.com

When you get to the site, there is plenty of guidance on how to join and use the receivers. The best way to start is to sign-up for the free guest login. To do this you just have to complete the registration details and you will be E-mailed a user ID and password that you can use to get to all the guest receivers. Although this only gives you access to a limited range of receivers, the mix is quite interesting and it's free! The DX Tuners team also regularly introduce some of the advanced receivers to the guest list, so it's really worth a look.

If you should decide you like the site, you can sign-up for two levels of membership - Advanced or Professional. The Advanced is just \$20 per year and the Professional is \$30, not bad if you're going to make good use of the facility, plus you do get access to a very good range of quality receivers.

To get the best from the site you do need to have a reasonably fast Internet connection - mainly to handle the streaming audio. However, the site can cope with slower connections as most receivers have the option to adjust the audio quality. In the majority of cases you can choose Low, Medium or High quality with Low being more suited to dial-up links and high quality for those with Broadband connections. From the tests I've done so far, even low quality audio is fine for most utility work.

The high quality option is mainly provided for those listeners that use DX Tuners to listen to higher quality f.m. broadcasts from around the world. Having used the site a few times for general listening, I wanted to see if you could use the recovered audio from the Internet connection to feed a utility decoder and get FAX pictures and other interesting stuff. The good news is, you can, and I'll attempt to show you how. Not only can you easily make use of these on-line receivers for utilities, but the results were excellent.

To make use of the streaming audio you will need to make some minor changes to your audio set-up - don't panic it's really easy.

Most utility stations take their audio input from a receiver using a connection to the 'Line-In' of the computers soundcard. However, the audio from the Internet is coming to us through the audio out of the soundcard.

To feed our decoder we need to change the record selection from the 'Line-in' to the 'Wave Out'. This latter being the normal route for sound coming out of the soundcard. To make this change you need to either use the speaker icon on the task bar or the Control Panel.

Let's start with the Speaker Icon. If you double-click on this you will be presented with the main volume control panel. However, we need the Recording panel so choose Options - Properties and make sure the right soundcard is selected then click the Recording button and press OK. You should now have the Recording Control panel open with a range of sliders visible, but just one of the check boxes clicked. Deselect the 'Line-in' that you probably have ticked and choose Stereo Mix. The Stereo Mix slider then becomes the record level control that adjusts the signal feed to your decoder.



Excellent HF FAX through DX Tuners

It's basically as simple as that. However, you may need to experiment as not all decoders use the audio path in the same way.

To test the feasibility of using DX Tuners to decode utilities I started with *Skysweeper* and tried to capture Hamburg Meteo from a Stuttgart based AOR AR8600 receiver. The first problem I encountered was a feedback loop in the audio path making the set-up an excellent echo-chamber!

The cause was quickly isolated to the *Skysweeper* audio path. *Skysweeper* has a very sophisticated audio routing and the default set-up supplies a sample of the processed audio signal back to the computer's soundcard. This is so you can listen to the recovered and filtered audio.

As we're taking the decode audio from the soundcard output this creates a loop in the chain so you get echo at low levels and a full-blown feedback as you increase levels! The solution is simple, with the decoding stopped, click on the 'In' or 'Out' boxes of the decoder block diagram and select Null for the output path. This will block the audio output feed and stop the feedback loop.

With this solved, the decoder worked perfectly and started producing excellent FAX images from the Hamburg transmission on 7.88MHz. As the receiver was so much closer to the transmitter and was receiving a very strong signal, the recovered image didn't suffer any of the multi-path smudging that is so common with the images received in the UK.

Next I tried the same operation, but using *JVComm32*. This worked as expected and the stereo mix operated as the Record level control. *JVComm32* makes level adjustment very easy as there are Record and Playback buttons on the Toolbar that you can use to quickly get at the main controls. The FAX quality recovered using *JVComm32* was really excellent and I've shown a sample in the column.

Whilst using *JVComm32* I also tried switching between high and low quality audio to see the effect. To be honest there was very little difference between the two - the high quality was just a bit cleaner.

Finally, I tried some PSK31 decoding using *Digipan*. This is a slow speed very narrow band systems and I was interested to see if this would also work over the Internet connection. I'm delighted to say it was absolutely fine. Again I've shown a screen shot so you can see it in action.

All the tests I carried out proved that you can use the DX Tuners on-line receiver systems for utilities and get some very good results. It's a great facility and provides the opportunity to get at utility signals that you couldn't possibly hear from the UK. The only point you need to be aware of is the etiquette for using the system.

When you log into a radio make sure you use the message facility to ask the other users before you take-over tuning a radio. I had one or two people just dive in and retune when I was part way through a FAX! The best way to achieve is to sign-up for one of the more advanced account options so you have a much wider choice of receivers.

SWM

Satellite

TV News



Venus tracks across the Sun's surface, transmission from APTN.



US President Bush speaks on battles past at the D-Day American cemetery, Omaha Beach (Telecom 2D).

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

The first privately funded space launch of a rocket - *Space Ship One* - into near space took place on 21 June, it went up and it came down. The launch was a great success and is likely to be the first of several. With the unfortunate loss of the 'CNN NEWSOURCE' feeder over *NSS-7* - due to encryption - live launch pictures were more difficult to find but the APTN 'UP4' feeder on *Eutelsat W1*, 10°E [10.970GHz-V, SR4167+FECS/6], provided good coverage with **Roy Carman** (Dorking) able to find additional coverage on *Eutelsat W3*, 7°E 11.104GHz-V, 6666+7/8. There was more excitement however on this same day. The GranadaMedia sat trucks were still active on *Telecom 2D*, 8°W, but vertically polarised. Whilst checking out the regional content being downlinked for the evening magazine programme I noticed that the HTV 'BT TES-41 4' truck was parked looking at a large anchored ship. Meanwhile, two fast moving motor boats, one an RNLI craft and the other a pilot cutter appeared with the latter attempting to board someone - the attempt was eventually aborted.



The Panamanian cargo ship at anchor in Milford Haven whilst Greenpeace activists prevent the pilot from landing on-board.



The Cassini spacecraft project orbits a research satellite around Saturn.



Paul G Allen is the project director for the Space Ship One rocket launch from the Mojave Desert.

At 1830 *TES-41* ceased transmissions and went home but eventually the ship reached harbour! *TES-41* downlinks @ 12.5554GHz-V, 5632+ 3/4. The sat truck test card identifies as 'ITV WALES NEWS UKI 596 T41'.

The Meridian truck *TES-43* downlinks on 8°W @ 12.562GHz-V all was well on the evening of 25 June as the crew enjoyed the sunshine of Hythe waterfront filming Cunard's *Queen Mary 2*. The story unfolds that the *QM-2* had been fitted out with inflammable ducting in parts of the ship, it was hoped for *QM-2* departure to coincide with the magazine programme transmission - didn't happen though!

In space the *Cassini-Huygens* spacecraft successfully entered an orbit around Saturn between end of 30 June and 1 July. *Cassini*, now in orbit, will send back data on the planet and its moons until at least 2008. Meanwhile, the *Huygens* probe is being readied to target the largest Saturn moon - Titan - around Christmas 2004. Much of this information was carried over a special technical hookup meeting of NASA and the ESA, which was carried live over *Eutelsat W1*, 10°E @ 11.081GHz-V (5632+ 3/4) as the 'Saturn Orbit Insertion Briefing' and hosted by NASA-TV.

Alan Richards (Skegness) noted that the *Intelsat 707* 1°W 11.657GHz feed from ABC News, Baghdad had gone down late June but it was later found re-established at 11.673GHz-V (5632+ 3/4) - unknown the reason for the move. They often feed via the London ABC bureau rather than direct into NY and may operate either 525 or 625-line PAL or NTSC. ABC also provide capacity Westbound feeds into CTV, Montreal. Things are looking up for the 1°W slot as the new *Intelsat 10-02* bird successfully launched out of Baikonur, Kazakhstan mid June to move into service at 1°W where it's now operational. The satellite will carry 70 C-band (4GHz) and 36 Ku-band transponders, covering Europe, Africa, Middle East and the Americas, so look out for enhanced signals at this spot in the sky. Norwegian uplinker Telenor have already booked 50% of the available Ku capacity. *Intelsat 707* meanwhile is being moved to a 53°W location to improve coverage across the Americas, Africa and Europe.

I received a letter from **Jason Long** (Cwmfelinfach, Caerphilly) who, very much like **Edmund Spicer**

(Littlehampton), 'hand tracks' his 800mm dish, often using existing analogue signals such as TV Algeria on 16°E for alignment - watching a mirror reflected image - and then conducting a search on the same satellite with his digital receivers. Apart from his Technomate SS000 FTA digital receiver Jason uses a pace analogue MSS200 and a couple of Pace Sky boxes. *Eurobird*, 28.5°E has provided many signals (in conjunction with the co-sited 28.2°E fleet) and notes that certain signals within the Globecast package cannot be resolved on his Sky boxes even when tuned in. Jason has provided a long list of his channel receptions so even with a basic set-up it's still possible to receive many signals - you only need to see the sky!

Adrian Howen (Fakenham, Norfolk) asks about checking *PAS-3R*, 43°W as Alan Richards told him that he suspects there are two signals at or around 12.613GHz-V, one is 'TVSA' but he can't lock up the other. Adrian checks and finds that there is - it's 'Televisa Frad' running a low SR1560 (FEC not advised) with the usual 308/256/8190 PIDs but it's not a strong signal. Adrian is using a 'blind search' Coship 3188c, 1.2m prime focus, scalar rings feed and 0.6dB noise LNB - and able to track over to 70°W. So, I search for this mystery signal and find absolutely nothing on this frequency, curious, a

wider scan however throws up a 'Galavision' bouquet - 12.585GHz-V (27500+ 3/4) with several programme channels plus a test card 'CENTRAL DE VIDEO' but locking up colour in both PAL and NTSC 4.43MHz settings. Adrian asks for help in identifying a 'very large digital signal at 11.640GHz-H ±10MHz on possibly 61-63°W, analogue receiver noise suggests MPEG2 and a high SR of +35000 - nothing appears on his Coship digital receiver.

Earlier in June **Roy Carman** noted a *Big Brother* - Israeli version over on the Greek satellite *HELLASAT-2* @ 39°E and with a service identification 'BROADCAST 1'. Though the programme content has little of note, the interesting technical note is the downlink frequency 11.661GHz-H (3332+ 3/4), perhaps the first sighting of this satellite in low Ku band horizontal mode, usually Hellasat is found operating in the Telecom band of 12.500-12.750GHz. And an impressive shot courtesy of his Dutch friend **Rine de Weijze** showing the transit of Venus across the Sun, taken off-air from a *UP4*, 10°E transmission.

Correction

In the July column I included pictures of the USA attempt at a new air-speed record. I incorrectly noted that the larger aeroplane was a B-47 but **Graham Tanner** advises that the B-47 hasn't been flying for over 20 years. The aircraft is in fact a B-52H. NASA had until a few years ago been using a B-52B (circa 1952) but in recent times NASA have gone upmarket and now use a 1960 model B-52H. Thanks to Graham.

There are changes in the wind of interest to satellite enthusiasts. Recently, we have moved into MPEG-2 digital reception - DVB-S relatively painlessly - MPEG-4:2:2 presents problems for most however. Having mastered the art of digital satellite reception it appears that a whole new set of digital parameters are on the way! New Zealand's *SatFACTS* trade magazine details a new satellite digital video standard - DVB-2S. Whereas DVB-S provides for digital signals in say a Single/Multiple Channel per Carrier (SCPC/MCPC) all having a fixed SR and FEC, DVB-2S will allow individual programme channels and/or data streams within an SCPC/MCPC transmission to have independent and unique digital parameters but the FEC rates under DVB-2S will vary between 1/4 and 9/10. This allows more channels to be squeezed into a given spectrum or higher definition content such as HDTV - but current receivers will require replacement for reception of the new standards - DVB-2S may hit the streets during 2005. Stay tuned!



A French reporter for an evening news programme rehearses his item against a backdrop of preserved military vehicles (Telecom 2D).



As the guests enter Dromoland Castle, Co. Clare, a security official takes another look back at the press.



George W. Bush travels to Ankara, Turkey and the media circus follows (UP4).



RTP (Portuguese TV) count down VTR clock (Eutelsat W2).



'BT TES-43' reporter at Hythe about to transmit the *QM-2* fire story (Telecom 2D).

Shack

Web

- **Jerry Glenwright** c/o SWM Editorial Offices, Broadstone
- **E-mail** shackweb@pwpublishing.ltd.uk

Hello and, as ever, a warm welcome to the bi-monthly column devoted to interesting, obscure, helpful and sometimes plain cranky websites of interest to s.w.l.s!

Web Gazetteer

There's a lot to get in this month so instead of the usual preamble, here's a selection of some of the best of what I've been surfing through during the past two months.

The Strowger Appreciation Site - web.ukonline.co.uk/uax13 If you've ever picked up the telephone in the Amberley telephone exchange and dialled to its sibling you'll have been fascinated by the remarkable complexity and beauty of pre-digital telephone

exchange equipment. This site from enthusiast Martin Loach dishes up detailed information on dozens of exchange installations and even includes audio clips of the equipment in action.

Check out Martin's excellent electric clocks (the generally neglected and forlorn large clocks you see attached to jewellers and various public buildings) pages too, linked from the main site.

Vintage Communication Pages - www.g1jbg.co.uk - is a wonderful collection of information, potted histories and pictures of radios, (domestic, novelty and military), clocks, telephones, recording, relay and test equipment and television. Good links too.

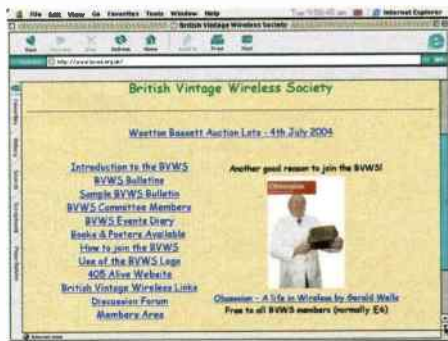
The Old Tellys Site - www.penders.cwc.net/otindex.html as you might expect, is a site dedicated to the preservation of old televisions. Anyone who's ever seen (or watched first time around) one of those lovely little Bakelite units from the early 1950s will spend a happy hour or two at this website, which has much to offer experts and the casually interested alike. Don't miss the Wives, Partners and Mothers Survival Guide page.

Mickey's Vintage Technology Page www.oldtechnology.net which, as well as TVs and radios, features a section devoted to old VCRs and VTR equipment. Teasingly, some of what's flagged here is not yet available for browsing, but the site is still well worth a visit.

Mike's Electric Stuff - www.electrictuff.co.uk - is a truly fabulous collection of facts, figures and data on antique electronic glassware (valves to you and me!) including spark gap tubes, the Loewe multi-valve, Geissler tubes, photoelectric cells and

much, much more. Continue scrolling at the home page and you'll also come to a section on Tesla coils and high-voltage stuff (including some breathtaking electrical discharge experiments), old calculators, more experiments showing what happens when you zap modern circuits with high voltages, help with making p.c.b.s, fun with argon lasers - the list goes on. Not to be missed!

British Vintage Wireless Society -



www.bvws.org.uk - the spiritual home of all those who like their receivers to weigh-in like a small family saloon. The society is "...dedicated to the preservation and communication of technical and

historical data" and an awful lot of it is available at this site together with details of becoming a member and news of recent auctions.

Vintage Technology - www.vintage-technology.info - a UK site packed with enjoyable information detailing old technology, from radios to pocket calculators and the components which they contain, valves, transistors and associated ephemera such as boxes, advertising materials and even the vehicles they were transported in. Well worth a visit.

Old Computers Web Museum - www.old-computers.com - ideal for anyone researching the history of a new boot sale find, this US site features potted histories of hundreds of computers from yesteryear and makes a great starting point for more detailed research.

Happy surfing!

Mailbag

Mike Evans M3EMB is an occasional correspondent to 'ShackWeb' (and its previous incarnation 'ShackWare'). He writes:

"I thought I'd tell you of my latest boot sale and ham radio rally findings. I acquired two Toshiba laptops: the TS1910 and the TS1910CS. Plus using *Windows 3.11* for £1.50. This publication is useful because at the school where I work part-time, I found in the paper bin an unopened pack of *Windows*

for *Workgroups 3.11* with an unused set of disks. My wife installed these disks on the mono Toshiba and she says the machine is much better now. These laptops are great fun to learn on but have no output to the outside world such as a standalone modem".

Usable machines, Mike, and finding a suitable modem should present you with no problems at all. Any unit rated at 33K or 56K will be fine for (slow) Internet use though dial-up connections are considered very old hat in these days of broadband. A modem should cost around £20 or less and your bootsales and ham rallies make for ideal searching. You already have an ISP (Mike's E-mail address is m.evans@mtxnet.co.uk) so connect the modem to your Tosh, type in the server DNS addresses and away you go...

Mike continues: "Being a ham with an M3 call and still wet with L plates, I am hoping to use one of the machines for logging my contacts once I can get hold of a suitable program. Later I would like to work the data modes, such as PSK31".

Logging software is available in every flavour from the simple to the complex and a straightforward web search using an engine such as Google (type SWL+contact+logging+software) will throw up what you want. As for a soundcard, if your Toshibas have PCMCIA slots (and most PC laptops from the past 10 years or so do) you can get a Soundblaster-compatible plug-in soundcard which makes use of a Type II PCMCIA slot and an external dongle for connecting cables - which is where your

receiver will attach.

I believe an unbadged OEM PCMCIA soundcard was shipped with Dell machines a few years ago and these occasionally turn up at rallies and the like for a few quid. They're rare, but not impossible to find. Mike is also searching for a

suitable power supply (he has one between the two machines) and the missing trackballs for the Toshibas.

"I've opened up the battery pack but it looks complicated, time consuming and costly [to repair]. The side-mounting rollerball mouse is missing on both too - anybody got one?" He would also like a small portable printer to go with these machines if anyone can help.

And Finally

Just space to say a quick thanks to another long-term correspondent **Ian Brothwell G4EAN** who once again has kindly delivered direct to my door a haul of old silicon that has relieved him of a weight in the attic and added to what is rapidly becoming the ShackWeb Museum of Old Silicon. Many, many thanks Ian. The wife of a friend of Ian's (now silent key) is disposing of his collection and there may be one or two gems for interested s.w.l.s - watch this space.

That's it for this instalment, until next time, good surfing and good listening!

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

Regular readers will be aware of my concerns over the number of people taking up, or rather, not taking up the Intermediate licence. There isn't space to explore the reasons, of which I think there are several, in this column.

I believe that there are two main reasons for its slow take-up. One is that the practical requirements of the exam are inappropriate. They present too much of a discouragement against taking the exam when weighed against the advantages to the Amateur of the Intermediate over the Foundation licence. The second reason is that it can be difficult to find somewhere to take the course. But it's not impossible!

If you're anywhere near Newbury and looking for a course, then there's an Intermediate Licence course coming up in November. Newbury and District Amateur Radio Society are starting the course on the 6 November with a date for the exam in mid-December. For those wishing to take the Foundation Licence the club is running a course over the weekend 25 and 26 September.

The Newbury club's preferred means of contact for prospective candidates is via E-mail. For the Foundation course it's **John White, G7WBI** who's address is g7bwi@yahoo.co.uk For the Intermediate it's **Steve Elliott 2E0SEL** who's address is steve.elliott@bg-group.com Alternatively, there are 'phone numbers in the Club Listing pages here in SWM.

Building On Strong Foundations

Far be it from me to present a totally gloomy picture concerning the amateur radio licence! Whilst all may not be well with every licence, recent figures from Ofcom present a much healthier picture for the Foundation licence as it approaches its third birthday.

The total number of Foundation licence holders may have been in decline for the past year, but under closer scrutiny the figures look much better. That's because during its first year many Foundation licences were issued to Amateurs already holding B class Full and Intermediate licences who only had to complete the Morse appreciation component of the exam to get an M3 call, and so gain access to the h.f. bands. At one point there were almost 2500 of these

licences (referred to by Ofcom as 'upgrades') making up over 50% of the total number.

When the A and B licences became one, giving all amateurs access to h.f., the holders of 'upgrade' Foundation licences stopped renewing them. This is bringing about a rapid decline in the number of M3 calls of that type, which in turn has been reducing the overall number of Foundation licences. But this is a 'one off' effect that's set to end soon.

If you take the 'Upgrade' licences out of the equation then it's clear that the number of new licence holders has seen a steady and seen a consistent growth from the start. If that trend continues there will be almost 7000 'all new' Foundation licence holders by the end of this year. Even more encouraging is that close to 30% of them will be under 21 years of age.

More Club News

Members of Wrexham and District ARS will be using the calls **GB4IOM** and **GB4SPT** to operate from the Isle of Man from the 1 to 8 September. The team, of at least ten amateurs, will be particularly active on the 1.8 and 3.5MHz bands, but expect to find them on other bands up to and including 430MHz.

Although the main activity will take place from a disused Coastguard tower at Scarelett Point, it's possible that some will occur from Snaefell. This will please Summits on the Air (SOTA) devotees.

All in a Good Cause

Now for some public thanks to the staff of PW Publishing Ltd., who sponsored my XYL, **Chris M3SHE**, when she took part in the *Bournemouth Race for Life* in June. Taking part in memory of a friend, in all she raised over £500 for Cancer Research UK.

The amateur radio angle is the Kenwood TH-F7E she's clutching. The TH-F7E allowed her to keep in touch with her magnificent support crew (well, just me really!) along the way.

World Famous Amateur

No doubt you can recall the widely reported death in July of the world famous radio amateur **Martin Brandeaux KE6PZH/FO5GJ**. You can't? Perhaps, like most people, you knew of him as Marlon Brando.



Vertical Antenna

As mentioned last month, **Tex Swann G1TEX** has been tinkering about with a vertical variant of the G5IJ antenna. Following his start, I made a few measurements of my own, albeit identical, version.

The big disadvantage with most vertical antenna designs that I've encountered is that they require several radial ground plane wires, which mean they take up almost as much space as a horizontal antenna. Not so with this one. It consists of about 10m of wire held up by a telescopic fibreglass mast. At the base the wire is connected to its coaxial feed via a G5IJ transformer. No radials.

The footprint of the antenna is less than the size of, well, a footprint. The telescopic mast is extremely light, and for the purpose of my tests was held up by attaching it to a fence post with plastic cable ties. Something stronger might be required for a more permanent installation.

A current balun was made next to the feed-point by winding about a dozen turns of coaxial cable in a loop roughly 200mm in diameter. Its purpose is to discourage unwanted r.f. currents flowing along the outside of the coaxial feeder.

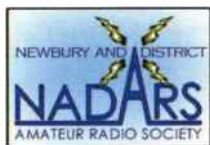
Measurements were taken with my trusty MFJ antenna analyser, which indicated a s.w.r. of 3:1 or better from about 10 to 28MHz (the frequency range where the vertical element is between a half and full wavelength).

That's plenty low enough for an a.t.u. to cope with. Removing the current balun pushed the s.w.r. up a little across the whole range of tested frequencies, so it appears to make a useful contribution.

Calls to Listen For

Keep an ear out for: **OJ0YC** World Wide Young Contesters on Market Reef at the entrance to the Gulf of Bothnia between Sweden and Finland from the 23 to 26 September.

Operating from adjacent Aland Island for the 25 and 26 during the CQ RTTY Contest will be **OH3BHL** and finally **Christian 3D2EA** will be on-air from from Viti Levu, Fiji. He's there already, and should remain there throughout September and possibly beyond.



● **Keith Hamer & Garry Smith**

17 Collingham Gardens, Derby DE22 4FS

● **E-mail:** dxtv@pwpublishing.ltd.uk **Web Site:** www.test-cards.fsnet.co.uk

June started off as the worst month ever for long-distance reception with endless periods of frustrating inactivity. Conditions improved dramatically from mid-month with transatlantic reception occurring on at least ten separate occasions on USA channels A2 to A6. Mostly the carriers were too weak to display video apart from on the 24th and 25th when 'rolling' 525-line pictures were seen in the Netherlands, Northern Ireland and the Midlands.

Sporadic-E Reception Reports

It is a round-up of exotica this time, commencing with spectacular reception which occurred in Northern India on 2 June when **Col. Rana Roy** identified Malaysian TV on Channel E2 from the analogue clock and RTMTV logo in the top-right of the screen.

On the 14th from 1700, **Paul Foley** (Newhaven) logged Belarus (BT) on R3 and R4, Russia (RTR) R3 and three unidentified carriers on R5 (99.25MHz). Iceland (RUV) E4 emerged at 1903 with Euro 2004 football. **Peter Barber** (Coventry) also encountered Iceland E4 on the 19th at 1054 during programme schedules.

On the 23rd between 0640 and 0720, Paul identified Iran (IRIB) E2, Syria (ORTAS) E2, Dubai (EDTV) E2, an unidentified Arabic station on E4 with a white logo top-left and Arabic audio on E2.

A superb opening on the 24th produced most European stations. At 1210 a tone on R1 was heard and, assisted by the use of a notch filter, the Latvian PM5534 test card became visible, later switching to colour bars with a prominent black band bearing the identification 'LATVIJAS TV-2'. The tone was later replaced by folk music. During the same period, **Tim Bucknall** (Congleton) and **John Faulkner** (Sutton-in-Ashfield) detected video on 65.75MHz, which corresponds to Chinese channel C3. Weak audio was also heard. There was no evidence of reception on channel C2 (57.25MHz) but just to confuse the issue, a signal from the Ukraine has been observed around this frequency - possibly a leaky cable system or an unofficial relay.

At 1710, **Peter Barclay** (Sunderland) discovered weak pictures from the south-east on E2 with Arabic speech. By 1839 there was a transatlantic path established and John

Faulkner saw 'rolling' 525-line pictures on A2 and A3 via a D-100 DXTV Converter and an HS 4-element Band I array. John also uses an Icom PCR1000 receiver linked to his PC for measuring extremely weak video carrier offsets.

The 27th was another bumper day for Paul Foley that started with Jordan (JTV) E3 at 0731, followed by Iran (IRIB-2) E2, Syria (ORTAS) E2 and an unidentified Arabic music programme on E4 at 0810. The big surprise was the Syrian PM5534 test card on E3 at 0905 with 'SYRIA' at the top and 'ORTAS TELEVISION' in the lower block. At 0923, a possible new Italian shopping channel 'Tele A' was observed on channel A; there is already a Tele A+ which operates just below E2. Peter Barber has measured the latter at 47.720MHz and comments that it can easily be separated from the normal E2 channel at 48.250MHz by using his D-100. Another shopping channel 'TVA' operates at 54.245MHz, which lies between Italian Channel A and E3. Paul Foley has also encountered a shopping channel below the official Italian Channel C (82.25MHz). On-screen telephone numbers refer to the Napoli area.

Stephen Michie (Bristol) and Peter Barclay advise that instead of showing programme schedules throughout the day, NRK-1 (Norway) now run 'Jukeboks', a selection of pop music videos.

Transatlantic FM

At 1410 on the 19th, **Paul Logan** (Lisnakea, Northern Ireland) heard a USA presenter on 88.5MHz which faded in and out for about 20 minutes. At the time, USA or Canadian



Fig. 3: The BBC 'Bat's Wings' Identification Symbol, designed by Abram Games and radiated from December 1953.

Fig. 1: Italian private station NCT (Nord Center Television) which operated in the 1980s from Udine.

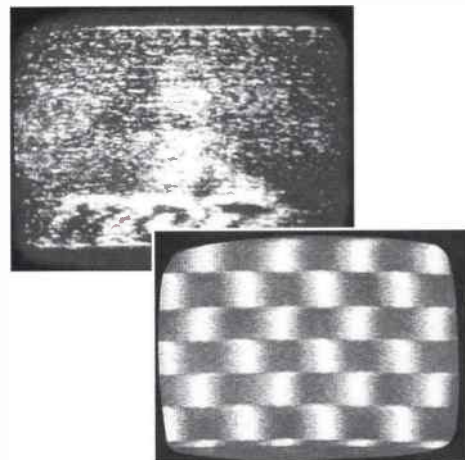


Fig. 2: The Chessboard test pattern from NCT.

TV carriers were present on A2, A4 and A6. Earlier, on the 10th, Tim Bucknall heard brief snatches of American accents on 107.1MHz.

Studio Links

In Bristol, **Simon Hockenhull** notes another local RSL station 'Power Jam' or 'Gel' on 106.60MHz with a link on 48.30MHz which, thankfully, is weak and is only causing slight interference on E2. Interestingly this link has moved from 48.24MHz so, perhaps they have encountered problems with Sporadic-E!

Irish Mystery

While on holiday in Aberdaron (North Wales), Tim Bucknall detected signals from an Irish transmitter on Channel C (61.75MHz video). However, RTE-1 Glanmire (50W e.r.p.) is thought to have closed several years ago but it is possible that the channel is being used as an unofficial relay.

DX Equipment

Paul Foley is using a custom-built 20-element log-periodic array from KMA Antennas in the USA. It covers 25-100MHz with about 5.5dBd gain and feeds a D-100 TV converter with an HS notch filter for removing baby alarm interference from R1. Paul comments that it does suffer some attenuation as one would expect but it's the difference between seeing a weak or patterned R1 or a complete obliteration of the channel with patterning down to E2. Paul adds that after the D-100 it's been the most useful investment he has made for DXing. Other equipment in use includes an Icom R8500 receiver and a Thomson multi-system TV.

Tony Jones (Basildon) advises that the Hitachi VT-MX100EUK video recorder he purchased from Gratton's at a privileged price of £49.95, displays weak signals perfectly and does not have the dreaded blue-screen video muting. Tony has erected a VF-100 wide-band antenna covering Bands I, II and III from HS Publications (see the DXTV and Archive TV website) and comments that it performs amazingly well considering its compact size.

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 via the Internet.

- Ben Hogan, clo SWM Editorial Offices
- E-mail ssb.utilis@pwpublishing.ltd.uk

In previous 'SSB Utilities' articles I have mentioned the rescue frequency of 5.680MHz, which is always worth monitoring. On 26 June Kinloss Rescue was successfully received in New Zealand during daylight hours. This thrilled the recipient somewhat and I have no idea as to whether Kinloss will send a QSL on receipt of a signal report but I doubt it.

In the July edition of SWM I referred to mobile and outpost communications in Australia, a nation that has depended on h.f. radio for so many services. The Royal Flying Doctor Service (RFDS) commenced operations in 1928 following difficulties experienced by medics attempting to travel the outback by motor car. They even tried fitting canvas caterpillar tracks to their vehicles with zero success.

Within a few years the RFDS had established a pretty big radio network through the outback area. A chap called **Alfred Traeger** had invented a radio powered by pedalling a generator, there being no electricity in most homesteads at that time. Traeger and the **Rev. John Flynn**, who founded RFDS, decided that as they had a radio system in place, other uses could be made of it and so in 1950 the first 'School Of The Air' lesson was broadcast.

The RFDS and Schools share frequencies and although the Schools are now moving to satellite technology there are still some transmissions on h.f. Consultations between school and pupil and doctor and patient can sometimes be heard in the UK.

Here are some frequencies for the Royal Flying Doctor Service and School Of The Air...

2.020	4.926	5.845	7.392
2.260	4.980	5.850	7.410
2.280	5.010	5.865	7.465
2.360	5.110	6.825	7.4655
2.656	5.130	6.840	7.517
2.792	5.140	6.845	7.565
2.800	5.145	6.860	7.580
2.805	5.200	6.880	7.803
3.876	5.222	6.890	7.975
4.010	5.230	6.920	8.014
4.030	5.260	6.925	8.150
4.045	5.300	6.945	8.165
4.050	5.340	6.950	8.171
4.350	5.360	6.960	11.460
4.635	5.445	6.965	
4.800	5.450	7.340	
4.860	5.731	7.357	

All frequencies are in MHz and are u.s.b.

I don't believe that the above list will necessarily enable you to find RFDS stations but should you hear an Australian accent this may help you to identify the transmission. Bear in mind that the three time zones in Australia are eight, nine and 10 hours ahead of us in the UK, i.e. if the time is 1200 UTC, the local time in Sydney is 2200 (the same date).

Combined Cadet Force

Many (many) years ago I was a member of a CCF (Combined Cadet Force) Signals Section at my school. This meant that one day a week I would wear an extremely itchy army uniform dating from World War Two and in the afternoon, with other spotty itchy youths, we would go square bashing and generally 'play' soldiers.

Sometimes we would be allowed near the radio shack. At that time the equipment available to us was of a very refined vintage. We had a No. 12 set transmitter dating from the First War and a very fine and huge complete Canadian No. 52 set consisting of the transmitter, receiver and a crystal calibrator unit.

Portable sets were No. 62 sets and their very heavy tractor batteries. I was once struck by lightning while talking on a 62 set.

We did have some nifty 88 sets, that messed up the old 405-line TV, but you could shout further than their limited range. Normally, we were made to carry very heavy objects and lay out endless lengths of tangly telephone wire.

We did, however, indulge in the odd CCF/ACF radio contest or two. This usually involved setting up a big tent on the playing field and lugging out that enormously heavy 52 set and powering it with an even heavier generator. The contests still take place and are designed, no doubt, to lengthen the arms of generations of schoolboys!

Three contests are held each year. The *Easter Bonnet* takes place at the beginning of March, *Summer Whine* (yes with an 'H') in June/July and *Christmas Cracker* happens during the first full weekend of December or the last weekend in November. The contests last for a full 24 hours but other, less formal, contests take place during some evenings. Summer Whine and Christmas Cracker occur at weekends and normally begin at 1400 local time one the Saturday.

The stations try to make contact with as many other CCF/ACF stations as they can on their h.f. frequencies. Sometimes a signal report is passed but on occasions other coded information is exchanged. A point is awarded for each contact plus an additional point for being a control station on a particular frequency. The *Christmas Cracker* results are broadcast on a CCF net at 1200 on Christmas Day.

The frequencies used are never referred to by anything other than a two letter designation but frequencies remain the same although the codes change every week. The call-up frequency is 5.343MHz u.s.b. and the other frequencies are: 2.2730, 2.4130, 2.7680, 3.8480, 4.3630, 4.4430, 4.9180, 4.9205, 4.9530, 2.2740, 4.3280, 5.3430, 6.9130 and 7.7080MHz. All are u.s.b.

Some stations in the contests just start at the calling frequency and then work down the frequency list announcing the frequency code as they go. This isn't terribly good operational security but makes monitoring more interesting and decipherable for listeners.

Typical callsigns include K87, Z52, Z73C, Z59C, Z74, Z51A, Z80A, 49A, Z27B, U12B, Z57 and Z29B. The 'Z' prefix indicates that the station is operating away from their normal radio shack (e.g. the beastly school field perhaps) and I think we got extra points for this as well. QSL cards are exchanged between the Signals Sections. The frequencies in use are allowed to be varied over several kHz to allow operators to avoid causing interference and move away from noise, etc.

The CCF security is, if anything, over emphasised but the military pay good money for the equipment and training of the young people and the idea is to instil a culture of good security and operating practice during their formative years.

Thanks very much to **Graham Tanner** for most of the above information. By the way, my old school's CCF Signals Section callsign was 5C.

Ideal Utility Monitor

I have just purchased a Yaesu FT-817 radio. This is an ideal set for the h.f. s.s.b. utility monitor. I spend quite a lot of time away in various places and the '817 has proved to be an excellent companion. The latest version has a nickel-metal hydride battery pack (Ni-Mh) that is easier to manage than the old NiCad packs. The only problem as far as receiving is concerned is that the battery pack connection is delicate and rather difficult to change if you ever need to replace the Ni-Mh set with the supplied AA cell battery tray while 'out in the field' so to speak.

This is a very small radio but with performance as good as most base station types. Its small size necessitates the usage of a menu driven control system but this can be swiftly mastered. The rotary tuning control is small as well but there can be no other option when packing radio equipment of such complexity into such a small cabinet.

When in a rural area I use about 21m of fine wire as an antenna, end fed via a small MFJ tuner into the radio. I also install an earth via one of those corkscrew type stakes that are available at pet stores to tie doggie down when out for a picnic. The results have been amazing and I feel that with a better antenna system (not possible when one has to carry all one's own gear on foot) they would be better still. I am considering secreting wire antennas in places that I often visit.

I also find an antenna tuning unit (a.t.u.) invaluable. Many years ago a small but excellent a.t.u. enabled me to load-up an external metal fire escape on a hotel building with reasonable success. It is certainly surprising just what can be pressed into service as an antenna when absolutely necessary.

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It is with sadness that I have to report the passing of John Morley on the 27 June at the age of 59. John was the farmer who for many years allowed enthusiasts to camp and park on his fields adjacent to the approach to Runway 11 at Mildenhall.

I first met John in around 1980 when he used to chat to me when I was parked in Pollards Lane. When I told him that the Lane was too far away from the approach for photos of fighters he let me park behind his barns and stand in the field for photography. Not long after that he later allowed me to pitch my tent behind the barns and I believe I was one of the very first people ever to camp in his field.

Realising the potential for a campsite for enthusiasts, the next decade or so saw the installation of toilets, showers, the viewing scaffold and breakfasts and BBQs during airshow week. The field soon became used by aircraft enthusiasts all the year round and the rest as they say is history.

John was a kind and genial man who would always stop and chat to the enthusiasts. He always charged a fair price for parking and camping when some others sought to exploit enthusiasts during airshow week. It was not unusual for him to let me park or camp for the odd free night. He was a good friend not only to myself but also to the many aviation and airband enthusiasts who knew him. He will be missed by many and our thoughts go out to his wife Beryl and the family.

RIAT 2004

I knew it was a bad omen for the Air Tattoo when six days before I set off to the show a massive storm hit our town, (and most of southern UK). Winds were reaching storm Force 10, gusting 11 and record low temperatures, and as a consequence, my two rooftop antennas were turned into pieces of modern art - that sort of depression is meant to happen in October, not July - so much for Global Warming!

My annual pilgrimage to the RIAT started this year on the Tuesday evening when I stayed with a friend of mine who was working in Operations at the airshow. Unfortunately, the initial news was not good, the four Italian Starfighters and the four US Navy F-18s had apparently all cancelled some time back, but it appears that no-one had told the person who updates the participants list on the website!

In fact as I write this on the Wednesday after the RIAT, they are both still included on

the website listing! In the end around 25 aircraft listed on the website had cancelled, a sign of the times perhaps? The format for the aircraft arrivals at RIAT 2004 had once again changed this year with there being only two primary arrival days on Wednesday and Thursday. The Friday was due to have slots for 20 or so late arrivals with most of the day being a dress rehearsal of the flying display - more on that later.

RIAT 2004 - Wednesday

Wednesday started very dull and grey but at least it wasn't raining. We set off to arrive at the Park and View at 0830 as arrivals were due to start at 0900, an hour earlier than in previous years. The first thing to do was to confirm the frequencies in use, they were as follows:

TOWER	120.375/337.575 (126.225)
RADAR	123.55/377.35 (Primary)
RADAR	134.55/338.65 (Secondary)
GROUND	119.15/259.975
DELIVERY	124.55 (Monday only)
ATIS	254.475

A problem with cross channel interference meant that 120.375 was withdrawn for a short while to sort out the problem with 126.225 replacing it for that period. As far as I am aware 120.375 is a new allocation and is not one of the usual UK Airshow Common frequencies.

The replacement 126.225 is also a new frequency, so it will be interesting to see if they are used for airshows in the future? The radar frequency, 134.55 is a known UK airshow common, the others are all Brize Radar frequencies, although for the show 123.55 was using the callsign Fairford Director.

Arrivals started promptly and first in was E-8C, RAZOR 89. The gloomy weather continued but eventually the sun came out around 1500 and it was to be sunny for the rest of the day - it was the only decent bit of sun in the three days that I was at Fairford!

Just after the sun came out an Italian Air Force Piaggio P.166 did a run and break for downwind to land on Runway 27. As he passed the mid-field point he decided that a barrel roll would herald his arrival at RIAT 2004. An informed source tells me that members of the Flying Control Committee were seen to have 'had kittens' at the sight of this manoeuvre and comments such as, 'what a silly thing to do' were uttered, (or words to that effect!). I suspect that the pilots'

appearance in front of that Committee was assured not long afterwards!

Incidentally, the Italian Air Force are to be congratulated on an excellent turn out, plus their Army sent a Dornier 228, which several enthusiasts admitted that they did not know even existed!

I noted around 65 arrivals during the day, a few selected aircraft/callsigns of interest were as follows:

Aircraft	Call	Unit
C-38A ASTRA	BOXER 38	201 AS/DC ANG
LC-130H	SKIER 93	139 AS
MAJAN 297	C-130H	R. OMANI AF
B-52H	SKULL 24	2 BW
C-130H	KIWI 235	40 SQN
MC-130E	WAHOO 77	711 SOS
F-16C x 2	REBEL 01/02	31 FW
C-130E	CORSO 79	198 AS

RIAT 2004 - Thursday

Sadly, the gloom returned and it was to be a very dull day with just a light sprinkling of rain and the very occasional few seconds of sunshine. I noted around 140 movements for the day, so military numbers appear to be down on previous years.

One incident did threaten to upset the main arrivals day and that happened just after midday at 1212. After many fast jets had successfully negotiated a safe landing, a Cessna 406 of the French Army managed to burst the nose wheel tyre and damage the undercarriage. The outcome was that the runway remained closed for just over an hour until 1321, this caused all sorts of problems mainly with aircraft holding and many getting close to their fuel divert limit, (I understand that several did divert into Brize Norton).

I think the Brize radar controllers earned their money during that hour as there were aircraft holding all over the sky. The only good that came from the runway closure was that it was lunchtime and the American Burger stall did a very brisk trade during that period!

Selected notable aircraft/callsigns noted on the Thursday:

Aircraft	Call	Unit
WC-130J	HOBBY 70	53 WRS
L-39C	KOP 100	LITHUANIAN AF
TYPHOON T.1	TRIPLEX 1/2	29 (R) SQN
HAWK x 7	FINN FORCE 132	FINNISH AIR ACADEMY
F-16MLU x 2	METAL 1/2	R. NETH AF/313 SQN
C-130H	SCARS 01	144 AS/AK ANG
F/A-18F	NOT NOTED	VFA-2 (callsign anyone?)



This month's photo, is the superbly marked US Navy, F/A-18F from VFA-2 landing at Fairford.

The Typhoon callsign TRIPLEX is an old 56 Squadron Tornado callsign from when they were at Coningsby, now apparently adopted by 29 (R) Sqn. The F-18F which was due much earlier in the day eventually arrived around 1800 to a cheer from the remaining crowd, it was resplendent in a full colour scheme. Some of us of a certain age remember when a large percentage of US Navy aircraft used to be painted in full colours instead of the current anonymous grey - those were the days!

RIAT 2004 - Friday Onwards

Sadly, the weather worsened with persistent drizzle and some heavy rain the order of the day. I had to unexpectedly leave early at 1300, but by that time I had noted just 15 new arrivals and according to the movement sheet only a few were due later in the day.

The cloud base varied between 200 and around 800 feet for most of the morning and so any hope of flying rehearsals was practically impossible. A flat display by a very colourful blue Harrier and a couple of fly-by's by a Tucano was the limit of the mornings flying. A unique event was scheduled to take place on the Friday only, as part of the UK/France 100 year celebrations for *Entente Cordiale*. There was to be a joint formation flypast by the Red Arrows and the Patrouille de France, but sadly I assume that the weather put paid to that.

If anyone can send in a report for the rest of the Friday, including callsigns if possible that would be most helpful. I have to say I feel sorry for anyone who turned up and paid £20 expecting a busy arrivals day or a flying rehearsal as they would have been very disappointed!

A news report on the local BBC TV station indicated that if this year was not a success then the future of the RIAT may possibly be in doubt. They reported one fact that I didn't know was that in 2003 the RIAT lost a half a million pounds, which as

far as I am aware is the first time they have ever made a loss. I have seen a report on the Internet that the crowds were up 5% this year at just over 168,000 so that hopefully bodes well for the future.

Certainly, the crowds in Park and View on the Wednesday and Thursday were noticeably bigger than last year. As I was not there, the weekend weather was predictably a lot better and I understand that the traffic management plan worked very well. The B-2s used the callsigns DEATH 53 on Saturday and DEATH 63 on the Sunday.

Despite the weather and the cancellations, I enjoyed my three days at Fairford, there was some interesting aircraft to photograph, including a few very nice special colour schemes. There is little doubt that it is a sign of the times that aircraft numbers are never going to equal those of the heydays of the eighties and nineties and I think that all enthusiasts must embrace that fact in the future.

After all, if there was no RIAT and someone told you that there was an airshow being organised with around 250 military aircraft taking part, you wouldn't be unhappy - long may they continue. My thanks go to **Richard Arquati** and the RIAT media team for their kind help.

Oops!

Lastly, a quick quiz. Hands-up all those who spotted last month's deliberate error - well done, answers to me on the back of a £10 note by October 1st, (just kidding). Unfortunately a glitch got into the system at the production stage and the wrong A-7 picture was attached to the right caption. Consequently, a Pennsylvania Air Guard A-7D was shown in the column instead of a Greek Air Force TA-7H - sorry about that!

Due to the RIAT report I have held over some items, including part two of my airband report on the SDU5600, until next month.

Abbreviations

ACC	Air Combat Command
ACMI	Air Combat Manoeuvring Instrumentation
ADR	Air Defence Region/Radar
AEW	Airborne Early Warning
AIRCENT	Airforces Central Europe
AIRSOUTH	Airforces Southern Europe
AUX	Auxiliary Radio
AFIS	Aerodrome Flight Information Service
AFRC	Air Force Reserve Command
AMC	Air Mobility Command
ANG	Air National Guard
APCH	Approach
ASACS	Air Surveillance And Control System
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
AWACS	Airborne Warning And Control System
C/POST	Command Post
C/S	Callsign
CAC	Centralised Approach Control
CFS	Central Flying School
CH	Channel
CRC	Control And Reporting Centre
CRP	Control And Reporting Post
DATIS	Digital ATIS
ETPS	Empire Test Pilots School
FAC	Forward Air Control
FIR	Flight Information Region
FIS	Flight Information Service
FOST	Fleet Officer Sea Training
FRADU	Fleet Requirements & Distribution Unit
FS	Flight Squadron
FSATO	Fleet Support Air Tasking Organisation
FTS	Fighter Training Squadron
FW	Fighter Wing
GCI	Ground Controlled Interception
H24	Operational 24 Hours A Day
ICAO	International Civil Aviation Organisation
ICF	Initial Contact Frequency
JAAWSC	Joint Anti War Warfare Shore Co-Ord
LACC	London Area Control Centre
LDOC	Long Distance Operational Control (HF)
LJAO	Local Joint Area Organisation
LMS	London Middle Sector
OTA	Operational Training Area
LUS	London Upper Sector
MAS	Middle Airspace Service
MATZ	Military Air Traffic Zone
NATO	North Atlantic Treaty Organisation
NDB	Non Directional Beacon
OPS	Operations
PETF	Practice Emergency Test Frequency
PRI	Primary (Frequency)
RAF	Royal Air Force
RAPCON	Radar Approach Control
RTTY	Radio Teletype (also noted as RATT)
RWY	Runway
S/B	Standby (Frequency)
SAR / S&R	Search And Rescue
SEC	Secondary (Frequency)
SHF	Support Helicopter Force
SOF	Safety Officer Flying (Squadron)
SOG	Special Operational Group
SSR	Secondary Surveillance Radar
ST	Stud
STC	Special Tasks Cell
SVFR	Special Visual Flight Rules
TAD	Tactical Air Designator
TC	Terminal Control
TCA	Terminal Control Area
UAS	Upper Airspace
UAS	University Air Squadron
UK ASACS	United Kingdom Air Surveillance And Control System
USAF	United States Air Force
USCG	United States Coast Guard
USN	United States Navy
WFU	Withdrawn From Use
VOR	VHF Omni-Directional Range Beacon

Infoⁱⁿ Orbit

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August - the height of summer - yet as of mid-July the forecasters are not predicting any long, hot spells during late July and early August. I am happy about that! Marion and I find hot weather rather debilitating.

I have been kept busy looking at several weather satellite (WXSAT) software packages that I am hoping to review for this autumn's WXSAT Special. **Craig Anderson's** recent updates to *WXtoimg*, an MSG decoding program Sys DVB demo by C C E of Bologna, Italy, and some new satellite software facilities by **David Taylor** are all keeping my computers busy this summer.

Weather Satellites

Being August and the holiday season, I am anticipating that many readers will be taking time off and doing things - such as reading this magazine - in a more leisurely manner! It may therefore be a good opportunity to

provide a little more background information.

A newcomer to the hobby of monitoring weather satellites enters at an exciting time. He or she can set-up either or both of two distinctly different receiving systems. As an instant guide, each system costs a few hundred pounds; a polar orbiting satellite (NOAA) system requires an antenna, cable, a suitable receiver for 137MHz and a computer. At most, a good receiver costs about £200. The other system, for geostationary satellites, requires a small dish and LNB, a suitable DVB (satellite television) receiver, specialist software (and licence from EUMETSAT) and a computer. This system costs a few hundred pounds (also excluding the computer). There are specialist, recommended sources for all these products and I expect to delve a little deeper for the autumn 'Info Special'.

The two systems are complementary - they provide similar types of imagery seen from different spacecraft perspectives: polar and geostationary WXSATs.

The polar satellites comprise the constellation of NOAA satellites operated by the American National Oceanic and Atmospheric Administration, including *NOAA-12*, *NOAA-15*, *NOAA-16* and *NOAA-17*. Each of these WXSATs is in a near-polar orbit and provides image transmissions, as summarised at the end of this column every month.

At the cheapest level, the automatic picture transmission (a.p.t.) 137MHz band frequencies provide imagery from near the start of their passes over your reception station (usually referred to as your QTH -

headquarters), to somewhere near the end of the pass. Each pass lasts up to about 12 minutes, depending on its maximum elevation.

During the pass, the line-of-sight of the signal is subject to physical interference, such as dense trees or buildings, and also to electrical interference. Locations vary in the amount of interference, and it is difficult to anticipate how good your reception of 137MHz band signals will be before you set-up a system.

Regardless of this uncertainty, there are thousands of a.p.t. (137MHz) systems that receive polar WXSAT transmissions all over the world. My a.p.t. station uses a roof-mounted antenna feeding a Timestep Proscan receiver; the signal is analysed by the computer's soundcard, running *WXtoimg* - see **Fig. 1**. Incoming data is analysed and displayed; when the pass is over it is automatically processed and various enhanced forms (including artificial colour) are stored.

The system is a constant source of interest to visitors, especially my five year old grandson Joseph, who explained to Marion that the signals are from a satellite in outer space. He told granny "If you want to know anything about astronomy and space, ask Grandad or me"! The portable uses an AMD 1.500GHz processor.

Quality From APT Images

As explained, reception quality varies with your environment and hardware set-up. Compare **Fig. 3** from my system, with **Fig. 4** from **Kevin Hughes** of Tamworth. Kevin regularly receives almost horizon-to-horizon signals from the NOAA satellites - hence an almost interference-free pass, yet mine includes broken stretches, particularly in the south (the region of north Africa). This results from a huge tree that the signal has to contend with, towering to over 30° elevation. With industry a few kilometres away, I am not sure that I can do much to improve reception, although I would like to fit an antenna pre-amp at the top of the mast.

If your local horizon has some severely limiting regions caused by trees or tall buildings, you may experience similar reception problems. Are these a reason for turning away from a.p.t.? Personally, I would be prepared to set-up a system unless the horizon was impossible. There should normally be a reasonably clear overhead region where a.p.t. (137MHz band) signals can be easily received. Many users have their antenna in the loft and report good reception.

The a.p.t. format includes two side-by-side images - a visible-light image and an infra-red image, as shown in **Fig. 1** - originating from two of the five channels transmitted from the NOAA WXSATs.

The other transmission format provided by NOAA WXSATs is called h.r.p.t. (high resolution picture transmission) and costs considerably more to set-up. These transmissions provide the entire imaging capability of the satellites - five channels of selected regions of the spectrum at a



Fig. 1: Polar WXSAT reception on portable computer.

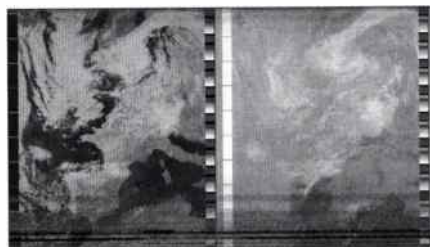


Fig. 2: NOAA-17 1049 10 July basic two-section image.



Fig. 3: NOAA-17 1049 10 July processed image.



Fig. 4: NOAA-17 9 July 1109 from Kevin Hughes.

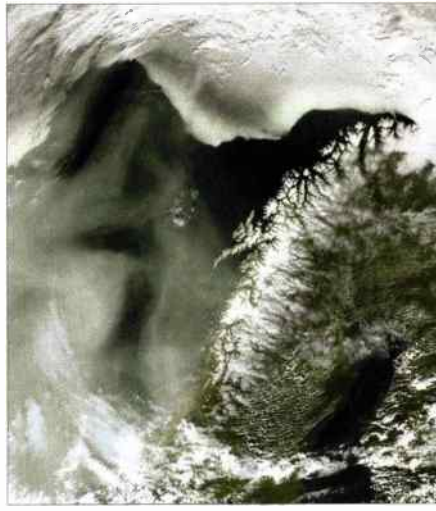


Fig. 5: NOAA-16 high resolution image (h.r.p.t.) from Ferdinand Valk.

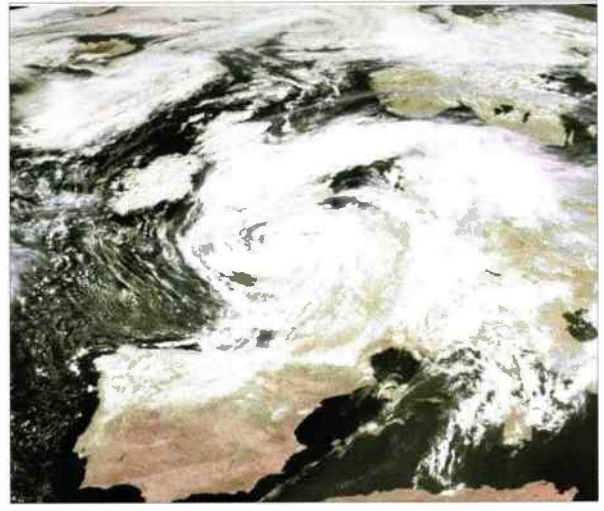


Fig. 6: HRIT channel 2 image from METEOSAT-8 8 July 1200 showing a summer storm. © EUMETSAT 2004.

resolution of about 1.1km below the satellite.

Such systems cost in the region of £2300 or more to set-up, and are mostly in use by professional researchers. A number of enthusiasts, including me, have operated such systems and I hope to resurrect mine if the repairs are successful, see later!

The other system is for geostationary satellites - specifically METEOSAT-8. Previous editions of this column have explained the circumstances in which the unexpected failure of a piece of hardware on MSG-1 (METEOSAT Second Generation) led to a change of plan for the user downlink transmissions. These now come to us via HotBird-6 using a DVB (satellite television) transponder.

Reception costs for the HRIT (high rate information telemetry) system were (and may be for any future direct-reception systems) beyond the funding of most amateurs. The hobbyist market was expecting to monopolise the LRIT (low rate information transmission) data stream, but we subsequently found ourselves able to tune into the highest quality geostationary WXSAT imagery obtainable!

So, what can the newcomer expect to receive from METEOSAT-8 (via HotBird-6)? Superb, near real-time images! When you set-up a HotBird dish, install the essential *Tellique* software, edit your personal password and username that EUMETSAT provide to successful applicants and install software to decode the files, you can sit back and watch the most advanced digital WXSAT image data appear on your computer screen.

Although one critic of this system implied that only NOAA images were from a 'real weather satellite' (implying that METEOSAT-8 does not count as a WXSAT!), I have to strongly disagree with this point of view. When events such as hardware failure (a pre-amp) on board a satellite (MSG-1) cause a re-think of the method of downlinking telemetry, operations staff have to derive a feasible alternative system to deliver the goods.

I am delighted that EUMETSAT staff decided to provide the image stream via

HotBird-6, making data cheaply available to a considerably larger audience than originally anticipated. None of this was planned - it resulted from an unexpected, major problem!

Those who venture along the METEOSAT-8 route should be able to receive a stream of imagery of first class quality, as long as the dish has a clear line-of-site to HotBird-6, positioned a few degrees east of longitude zero.

The newcomer to this hobby can therefore 'test the temperature' by deciding along which road to journey, whilst also being aware that the long-term plans for future WXSAT launches mean that it is not going to end any time soon!

WXSAT Launches 2004 - 2018

US Polar Satellites:

[NOAA-17 (latest) - Launched 24 June 2002]
 NOAA-N (to become 18) - 11 February 2005
 NPOESS Preparatory Project - 31 October 2006
 NOAA-N' - 2008 pending repairs
 NPOESS C1 - October 2009
 NPOESS C2 - October 2010
 NPOESS C3 - October 2011
 NPOESS C4 - June 2013
 NPOESS C5 - June 2016
 NPOESS C6 - June 2018
 [NPOESS - National Polar-orbiting Operational Environmental Satellite System]

US Geostationary Satellites:

[GOES-M (current) - Launched 23 July 2001]
 GOES-N - December 2004
 GOES-O - July 2007
 GOES-P - October 2008
 GOES-Q - cancelled
 GOES-R - April 2012

EUMETSAT

[METEOSAT-8 (METEOSAT Second Generation (MSG-1)) - Launched 28 August 2002]
 MSG-2 - 2005
 MSG-3 - 2008
 METOP-1 - July - December 2005

METOP-2 - June 2010

[METOP - Meteorological Operational Polar Satellite (EUMETSAT)]

Russia:

[Meteor 3M-N1 - launched 10 December 2001]
 Meteor 3M-N2 - December 2004
 GOMS-N2 - 2005 (geostationary)

Japan:

Multifunctional Transport Satellite (MTSat)
 MTSat-1R - 2004
 MTSat-2 - 2005

China:

[FY-1D polar orbiter launched 15 May 2002]
 China FY-2B geostationary satellite launched 26 June 2000
 China FY-2C - 2004
 China FY-2D - 2006
 China FY-2E - 2009

This launch list is subject to changes during the next decade, but it demonstrates the commitment of the organisations and nations involved to maintaining a comprehensive weather monitoring satellite constellation. Indications are that NOAA will continue with a.p.t. transmissions for another decade, although some other formats (WEFAX and PDUS) are being terminated during the next 18 months or so.

Obviously, we cannot pick up all the satellites on our domestic systems: the geostationary ones are distributed around the world, along the Clarke Belt, and not all polar WXSATs transmit a.p.t. (137MHz band). However, METEOSAT-8 transmissions are already carrying several other geostationary image formats, and there is the probability of METOP data being added in the future.

Overall, the future of WXSAT imaging for the amateur hobbyist has probably never been better - and perhaps we might even see the new SICR and METEOR provide some a.p.t.!



Fig. 7: Czech Republic representative signs on - picture courtesy David Taylor.

EUMETSAT Conference 2004

News from EUMETSAT's Prague conference came too late last month for a fair write-up, so I have compiled just a few notes, illustrated by pictures from David Taylor who attended the conference. It is clear from the long list of speakers that the conference was an important information exchange session. Speakers from EUMETSAT confirmed the progress of developments towards the launch of future MSG satellites and the polar constellation METOP. NOAA was represented by high ranking staff, as was Russia and China.

EUMETSAT is composed of Members States and Co-operating States, and part of the session involved the Czech minister signing for the Czech republic to become a co-operating member state.

Ferdinand Valk and his son Jonathan were on hand to give a demonstration of images on the *SatSignal* stand.

As briefly mentioned last month, two awards were presented: David Taylor for the best software demonstration and **Vibeke Thyness** from the Norwegian Met. Office who won the award for the best poster (about the sea-ice SAF's work).

Yaesu Controller Check Out

With my h.r.p.t. system in 'mothballs' for the time being, as reported last month, only the 'clip-clop' sounds from the a.p.t. transmissions have graced my computer room. The elevation motor that helps control my h.r.p.t. system failed a few weeks ago, so I removed it from the mount assembly and decided to try to service it myself.

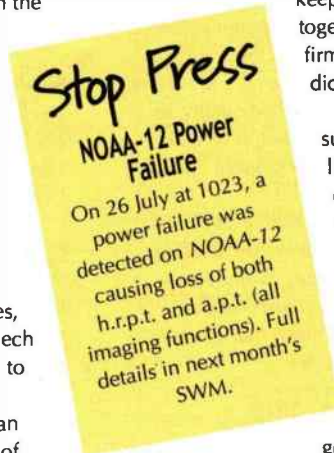
I was unable to undo the bolts fitted around the unit, so I took it along to the local garage where a mechanic very kindly loosened all the bolts within a matter of minutes. I explained what the motor was for, carefully describing the weather satellite receiver, to avoid confusion with ordinary satellite television receivers! They did not charge for the bolt loosening, so I offered to bring a printed WXSAT picture if I was able to fix the unit.

Bolt removal did not solve the immediate

problem because I found that I could still not separate the two halves! After explaining about the problem to the manufacturers (Yaesu), they confirmed that nothing other than stickiness was keeping the two halves together. Some gentle but firm taps with a mallet did the job.

Inside, the unit was surprisingly clean, with little evidence of rust. I carefully removed some debris, lumps of grease and small pieces of plastic and copper. The various components seemed intact so I sprayed some WD40 around the gearing and decided to re-assemble the unit and re-test.

Then we had the gales of early July - see **Fig. 6!** We tried to re-mount the dish on the cylindrical axis of the controller but for some reason, the dimensions now seemed wrong. I decided to wait a few days while completing this column. Hopefully next month I shall have moved on to full testing.



Frequencies

a.p.t.

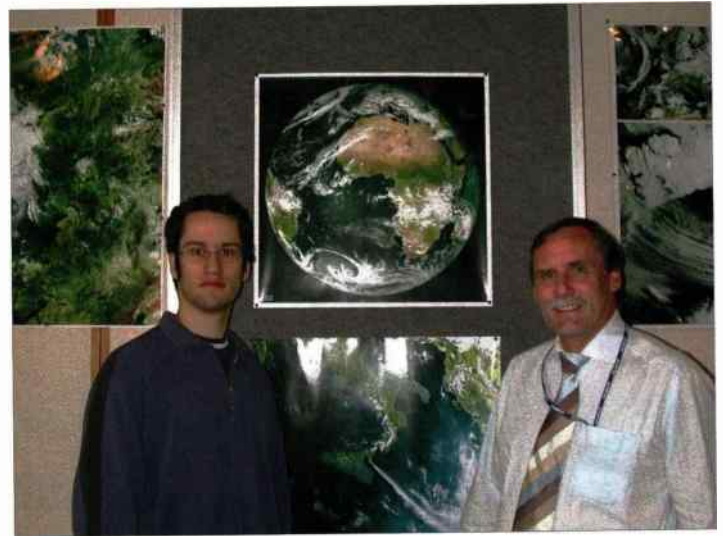
NOAA-12 and NOAA-15 transmit a.p.t. on 137.50MHz.
NOAA-17 transmits a.p.t. on 137.62MHz.
during overlap periods, NOAA-12's a.p.t. may be switched off.

h.r.p.t.

NOAA-12 and NOAA-16 transmit h.r.p.t. on 1698.0MHz.
NOAA-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 various formats transmitted via HotBird-6 at 13°E on 11.096GHz.

Fig. 8: Ferdinand Valk and Jonathan.



Forum Activities

I read the Internet's weather satellite forums every day because I believe it is important for me to keep up with the experiences and comments made by users. Unfortunately, forums are open to miss-use, and this has been the case in 'rig-members' in which a sequence of posts containing inappropriate content was repeatedly posted, despite requests for their cessation.

Inevitably this resulted in the list's moderators closing it down. Even more sadly, in my view, were claims made on the 'rig-' list to the effect that I was responsible for the closing down of the 'wxsat-' list! I chose to ignore these claims, rather than engage in counter-claims.

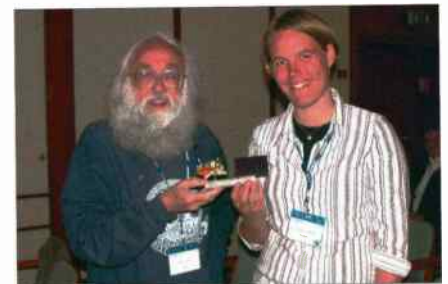


Fig. 9: David Taylor receives software award.

Long Wave Maritime

Beacons

● **Robert Connolly** 21 Eleaston Park, Kilkeel, Co. Down, N. Ireland BT34 4DA
 ● **E-mail** beacons@kilkeel17.freemove.co.uk

The former NDB at Tory Island (TY 313kHz) was converted to a DGPS station. (photo courtesy of Finbar O'Connor).

Some readers may be unaware of just how long maritime beacons have been around. I was carrying out some research recently and discovered that from an operational point of view the maritime beacons appeared in fact slightly older than their civil aero relations.

Trinity House kindly informed me that back in 1924 they first experimented with Non Directional Beacons (NDBs) at St. Catherines and Nash Point Lighthouses. The Northern Lighthouse Board installed the first fully operational beacons at Kinnaird Head and Sule Skerry in 1929. In Ireland the Commissioners for Irish Lights installed their first NDB at Mizen Head in 1931 at a cost of over £10000. That was a lot of money then! In comparison the first civil aero beacon in the UK was installed at Croydon Airport in 1932.

The fact that maritime NDBs in the British Isles were operational in one form or another for over eighty years obviously speaks volumes for their usefulness and goes some way as to explain the reluctance of some countries to close their beacons down. Let's face it they were reliable and relatively inexpensive to operate.

On the subject of former maritime beacons I received some information from **Finbar O'Connor** regarding the former NDB at Tory Island (TY 313kHz) that was converted to a DGPS station. Finbar had occasion to visit this Island recently and kindly sent me details of the antenna system along with some photographs.

The antenna in use is a Classic 3 wire 'Tee' type. It is suspended between the lighthouse and an 18m high tower. Between the central drop there is 30m at the lighthouse end and 25m at the tower end giving a total top hat length of 55m.

The white box in the photograph is the

a.t.u. unit. Finbar, who is senior radio officer at Malin Head Radio Station, tells me that Tory Island was one of three former marine NDBs they monitored twice daily with the other two being Eagle Island (GL 307kHz) and my former local marine NDB South Rock Light Float (SU 291.5kHz).

Propagation conditions have been their usual mix for the spring and early summer. I have been fortunate enough to receive a couple of the rarer Spanish beacons here (AS 285.5 and GA 300.0). In addition in mid-June I managed to receive a faint KA 312.5 from the Ukraine although none of the other beacons in that chain were heard.

Tony Moore was pleased to advise me that in late June he received NA 283.5 from the Canaries for the first time at his QTH near Redcar. **Giorgio Casu** from Sardinia found conditions from Spain were not as good as the previous quarter although he did manage to receive several beacons from the Ukraine.

Roelf Bakker in the Netherlands reports receiving a beacon in marine format (KG 323.5) during daylight and suspects it originated from somewhere in the Baltic. This beacon is unknown but maybe a Russian naval beacon being used on some form of exercise. It has been



heard on previous occasions but not in the last year.

In early May the Spanish beacon MA (284.5) went 'off air' and this was confirmed by details on my NAVTEX receiver. This also occurred last year around that time and I suspect it was annual maintenance time. Later in May I had not heard it return and so made enquiries via a NDB reflector group that I subscribe to.

I was surprised to receive a reply from **Rodney Valdron** from Newfoundland advising me that he had received it there a few nights previous. Rodney advised me that he has received several maritime beacons from Europe and he gets frequent reception of western European beacons from about 30 minutes before dusk until three hours after dusk at his location. He kindly followed this up with a welcome set of logs for the column.

Readers may be envious to know that his antenna is about 197m long. He uses RG-6 coaxial cable with the shield wrapped around the centre conductor at the extremities to form a 'single wire'. Rodney tells me he used to work for the local Cable TV company years ago and had a few 'half-empty' spools of the stuff. It certainly seems to be doing a good job!

Finally **Arnie Nesbitt** advised me that he used an crystal receiver with an 800m sheep fence as an antenna from a location near Whitby to successfully identify three maritime and several aero NDBs. Not an easy task with an crystal receiver! Please submit to your logs for the June to September period to me by the end of September. Until the next time, good DXing.

Long Wave Maritime Beacon Chart

kHz	C/S	Station Name	Location	DX'er
283.5	NA	La Entallada	Canaries	A* B* C*
284.5	MA	Cabo Machicharo	Spain	A* C* E
285.5	AS	Castellon	Spain (Med)	A* E*
289.5	MY	Cabo Mayor	Spain	A B
292.5	BA	Estaca De Bares	Spain (N/W)	A B C* E F*
293.5	MH	Mahon	Balearics	A* B* D*
294.0	FI	Caia Figuera	Majorca	A* D*
296.5	FI	Cabo Finisterre	Spain (N/West)	A* B* E
298.0	KU	Kook Islands	Greenland	E
299.5	KN	Sirova	Norway	A* B
300.0	GA	Malaga	Spain (S/East)	A*
304.0	D	Rota	Spain (S/West)	A*
305.0	KA	Klaipeda Rear	Lithuania	A*
305.7	DA	Dalatangi	Iceland	B* C*
309.5	EYa	Yevpatoriyskiy Lt.	Ukraine	B* D*
309.5	SW	M. Khersonesskiy	Ukraine	B* D*
309.5	TR	M. Tarkhantuskiiy	Ukraine	B* D*
312.5	BK	Balitsysk	Baltic Russia	A*
312.5	BT	Mys Taran	Baltic Russia	A*
312.5	KA	M. Kyz-Aul	Ukraine	A*
314.0	SN	San Sebastian	Spain (North)	A* D*
323.5	KG	Unid ??	Baltic Sea Area?	B*
337.0	MY	Nyggnaes	Faroes	A B C* F*
372.0	OZN	Prins Christian Sund	Greenland	A* B* C* E*
381.0	AB	Akraberg	Faroes	A* B* C* F*
404.0	NL	Noslo	Faroes	A* B* C*

Entries marked * were logged during darkness. All others at dusk/dawn or during daylight.

Equipment Used

- A) Robert Connolly, Kilkeel, N. Ireland. Equipment: Receiver: JRC NRD-525. Antenna: Datong AD-370 antenna & Timewave DSP-9+ filter.
- B) Roelof Bakker, Middelburg, Netherlands. Equipment: Active whip and active loop + two tuneable pre-amplifiers. The output from the pre-amps is routed to a phasing unit and then into the main receiver, a Wandell & Goltermann SPM-3 selective level meter. The output from the SPM-3 at 1500Hz, is down converted to 500Hz. Here follows a Datong FL-3 filter and/or a LC-filter with a bandwidth of 25Hz. With exception of the SPM-3 and the FL-3, the station is home-made.
- C) Tony Moore, New Marske. Redcar, England. Equipment: Receiver Lowe HF-225. Antenna: Datong AD-370 Active Antenna. Vert Filter: Datong FL 2
- D) Giorgio Casu, San Gavino Monreale, Sardinia. Equipment: Receiver: Icom IC-756 Proll. Antenna: Wellbrook LF1010.
- E) Rodney Valdron, Newfoundland, Canada. Equipment: Receiver: Icom 735 with 500Hz c.w. filter. Antenna: 197m long wire approx 3m above ground.
- F) Arnie Nesbitt, near Whitby, England. Equipment: Receiver: Crystal. Antenna: Sheep fence earthed by a water trough.

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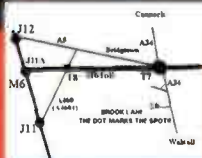
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How to use the Propagation Charts

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.

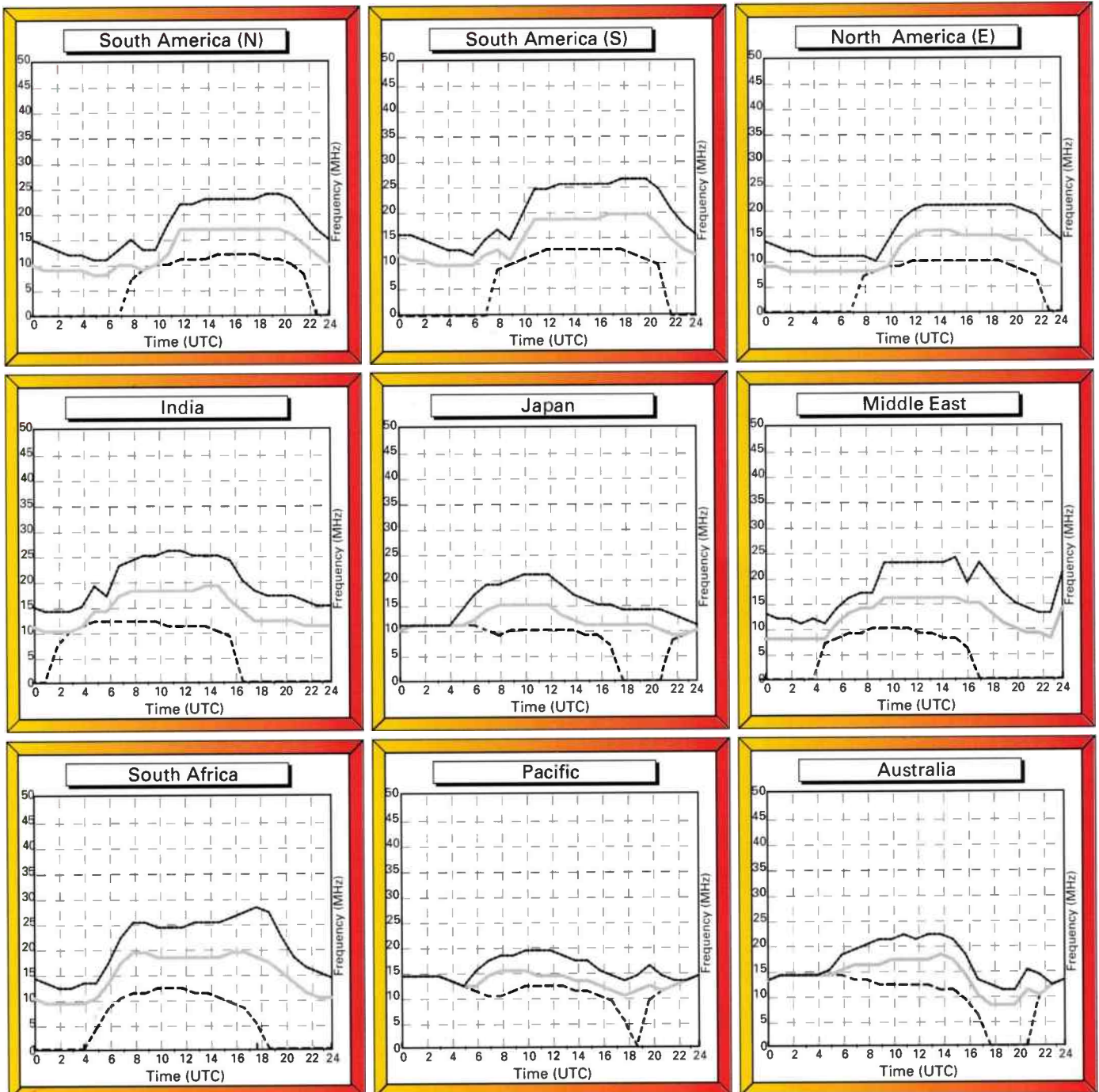
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

September 2004
Circuits to London

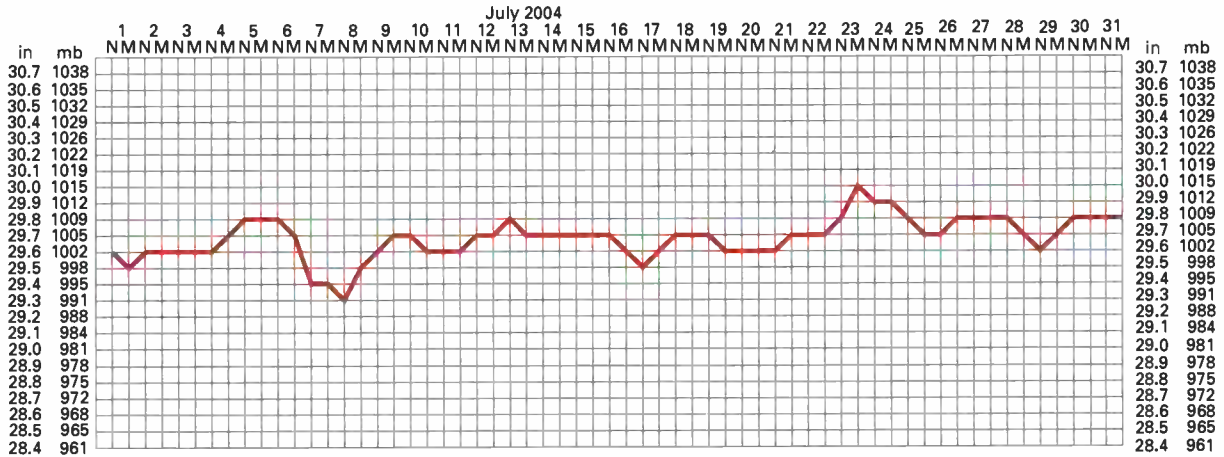


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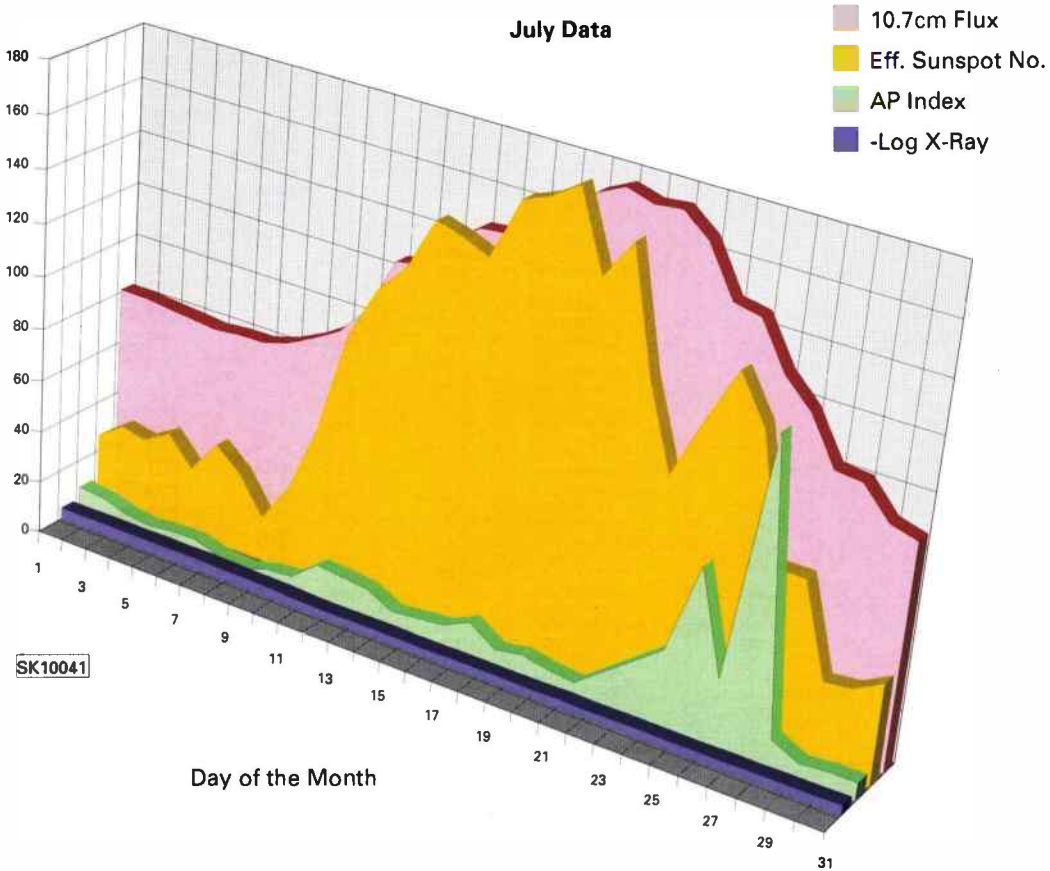
Propagation Extra

● **Kevin Nice** G3UNR, 13KRS95787
 SWM Editorial Offices, Broadstone
 ● **E-mail:** kevin.nice@pwpublishing.ltd.uk

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, July 2004



July Data



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).

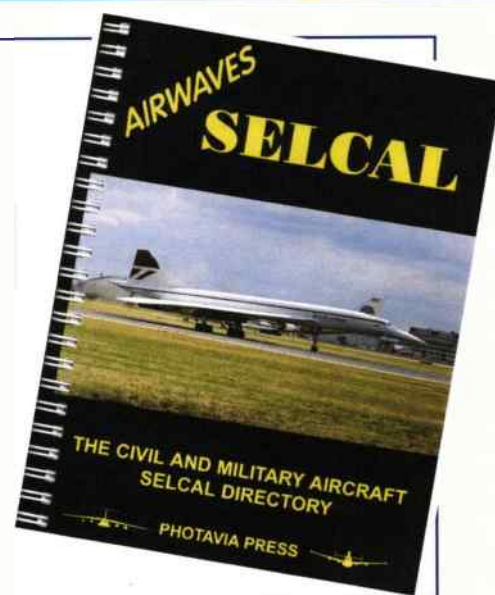
K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

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

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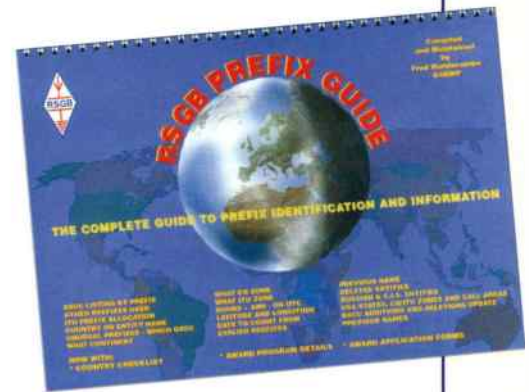
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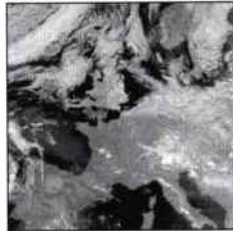
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CUMBRIA

EDEN VALLEY RS, G0ANT. Meets at the BBC Club, Penrith, Details from John Rose 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, G3BRS. Meets at the Mosses Centre, Cecil Street, Bury, Lancs BL9 0SB. Details from Steve Gilbert G30AG. Tel: 0161-881 1950

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 G4GWS. Tel: (01942) 211397

ECCLIS & DARS, G3GJK. Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester, Details from Chris Harrison G8KRG. Tel: 0161-773 7899

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

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

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

ROCHDALE & DARS (RADARS), G0RCC. Meets at the Bamfield & Fieldhouse, Cricket Club, Bamfield Village, Details from John Cannell G70AI. Tel: (01708) 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, G6UQ, G8SRS. Meets at the T.S. Hawkins, Stockport Sea Cadets HQ, Pearmill Ind. Est., Stockport Road, West Hoe, Lower Bredbury, Stockport, Details from David Simecock 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 G7JK. Tel: 0161-865 5609

WEST MANCHESTER RC, G4MWC. Meets at the Astley & Tydsley Miners Welfare Club, Meany Road, Astley, Tydsley, Manchester, Details from Jeffrey Moran M0B6U. Tel: (01204) 497694

WIGAN & DARS, G0HRW. Details from Mr D.H. Barkley G0DPI. Tel: (01942) 237162.

ISLE OF MAN

ISLE OF MAN ARS, G03PLH. Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas, Details from Dave Walton M0B8XL. Tel: (01624) 816308

LANCASHIRE

BURNLEY & DARS, R5B7674. 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 M1AC.

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

FISTS CW CLUB, G0IPX. Details from Mr E. Longden G3ZQS. Tel: (01254) 703948.

FYLDE ARS, R5S3939. Meets at the A.N.T. Flying Clubhouse, Blackpool Airport, Details from Ken Randall G3RPH. Tel: (01253) 407952

MORECAMBE BAY ARS, G4YBS. Meets at the Trimple Sports & Social Club, Outwood Lane, Morecambe, Lancs. Details from Brian Watson G0RDH. Tel: (01524) 424522

PRESTON ARS, G3KJE. Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston, Details from Eric Eastwood G1WQY. Tel: (01772) 686708

ROLLS-ROYCE ARC, G3RR. Meets at the Club Room, Rolls-Royce Sports Ground, Barnoldswick, Details from Mr J.A. York G3KVJ

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

THORNTON CLEVELY ARS, G4ATH. Meets at the Frank Townsend Centre, Beach Road, Thornton Clevellys, Lancs. Details from Mr J.E. Duddington G4BFH. Tel: (01253) 853554

MERSEYSIDE

LIVERPOOL & DARS, G3AHD. Meets at the Churchill Conservatory Club, Church Road, Wavertree, Liverpool L15. Details from David G. Parr G5DYE

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

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

WIRRAL & DARC, G4MGR. Meets at the Irby Cricket Club, Mill Hill Road, Wirral. Details from Tom G4BKF, E-mail: secretary@wadarc.com Tel: (07050) 291850

WIRRAL ARS, G3NWR, M31ARC. Meets at the Club Room, Ivy Farm, Arrow Park Road, Wirral L49 5LW. Details from Alan Upton G3UZU. Tel: 0151-677 3266

NORTH EAST

CLEVELAND

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

STOCKTON & DARG, G4XGX. Meets at the Billingham Community Centre, Billingham, Cleveland. Details from David J. London G0VGS. Tel: (01642) 896395

CO DURHAM

BISHOP AUCKLAND RC, G4TTF. Meets at the Stanley Village Hall, Rear High Road, Stanley, Crook, Co. Durham. Details from Mark Hill G0GFG. Tel: (01388) 745353

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

GREAT LUMLEY AR & ES, G4EJZ. Meets at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham, Details from Nancy Bone G7UUR. Tel: 0191-477 0036, mobile (07990) 760920

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

HUMBERSIDE

EAST YORKSHIRE ARS, G0FCR. Meets at the Northern Foods Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4E8T. Tel: (01482) 876702

GOOLE R & ES, G0OUE. Meets at the West Park Pavilion, Goole, South Humberside.

GRIMSBY ARS, G3CNK. 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, Alfwick Road, Hornsea, North Humberside, Details from Jeff Southwell G4GYS. Tel: (01964) 533331

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

RAYWELL PARK SCOUTS ARS, G4CMT. Details from Mr A.D. Russell M0AUX.

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

NORTH YORKSHIRE

DARLEY ARC, G0FOS

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

QUEEN MARY ARC, G6QJ. Meets at Blazefield, Pateley Bridge, Harrogate, North Yorks HG3 5DR. Details from Frank Hams G4IEY. Tel: (01242) 236715

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

ROYAL SIGNALS SCARBOROUGH ARC, G0RCS. Details from Mr A.W.W. Timme G3CWW. Tel: (01484) 842330.

SCARBOROUGH ARS, G4BP. Meets at the Scarborough Cricket Club, Pavilion, North Marine Road, Scarborough, North Yorks YO12 2TJ. Details from Mr D.P. Tipper G3JBR. Tel: (01723) 377296

SCARBOROUGH SE GRP, G0X00. Details from Roy Clayton G4SSH. Tel: (01723) 862924.

THE VINTAGE & MILITARY ARS, R51B3536. Details from H.A. Aspinall.

YORK ARS, G3HHV. Meets at the Guppy's Enterprise Club, 17 Nunney Lane, York, Details from Keith Coss G3WVO. Tel: (01904) 422064

YORK RADIO CLUB (AMATEUR) G4YRC. Meets at the Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392

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, G4AAK. Meets at the Old Telephone Exchange, Crosswell Road, Ellington, Morpeth, Northumberland, Details from Mr D. Stansfield G0EJV. Tel: (01670) 513026

SOUTH YORKSHIRE

FINNINGLEY ARS, G7HAH. Details from John Fennell G4HOY. Tel: (01427) 872522.

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

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

SHEFFIELD ARC, G0INF, NRAE/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Giossep G0SFF

TYNE & WEAR

HOUGHTON/LESPRING ARC, G3NMD. Meets at the Dumblrie Royal British Legion, Dumblrie, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Aungles G0A6F. Tel: 0191-584 4673

SOUTH TYNESIDE ARS, G3OWHQ. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWJ. Tel: 0191-421 9921

TYNEMOUTH ARC G0NMM. Meets at the Linskill Centre, Lincill Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0SBN

TYNESIDE ARS, G3ZQM. Meets at the St Teresa's Club, 200b Heaton Road, Newcastle-upon-Tyne NE6 5HP. Details from Mr J. Pickersgill G0ZG. Tel: 0191-265 1718

WEST YORKSHIRE

DENBY DALE & DARS, G4CDD, G8KMK. Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4F5Q

HALIFAX & DARS, G2UQ. 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. Tomson M1B6Y. Tel: (01274) 723951

LEEDS & DARS, G4LAD. Meets at The Radio Shack, Yarnbury (Horsforth), RUFC Grounds, Brownberry Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0IBU

NORTH WAKEFIELD RC, G4HOK. Meets at the East Ardsley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 01123-253 9087

OTLEY ARS, G3XNO. Meets at The RA0B Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SNV. Tel: (01274) 636197

PONTERFAC & DARC, G3FVQ. Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0MQE. Tel: (01977) 677006

SPEN VALLEY ARS, G3SVC. Meets at the Old Bank WMC, Millfield, West Yorkshire. Details from Mr J.R. Wilde G0F0I. Tel: (01274) 875038

WAKEFIELD & DARS, G3WRB. Meets at the Ossett Community Centre, Prospect Road, Ossett, W. Yorks. Details from Ian Roberts. Tel: (01924) 216502

WAKEFIELD RPRP GP, G0KNR. Details from Mike Charlton G6ZGX.

WHITE ROSE ARS, G3XEP. Meets at the Moortown RUFC, Moss Valley, Kings Lane, Leeds LS17 7NT. Details from Mr M. Wilson G7SDW. Tel: 01123-273 6039

MIDLANDS

LEICESTERSHIRE

BEDFORDSHIRE

DUNSTABLE DOWNS RC, G4DDC. Meets at the Chevus House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419

SHEFFIELD & DARS, G3FJE. Meets at the Church Hall, Amphill, Shefford, Beds. Details from John West. Tel: (01462) 812739

ST SWITHUN'S ARC, M0AUN. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelynn Darton G0WOD. Tel: (01767) 883179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2XIV. Meets at the Coleridge Community College, Radesgun Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712

DUXPOND ARS, G62MM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.J. Pope. Tel: (01279) 656149

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Fareot Road, Felton, Peterborough. Details from Alan D. Ralph G8XLH

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Medway Centre, Medway Road, Huntingdon. Details from David Leach G7DUI. Tel: (01480) 431333

MARCH & DARS, G3PHM. Meets at the British Legion Club, Rookwood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885

PETERBOROUGH R & ES, G3DQW. Details from Mr V. Edwards G8NGZ.

WISBECH AR & ELEC. CLUB, M5ARC, G4POL, G8NED. Meets at RAF Club, Old Market, Wisbech, Details from Alan Brickfield M0DUQ. www.warec.org.uk

DERBYSHIRE

BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High Street, Bolsover, Derby, Details from Colin Morris G0RXT. Tel: (01246) 822856

BUXTON RA, G4SPA. Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4HO. Tel: (01298) 25506

DERBY & DARS, G2DJ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Sherdoff G3SZJ. Tel: (01332) 556875

EREWHAM VALLEY ARG, G0PCX. Meets at The Sitwell Arms Wash House (between Horseley Woodhouse and

Woodside). Details from Peter Russell M0AQU

MOUNT ST. MARY'S ARC, G4MSM. Meets at the College, Spinkhill, Sheffield. Details from Rev. P. McArdie G0DAG. Tel: (01246) 812230

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marpool United Reform Church, Chapel Street, Marpool, Ilkeston, Details from Graham Bromley G4UNT. Tel: (01773) 834308

NUNSFELD HOUSE ARG, G3EEQ. Meets at the Nunsfield House, Boulton Lane, Alveston, Derby. Details from William F. Smith G7PJ

STH DERBYS & ASHBY W ARG, G0SRC. Meets at the Moira Replea Centre, 17 Ashby Road, Moira, Swadlowcote, Derbyshire DE12 6DJ. Details from Mrs B. Waldley. Tel: (01283) 760822

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Geithing M0CLQ. Tel: 0115-955 5766.

GLoucestershire

CHELTENHAM AR ASSN, G5BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ivan Wilson G4BGW. Tel: (01452) 731956

CHELTENHAM CLUSTER SUPP GP, G8TDX. Details from Mr A.M. Davies G0HDB. Tel: (01684) 72178.

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

SMITHS INDUSTRIES RS, G4MEN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G1JMF

STROUD RS, G4SRS. Meets at the Minchington Youth Centre, Nr. Stroud, Details from Mr S.C. Spencer G3L0

WHITE NOISE LISTENING GOWNL. Details from Adrian Deane G7KCC.

HEREFORD & WORCESTER

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

BROMSGROVE ARS, G4TUJ. Meets at the Lily End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TGP. Tel: (01527) 542266

DROITWICH ARC, G4PYO. Meets in the Community Hall, Droitwich Spa, Worcs. Details from Hector Wragg M1BUV. Tel: (01905) 794399

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gao! Street, Hereford, Details from Tim Brigland-Taylor G0WJU. Tel: (01432) 279435

KIDDERMINSTER & DARS, G0KRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders G0ZBZ. 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@alernon.fsnet.co.uk

REDDITCH RC, G4ACZ. Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01899) 762041

VALE OF EvesHAM RAC, G0ERA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NRD. Tel: (01396) 41508.

LEICESTERSHIRE

1F ATC, G7MCD. Details from Sqn. Cdr. Adrian Utting G1WZQ.

BEAUMON ARS, G3BMR

DEMONTFORT 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 G8BF. Tel: (01455) 846493

LEICESTER RS, G3LRS. Meets at Gilroes Cottage, Groby Road, Leicester LE3 9QJ. Details from Mr S.P. Hay G3HYH. Tel: 0116-224 2598

LOUGHBOROUGH & DARC, G3RAL. Meets at Hind Leys College, Shephed, Loughborough, Leics. Details from Chris Walker G1ETZ. Tel: (015209) 504319

MELTON MOWBRAY ARS, G4FOX. Meets at the St. John Ambulance Hall, Asfordley Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3NWK. Tel: (01664) 63369

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

TAMWORTH ARS, G8TRS. Details from Mr A.I. Dyon G0WJU. Tel: (01827) 830437.

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

LINCOLNSHIRE

EAGLE RADIO GROUP, M0ERG. Meets at the Eagle Hotel, Victoria Road, Mablethorpe, Details from Terry Stow G0SWs. Tel: (01507) 478590

FIVE BELLS GROUP, G4SIV. Details from Mr B.K. Tatnall G40DA.

GRANTHAM RC, G0GRC. Meets at the Kontak Social Club, Barrowby Road, Grantham, Lincs. Details from the Secretary. Tel: (01476) 857436

LINCOLN SHORT WAVE CLUB, G5FZ. Meets at The Railway Club, Triton Road, Lincoln. Details from Mrs Pam Rose G4S70. Tel: (01427) 788356

RAF CONINGSBY ARC, G3LQS. Meets at Essex Block, RAF Coningsby, Details from Peter Hanson G0NVY

RAF WADDINGTON ARC, G0RAF. Meets at Pwypwe Inn, Fosbeck, Saxby Road, Lincoln, Details from Robert Pickles G3VCA. Tel: (01522) 528708

SPALDING & DARS, G4DSP. Meets at The Old Fire Station, Spalding, Lincs. Details from Raymond Pearson G8ELV. Tel: (01775) 711953. Web: www.sdrs.org.uk
SPILSBY ARS, RS91468. Details from Clive Ironmonger G6HYF. Tel: (01790) 752712.

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Litacs Public House, 39 Church Street, Kettering, Northants NN14 1HD. Details from Fay Barwell G6AKS. Tel: (01536) 390954
MID NORTHANTS AR EXP, GOING. Details from Lionel Parker G5LP.

NORTHAMPTON RC, G3GW. Meets at The British Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller G0GBZ. Tel: (01327) 349188
NORTHAMPTON SCOUT ARG, G8NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rivett G8WPU

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

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3EKW. Meets at the Hayward Road Community Association, Hayward Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177
DUKERIES ARS, G4XTL. Meets at Ambleside Community Centre, Ambleside, New Olerton, Notts. Details from Colin Foster G7DEX

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

MANFIELD ARS, G3QCQ. Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from David Peat G0KRP. Tel: (01623) 631931

NORTH NOTTS DATA GROUP, G0WNN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8QGQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VPK. 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 G4GBS. Tel: (01302) 743130

SHROPSHIRE

SALOP ARS, G3SRT. Meets at the Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury. Details from John Burnford G0GNT. 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) 255418

TAFFORDSHIRE

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, Watling Street, Hatherton, Cannock, Details from Arnold Matthews G3FZW. Tel: (01543) 262495

CHAD RC, G4CAR. Meets at the Swinfen Officer's Club, Swinfen, Lichfield, Staffs. Details from Bernard Jayne G8BFL. Tel: (01543) 268569

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

MOORLANDS & DARS, G4NHT, G1JMD. Meets at the Crede Works, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKG. Tel: (01782) 395793

NEWCASTLE-UPON-TYNE SCOUT AR COM GR, G7UGQ

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, Walmley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263

WARWICKSHIRE

AVON VALLEY ARA, MORAD. Details from Mr Peter Bradham G0WUJ. Tel: (01905) 724531.

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

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

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

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, G0NEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NOL. Tel: (01922) 636162

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Brinklow Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 873999

DUDLEY ARC, G4DAR. Meets at the Community Centre, Sedgley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LYA. Tel: (01384) 277925

HILLCREST ARS, G0SPM. Meets at The College, Simms Lane, Netherton, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457

KYNOCH R & TVS, G3HPF. Meets at the Club Workshop, IM Ltd., Sportsfield, Perry Bar, Birmingham. Details from Mr G. Nicholas. Tel: (01922) 635376

MIDLAND ARS, G3MAR. Meets at Unit 22, 60 Regent Place, Crayne, Birmingham (jewellery quarter). Details from John A. Hocke 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 ARC, 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 Gaskin G8AYF. 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, G6RS. Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards

WEST BROMWICH CENTRAL RC, G4WC. Meets at The Sandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Leitch G0PAL. Tel: 0121-561 2884

WEST MIDLANDS POLICE ARC, G0COP, G1WMP. Details from Steven Jones G6LRL

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252

WOLVERHAMPTON ARS, G3TA. 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 G1PKZ

LONDON & CENTRAL BERKSHIRE

ARBORFIELD ARC, G3IHH. Details from Mrs E.W. Harding 2E1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Elerton G3NCN

BURNHAM BEECHES RC, G3WR. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G8ELL. Tel: (01628) 625720

MAIDENHEAD & DARC, G3MKK. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210

NEWBURY & DARS, G5XY. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Max Maxwell G7DXC. Tel: (01635) 253233

READING ARC, G3JLT. Meets at the Woodley Pavilion, Woodford Park, Hackden Drive, Woodley, Reading. Details from Marnoch Standen G0JMS. Tel: 0118-972 3504

BUCKINGHAMSHIRE

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

CHESHAM & DARS, G3MDG, G1JMDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirwell G0VFW. Tel: (01442) 832169

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

*MILTON KEYNES ARS, G3HIJ. Meets at Bitchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Bitchley, Milton Keynes. Details from Malcolm Bay M0MBO on (01252) 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, Pawsons Road, Croydon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 6948

BARKING R & ES, G3KBF. Meets at the Parkside Community Centre. Details from Bill Chewett G0JQK. Tel: (01708) 474443

*BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan Messenger G0TLK. Tel: (01898) 818582

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Veaney G7BKH

CRYSTAL PALACE & DRG, G3VCP. Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G300U. Tel: (01737) 552170

DARENTH VALLEY RADIO, G0KDV. Meets at the Crockerhill 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 G0PQE. Tel: 0208-953 2164

HAVINGER & DARS, G4HRC. Meets at the Fairiytes Arts Centre, 51 Billet Lane, Hornchurch, Essex.

RS OF HARROW, G3EPX. 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 G0HHC. Tel: 0208-504 2831

MITCHAM & DISTRICT ARS. Meets at the ATC Hut, Comonside 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 G4OXC. 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, RS95599. Details from Robin Clay G0VJI.

WHITTON ARC, G0MIN. Meets at the Whiston Community Centre, Percy Road, Whiston. Details from Ian Clabon G0OFN. Tel: 0208-894 9131

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5ZG. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PFX. Tel: (01279) 506933

DACORUM ARTS, G7RIH, G0WH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TCD. Tel: (01442) 211925

HODESDON RADIO CLUB, G0TNS. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3JUN. Tel: 0208-292 3678

MIMRAM CONTEST GP, M0ABC. Details from Alan Holdsworth G80U. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G82RT. Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Livens G2CCK. Tel: (01992) 558493

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Peter Bell 2E1CRK. Tel: (01462) 674505

VERULAM ARC, G3VER, G8VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Crane G3PMF. Tel: (01923) 262180

*VERULAM (ST. ALBANS) RADIO CLUB. Meets at the RAFA, New Kent Road, off Marborough Road, St. Albans, Herts. Details from Ralph G1BSZ. Tel: (01923) 265572.

WELWYN & HATFIELD ARC, G3WGC. Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (07973) 560649

SURREY

BENTLEY ARC, G0VZS. Details from Derek Gilbert G0NFA.

CATERHAM RG, G0SCR. Details from Mr P.N. Lewis G4APL.

CROSDON AMATEUR TRANS. SOC., G4FRU. Meets at St. Swithuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meadow Avenue, Farnborough, Hants. Details from Mr M. Hearsay G8ATK. Tel: (01252) 715765

GUILDFORD & DRS, G0GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitbourn G0SWE

KINGSTON & DARS, G3KIN. Details from Mrs Mary Ashdown G0BQY.

REIGATE ATS, G5LJK, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

SUTTON & CHEAM RS, G2GP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Putock G0BWH. Tel: 0208-644 9945

THAMES VALLEY ARTS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Giggles Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3ENI. Tel: (01483) 284277

WIMBLEDON & DARS, G3WIM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Mr Reg Blackwell M1EEK. Tel: 0208-696 9857

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON RADIO CLUB, G4GQR. Meets at Vallance Community Centre, Sacville Road, Junction of Connaught Road, Hove. Details from Hon. Sec GORNS. Tel: (01273) 699104

CROWBOROUGH DARS, G0CRR. Meets at the Plough & Horses, Walsley Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VY. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4DRV. Tel: (01323) 728479.

THE ORZ ARC OF SUSSEX, G83VY. Meets at the Coach Station, Watlington Road, Eastbourne. Details from Stuart Constable M0CHW. Tel: (01483) 863020

HAMPSHIRE

ANDOVER RAC, G0ARC. Meets at the Village Hall, Wildham, Andover, Hants. Details from Mr R.S. Coleman G0WYD

BASINGSTOKE ARC, G3TCR, G8JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJ3

FAREHAM & DARS, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397

HIGHFIELD PARK RC, G4WD. Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01734) 225019

HORDEAN & DARC, G4FBS. Meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Details from Stuart Swain G0FYX. Tel: (01705) 472846

ITCHEN VALLEY ARC, G0VIR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827

SONY BROADCAST ARC, G4SZC. Accredited C&G RAE centre. Meets at Sony Sports & Social Club, Priestley Road, Basingstoke. Details from Stephen Harding G4GSJ. 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: (02592) 649254

SUBMARINE ARC, G3BZU. Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PFP. Tel: (01329) 232386

THREE COUNTIES ARC, G4WWR. Meets at the Bramshot Parish Inst. & Club, Hildreth Road, Liphook, Hants. Details from Damian Kamn G7RFV. Tel: (01428) 724456

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LKG. Tel: (01703) 841794

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields House

Country Cent, Newham Road, Binstead, Isle of Wight. Details from Mr Pabody

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZFU. Tel: (01983) 294309

OXFORDSHIRE

BANBURY ARS, G0BRA. Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1YSY. Tel/FAX: (01295) 253509

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LJO. Meets at the Grove House Club, George Street, Summitdown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311

VALE OF WHITE HORSE ARS, G5PR, G4YWM, G6VWH. Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NN. Meets at the St. Pancras Hall, Chichester. Details from Graham Swann G0SWD

*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 Alister Watt G3ZBU. Tel: (01403) 263432

MID SUSSEX ARS, G3ZMS. Meets at Marle 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 G00OC.

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, Chippenham, Details from Jon Alinge G4LIZ. Tel: (01249) 462610

SWINDON & DARC, G3FCE. Meets at the Eastcott Community Centre, Saveneck St., Swindon. Details from Den Forrest M0ACM

TROWBRIDGE & DARC, G2BQY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wilts. Details from Ian Carter G0GRI. Tel: (01225) 864698

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTOL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Benday G7BWN

GORDANO ARG, G6GRG. Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NORTH BRISTOL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 790443

SEVERNIDE TV GROUP, G83ZZ. Meets at NBARC, Filton, Bristol. Details from Paul Stevenson G8YNM. Tel: 0117-995 5386

SHIREHAMPTON ARC, G4AHH. Meets at the TS Enterprise Sea Cadet Unit, Station Road, Shirehampton, Details from Mr R.G. Ford G4GTD. Tel: 0117-985 6253

SOUTH BRISTOL ARC, G4AWA. Meets at the Whitchurch Folk House, East Dundry Road, Bristol. Details from Mr L.F. Baker. Tel: (01275) 834282

THORBURY & SOUTH GLOS ARC, G4ABC. Meets at the United Reform Church Hall, Rock Street, Thornbury, Bristol. Details from Stan Greenhill G0RYM. Tel: (01454) 413177

WESTON-SUPER-MARE RS, G4WSM. Meets at the Woodspring Hotel, High Street, Worle, Weston-Super-Mare. Details from Stephen Cole G3VOL. Tel: (01934) 843144

NTE (PAIGNTON) ARS, G00SH. Meets at Paignton Community College, Upper School, Waterleaf Road, Paignton. Details from Rod Maude G05WM. Tel: (01803) 521066

TORRAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Olway G3RMA. Tel: (01803) 556425

UNIVERSITY OF PLYMOUTH ARS, G0UOP. Details from Alan Santillo G0XAW.

DORSET

BLACKMORE VALE ARS, G4R6V. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 8PF. Details from Mr A. Marriott G0GFL. Tel: (01258) 860741

BOURNEMOUTH RS, G2BR8. 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, G0MUD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerford, Christchurch, Dorset. Details from Mr K.P. Harris G7WSN. Tel: (01202) 484892

FLIGHT REFUELLING ARS, G4RFR. Meets at the Flight Refuelling Social Club, Merley, Wimbome, Dorset. Details from Martin Axon Z1DFZ. Tel: (01202) 693334

POOLE RS, G4PRS. Meets at the Bournemouth & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Meyer G0KKL. Tel: (01202) 700903

PORTLAND ARC, G0VOP/G7VOP. Meets at Clifton Hotel, Grove Road, Portland. Details from Kerry Morris G1WIK. Tel: (01305) 788591

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickery, 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 M1WCH/M3WCH. Tel: (01929) 424413

WESSEX AMATEUR WIRELESS CLUB, G1WAW. Details from Ken Powell G1NCG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G3J3VC. Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade, Details from Mrs Anne Mourant M0JBU. Tel: (01534) 734948

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HJD. Tel: (01935) 713131.

TAUNTON & DARS, G3KZW. Meets at The Memorial Hall, Taunton. Details from David Rosewar M0CIF

***WEST SOMERSET ARC, G00WX.** Meets at the West Somerset Community College, Minehead, Somerset. Details from Robert Bonar G1DNO/M3ONV. Tel: (01634) 863462

WINCANTON ARC, G0WR4. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506

YEOVIL & DARC, G3GMH, G5YEO. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3COC. Tel: (01935) 425669

ESSEX

BRAINTREE & DISTRICT AMATEUR RADIO SOCIETY, G3XG. Meets at the Braitree Hockey Club, Church Street, Bocking, Braintree. Details from John M5JUB. Tel: (01777) 490947

CHELMSFORD ARS, G0MWT. Meets at the Marconi Social Club, Beehive Lane, Chelmsford, Essex. Details from David Bradley M0BQC. Tel: (01245) 502838. E-mail: cars@gmwf.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCQ. Meets at the Colchester Institute, Sheepen Road, Colchester. Details from Frank R. Howe G3R1. Tel: (01206) 851189

DENGIE HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986

HARLOW & DARS, G6LUT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Ted Thripton G7UFP. Tel: (01279) 832700. FAX: (01279) 864973

HARWICH ARG, 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 G6LUU. Tel: (01268) 895474

SOUTHEND & DRC, G5QIK. Meets at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details from Alan Radley G0T1M. Tel: (01268) 741229

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Parish Rooms, Scrattan Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 612138

VANGE ARS, G3YCW. Meets at the Bāmstable Community Centre, Basildon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606

KENT

BREDHURST RX & TX SOC., G0BRC. Meets at Rock Avenue Working Mans Club, Rock Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7M1M

CRAY VALLEY RS, G3RCV, G1RCV. Meets at the Progress Hall, Admiral Seymour Road, Eltham, London SE9. Details from Bob Treacher BR532525 via www.cvs.org

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Jim Cairns M1BK1. 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

HASTINGS ELEC. & RC, G6HH, G1HHH, G6LL. Meets at West Hill Community Centre, Croft Road, Hastings, East Sussex. Details from Mr J. Boothroyd G0MTJ. Tel: (01233) 732656

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQP.

HOME COUNTIES ATV GRP, G6HCT. Meets at the Binfield Club, Binfield (near M4/110). Details from Mr A. Brooker G4K2Z

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Meireose Close, Maidstone, Kent. Details from Colin Wilson G0VAF. Tel: (01622) 738536

MEDWAY ARTS, G5MM, G8MVA. Meets at Tunbury Hall, Caskin Close, Tunbury Avenue, Walderslade, Chatham. Details from Mr J. Hale G3PTH

NORTH KENT RS, G4CWC. Meets at The Pop-in-Parlour, Graham Road, Bexleyheath, Kent. Details from Mr A.V. Robbins G9MLQ. Tel: (01474) 365694

SWALE ARX, G4SRC, G6SRC. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 665559

THE MORSE CLUB, G300KE. Meets at The Five Wents Memorial Hall, Swanley/Hextable Road. Details from Ken M3CZA. Tel: 0208-306 35-44.

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, G0TKV. 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 G0MQL

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0V2D. Tel: (01953) 604769

NORTH NORFOLK ARG, G8ZMC. Details from Tony Smith G4FAI. E-mail: g4ai@connecttree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TZO. Meets at the Cufford School Cufford, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT

FELIXSTOWE & DARS, G4ZFR. Meets at the Orwell Park School, Nacton, Near Ipswich. Details from Paul Whiting G4YQC. Tel: (01473) 642595

FRAMLINGHAM COLLEGE ARC, M0CBB. Tel: (01728) 727232

IPSWICH RADIO CLUB, G4IRC. Meets at the Golden Hind, Nacton Road (3rd Wednesdays at The Hollies, Buckingham Straight Road), Ipswich. Details from Keith Gaunt G7CIY. Tel: (01394) 420226

***LEISTON ARC, G3X6S.** Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattermole M3M1G. Tel: (01728) 746044

LOWESTOFT DRS, G3JRM. Meets at The George Barrow Hotel, Oulton Road, Lowestoft. Details from Phil Holden G0JSG. Tel: (01502) 585448

MARTLESHAM RS, G4MRS. Meets at the BT Laboratories, Martlesham Heath, Ipswich, Suffolk. Details from Darren Hatcher. Tel: (01473) 644475

SUDBURY & DRA, G0SWI, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Sudbury, Suffolk. Details from Bryan Pantton G1TWY

SUFFOLK DATA GROUP, G87MD. Details from Peter Pryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYD

CONWAY VALLEY ARC, G6WTM. Meets at the Studio, Penrhos Road, Colwyn Bay, Cwyd. Details from Mr R.W. Evans G6PWC. Tel: (01745) 850668

HALJUX & DARS, G3W3RG. Details from Mr D. Austin G1XHG.

NORTH WALES RS, G6WNWR. Meets at the Old YMCA, Queens Drive, Colwyn Bay, Cwyd. Details from Ted Shipton G6WDSJ. Tel: (01745) 336959

WREXHAM ARS, G4W4XOM. Meets at the Community Centre, Maesgwyn Road, Wrexham. Details from Mr P. Moran G6WOWR

GWYNEDD

MEIRION ARS, G4W4ZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gervase Chavasse G4WJURJ. Tel: (01341) 421028

PORTHMADOG & DARS, G6W0MV. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M1LDRP

THE DRAGON ARC, G4W4TTA. Meets at the Ebenezer Church Hall, Lon Foel Craig, Llanfaiswl, Isle of Anglesey. Details from Stewart Rolfe G6WEIF. Tel: (01248) 362229

POWYS

POWYS ARC, G4W4HVN. Meets at the ATC HQ, Park Lane, Newport, Powys. Details from Mrs Jean Brown ZW1CEZ. Tel: (01686) 640814

SOUTH WALES

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ABERPORTH YMCA, G4WS4ZV. Meets at the Hut B17, The Airfield, Aberport. Details from Mr G. Carnurthor G4HJG. Tel: (01239) 811205

ABERYSTWYTH & DARS, G6W0AR. Meets at the Scout Hut, Plasgrog Avenue, Aberyystwyth. Details from John Woodward G6SIDK. Tel: (01970) 890657

CARMARTHEN ARS, G4W4YCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynon Road, Llanguonnor, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G4W4XL. Tel: (01267) 231359

CLEDDAU ARS, G6WSYG. Details from Trevor Perry G4W4JK. Tel: (01646) 600725.

LLANELLI ARS, G6W0EZO. Meets at the Fumace Community Hall, Fumace Square, Llanelli. Details from Roy Jones G6W0J2K. Tel: (01554) 820207

PEMBROKESHORE RS, G6W0EJE. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest. Details from Ian M. Jones M6WOCAB. Tel: (01437) 763208

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ABERGAVENNY RS, G4W4GL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes G6W0QY. Tel: (01633) 483186

BLACKWOOD & DARS, G6W3GV. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans G6W0ITI. Tel: (01495) 225178

EBBW VALE COLLEGE RS, G6W0INV. Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden G6W0HCN. Tel: (01495) 305192

NEWPORT ARS, G4W4EZW. Meets at the Brynglas Community Centre, Brynglas Road, Newport, Gwent. Details from Paul Nicholls

PONTYPOOL ARS, G6W3RHN. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G6W00LZ

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BRIDGEND & DARC, G4W4NP. Meets at the Club Brynmyrn, Brynmyrn, Bridgend. Details from Alun Huiles. Tel: (01656) 721574

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BARRY ARS, G6W3VKL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Morimore G4WBVJ. Tel: (01446) 738756

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International Radio Clubs

AMSAT-UK (G0AUK)

Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: g3wgm@amsat.org or visit www.uk.amsat.org

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)

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Information from Treasurer Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark or visit www.dswci.org

International Listeners' Association (RS88763)

Details from Trevor Morgan GW4OXB, 1 Jersey Street, Haford, Swansea SA1 2HF. E-mail: gw4oxb@net.nfl.com

International Short Wave League (ISWL - G4BJC)

Information from Honorary Secretary Bill Mackie G-9137/G4AIE, 23 College Park, Horncastle, Lincs LN9 6RE. E-mail: bill.mackie@zetnet.co.uk or visit www.iswl.org.uk

Military Wireless Amateur Radio Society (G0PTZ)

Further details from John Taylor-Cram, 7 Hart Plain Avenue, Cowplain, Waterlooville, Hampshire PO8 8RP. Tel: 0239-225 0463

Radio Amateurs Invalid and Blind Club (RAIBC - G4IBC, GBOIBC, GB1IBC)

Enquiries to Honorary Treasurer/Membership Secretary Mrs Shelagh Chambers, 78 Durlay Avenue, Pinner, Middlesex HA5 1JH. Tel: 0208-868 2516

*Radio Amateur Old Timers' Association

Enquiries to Membership Secretary Ted Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich NR9 5SH. Tel: (01603) 872309, E-mail: edit@raota.fsnet.co.uk or visit www.raota.supanet.com/

Remote Imaging Group (RS88803)

Further details from the Membership Secretary John Din, 59 Woodend Road, Coalpit Heath, Bristol BS36 2LH. FAX:

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Royal Air Force Amateur Radio Society (RAFARS - G8FC, G8RAF)

Details from the Administrator, HQ RAFARS, RAF Cosford, Wolverhampton WV7 3EX. Tel: (01902) 372722, E-mail: administrator@rafars.org

Royal Navy Amateur Radio Society (RNARS - GB3RN, G3CRS, G1BZU)

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Royal Signals Amateur Radio Society (RSARS - G4RS)

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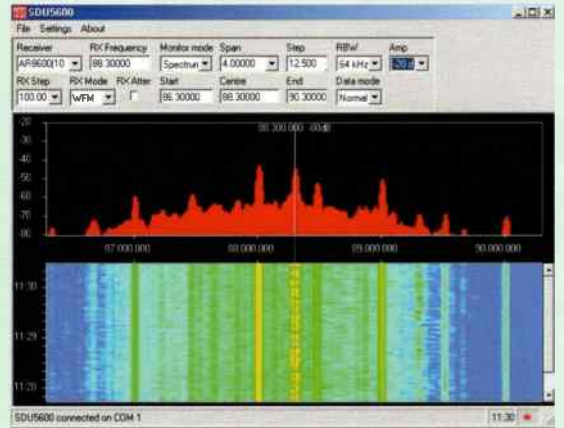
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