

ShortWaveMagazine

# SWM

& Scanning Scene

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hobbyists



## SCANNING SPECIAL

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Police Comms -  
Airwave



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AOR's Superfast  
SR2000 FFT Scanner  
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137 - 174 MHz VHF Ham + PMR  
406 - 512 MHz Public Services
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  - Two Second Automatic Scan Delay: Delays scanning for 2 seconds before moving to another channel, so you can hear more replies
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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
  - Scan Rate: 10 Channels per second
  - Search Rate: 10 Steps per second
  - Scan Delay: 2 seconds
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**Uniden UBC72XLT**  
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- Frequency Range: 25-88MHz, 108 - 174 MHz, 400-512 MHz
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- 10 Priority Channels
- Rechargeable Ni-Cd battery pack
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# e action!

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#### Includes free:

- Mains Charger Multi voltage 110V-240VAC for easy use anywhere in the world
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- Belt clip • Carrying strap
- Antenna Flexible, low profile

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- 1200 memory channels
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  - Any channel ship scan
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#### Includes free:

- Mains Charger Multi voltage 110V-240VAC for easy use anywhere in the world
- Nicad battery pack 4.8V DC 700mAh
- Belt clip • Carrying strap
- Antenna Flexible, low profile

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## July 2005

On Sale 23 June  
Vol.63 No. 07  
(August 2005 issue on sale 28 July)

Published by  
PW Publishing Limited  
Arrowsmith Court  
Station Approach  
BROADSTONE  
Dorset BH18 8PW  
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## Scanning Special airwave

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### 26 Air traffic Control - Part 2

Ian Doyle looks towards summer as he gives us a glimpse behind the scenes of the Royal International Air Tattoo. This month he continues his look at the Air Traffic Control activity in the briefly busy skies above RAF Fairford.

### 32 Computers & Radio - Part 3

Jack Weber continues with his look at how computers can enhance your radio set-up. This month he introduces us to programs that allow capture, manipulation and storage of received audio.

### 64 SWM Club Listing

If you want to meet others with a passion for radio, then look no further. Use our comprehensive and most up-to-date guide to local clubs. Please note this is now split into three parts running on a rotating basis.



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cover subject: *Reliable and secure communications are essential for the police force. The new FFT based scanner from AOR is incredibly fast at searching transmissions.*

### Share your thoughts

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

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

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## RADIO BOOK STORE

see page 41



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## Coming Next Month

in August 2005

\*contents subject to change

- Sky High Special - Homing in on radio traffic
- Uniden's UBC3300XLT hand-held receiver - Reviewed
- Bumper Scanning Section
- RIAT Communications - see how the Tattoo is run
- Keep on top of the world of monitoring with SWM and much more...

With bumper Scanning Scene section!

## SWM Services

### Subscriptions

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

### Components For SWM Projects

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

### Photocopies & Back Issues

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

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

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

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### Technical Help

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

# ED's



## comments

This magazine is without doubt the one that I've enjoyed working on more than any other I can remember for a long time. I really hope that you all enjoy reading it as much I as I have during the process of putting it all together. The look and feel of our air supplement is a credit to Bob Kemp who has, in my view, created a very special 32 page give-away. Bob would not have been able to utilise his skills if it were not for the terrific material supplied by both **Pat Carty**, a new face to *Short Wave Magazine* and someone that I'm sure you'll be seeing more from; and also **Richard Arquati** of the The RAF Charitable Trust Enterprises. I am very grateful to both of these gentlemen for their contributions, it really has been a most excellent collection of information and stunning pictures. Certainly our temporary proof reading assistant, PW Editor **Rob Mannion** has enjoyed it greatly.

## Pinnacle

Staying very much on the RIAT theme - an event of great interest to many of our readers as it combines the listening aspect of the hobby with the opportunity to actually see close-up, the aircraft that can be heard as they go about their daily activities. RIAT has indeed developed in to a massive event over the years and in my view it truly represents the pinnacle of the military aircraft and airband enthusiasts' calendar. Don't miss the chance to win a pair of tickets - we've ten pairs to give away - but hurry, as there's only two weeks from SWM going on sale to enter. If you are going to get your caption to us in time, you'll need to get a move on.

As you may know the Royal International Air Tattoo began over 30 years ago. The first 'Air Tattoo' was organised by Paul Bowen and Tim Prince at North Weald airfield on 31 May 1971 to raise money for the RAF Association and is now the world's largest military airshow.

From 1976 until January 2005, the Air Tattoo was staged by the Royal Air Force Benevolent Fund Enterprises in support of the RAF Benevolent Fund

By 1976, when Air Marshal **Sir Denis Crowley Milling** was Controller of the RAF Benevolent Fund, the Air Tattoo was already becoming a major airshow. Sir Denis invited his war-time Battle of Britain leader Group Captain **Sir Douglas Bader** to be president of what was now to be called 'International Air Tattoo'. Over the next six years until his death in October 1982, Sir Douglas worked to establish the Tattoo as the largest of its kind in the world. (Sir Denis, then Vice Patron of RIAT, died in December 1996).

From 1973 to 1984 the International Air Tattoo was held at RAF Greenham Common near Newbury before moving to RAF Fairford. In 1990 and 1992, the airshow was staged at the top secret research airfield - A&AEE Boscombe Down in Wiltshire. The Gloucestershire base has now become the event's permanent home, apart from 2000 and 2001 when runway repairs were carried out. The Tattoo was awarded Royal Status in July 1996, the year of its Silver Jubilee airshow.

In 1971 six overseas air forces took part in the Tattoo, with around 80 aircraft on display. By contrast, in 2003

more than 500 aircraft represented more than 40 British and international air arms.

In May 2004, Air Tattoo co-founder Paul Bowen died after a short illness. His friend and co-founder Tim Prince then succeeded him as Tattoo Director.

In autumn 2004, following a governance review by the RAF Benevolent Fund (RAFBF) it was decided that its RAFBF Development Trust, under whose umbrella the Tattoo took place, should become a stand-alone charity. It did this in January 2005, changing its name to The Royal Air Force Charitable Trust (RAFCT).

Today, the Royal International Air Tattoo is staged by the Trust's trading company - The Royal Air Force Charitable Trust Enterprises - and is widely considered to be among the greatest airshows in the world, attracting over 150000 attendees each year.

## Shuttle

Sadly, the Space shuttle didn't launch as planned, the new date is once again just after this magazine goes on sale so I hope you all caught some interesting shuttle related radio signals. I'd be interested to hear from any readers who managed to hear any comms along with details of your radio gear used.

## Locating Signal Sources

I have noticed that Ofcom are well and truly on the money saving path when it comes to spectrum regulation. In addition to the cost saving measures under discussion regarding the simplification of administering amateur radio. They recently announced that they intend to commission a UK wide computer controlled monitoring and direction finding network for tracking down sources of radio interference. It was announced that QuinetIQ have won the supply contract, which considering their background in the defence market with electronic warfare solutions, should mean a rather accurate and slick system. The use of this type of highly automated system raises questions about the future of the Baldock monitoring station last visited by yours truly back in 2002. See SWM May 2002 for details. For that matter, I guess the whole network of monitoring stations like Baldock will become unnecessary!

On a similar topic, since **Clive G4SLU** built the Ramsey DDF1 direction finding system I have been considering a SWM readers' DF network that could run via the Internet. The type of set-up that would involve owners of DDF1 sharing their systems with each other so that sources signals could be located via a group web page. This would be an interesting project that requires some development work to interface the DDF1 to a PC and some software to, control the associated radio, read the DF data and share this information with a network of users. I wonder if there is any interest amongst the readership.

See you all next month.

*AVV 73 Kevin*

# QSL

**Is there something you want to get off your chest? Do you have a problem fellow readers can solve?**

**If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

**Dear Ed**

I read with interest 'The Shack' article by Dennis Easterling in April's *SWM*, particularly the bit about security when using a shed, and I thought I'd share my experience of this.

I have had my shed broken into, and items stolen. Fortunately, my radio gear is inside the house, but it revealed to me the tactics these low-lives use to break into sheds. I too, had replaced the screws on the hinges with nuts & bolts, but that doesn't bother these people at all. What this (teenage) individual did was simply grasp the bottom of the door, and forcibly destroy it, bracing himself against the shed side with his feet. He then gained entry through the resulting hole. It apparently takes only a few seconds, but fortunately he was seen by a neighbour, and although the police interviewed him, no charges could be brought, but it prompted me to re-assess my security.

Since then, the inside of the new door has been re-enforced, a bar has been fitted across the outside of the door, padlocked to the shed frame. I have fitted padlocked bolts top and bottom of the door, and a PIR alarm inside. There still remains the fact that they could systematically remove the shed exterior if they really wanted, but you have to stop somewhere.

Paranoid? Definitely. But until it happens to you, you just don't appreciate how easy it is, and how they pass the technique around amongst themselves - so better to pay a bit of money out now, than trust that an enclosed garden will help, because mine is enclosed, and believe me the only person it helps is the thief.

**Bob Farish M1FJ  
Leeds**

*Sadly, it would seem that outbuildings are always at more risk than a room in the house. But, just how many of us are lucky enough to have the space, or the permission to use one of those precious internal rooms? Don't forget to ensure that your insurance cover includes all your valuable radio kit - just in case. - Ed.*

**Dear Ed**

With reference to Alan MacDonald's letter in the April issue of *SWM* regarding reception of medium wave signals. I wonder if Alan has tried a frame antenna? I built one once based on a design in one of the antenna handbooks, I forget which one but maybe Kevin can remember? The original design was 1.2m square but could be scaled down.

The one I built was a square frame about 600mm on each side mounted on a stand, on this was wound I think about 13 or 14 turns of wire spaced slightly apart, the ends were brought out to an air spaced tuning capacitor, which I salvaged from an old valve radio.

On the original design one more turn was added and this was connected to a coaxial lead to couple it to the antenna socket of the radio. However, this coupling is not required for a portable radio.

Simply place the radio close to the antenna, point the frame in the general direction of the station, tune the frequency required, then turn the tuning capacitor slowly until the signal peaks. I had some very marvellous results with it.

*Tuned loops are most definitely a useful solution to lack of space, they also have the benefit (or disadvantage depending on your view) of being narrow band. We have published construction details in past issues of *SWM*. The most recent was some 10 years ago. Reprints are available from the *SWM* Book Store if anyone should need the information. They are very effective and enjoy strong nulls, so are superb at rejecting unwanted signals - just so long as they're not in-line with the desired station. - Ed.*

**Mike Huson (MOMAD inactive)  
Stoke on Trent**

THE BEST LETTER  
RECEIVES A £20  
VOUCHER TO SPEND  
ON ANY *SWM* SERVICE.

## topqsl

**Dear Ed**

I very much enjoyed reading your article about MilSat monitoring in April's edition of *SWM*. I licked my lips as I learnt more about what it was possible to hear.

As soon as I'd finished reading the article I set about finding out as much information about MilSat monitoring as I could. So what better place to start than the Internet. I found a frequency list and programmed each one in to my Yaesu VR-500 scanner.

At this point I should mention that I didn't construct a Yagi antenna or have a low noise amplifier (I will invest in both at a later stage I'm sure). So for an antenna, I used one of the legs from an old discone - believing that it was about the right length (545mm) for 260MHz.

Immediately, as I activated 'scan' the squelch opened on 250.550MHz with a reasonable three bar digital sounding signal - I used the signal to optimise the direction of the makeshift antenna I was pointing to get the best signal on other frequencies I tuned to. I noticed that 244MHz region is a hotbed of digital sounding stuff and the scanner continually stops throughout this region.

I've heard 266.850MHz with Russian phones, 261.709 - Arabic phone? and a number of what sound like radio station relays! Signals in the main were pretty reasonable and I could resolve most of what I heard. I'm very impressed with the VR-500 performance.

This is a very interesting part of the radio spectrum that I thought was only used for military airband but this is an entirely different way of listening. I always thought the long distance stuff was found on the h.f. bands!

Anyway, I thought I'd contact you with my MilSat experiments as your MilSat monitoring article really intrigued me.

**Richard Brown  
Kincardineshire  
North East Scotland**

*Richard, I'm glad that the feature inspired you to 'have a go'. I've had quite a lot of feedback and plenty of 'hits' from readers listening to the audio files - Ed.*

## Portland ARC Rally

Portland Amateur Radio Club are holding a Rally on 17/18 July as an attraction at the Portland Steam and Vintage Show, Southwell Business Park, Portland in Dorset. There will be a large marquee and the 'anchor' stand will be The Short Wave Shop. Other features will include WXSAT and WXFAX demos, hopefully a c.w. local test - all standards, a Bring & Buy, RFARS, involvement of Portland Island Computer Club, RAYNET and other attractions.

Admission to the rally is free as it is part of the steam and vintage show, which people pay to enter. There will be ample parking and overnight camping space plus security guards.

## Japan to relax Morse Requirements

The Japanese Ministry of Internal Affairs and Communications (MIC) took action on 24 May to relax Morse code requirements for amateur radio licensing, but it did not eliminate them altogether.

With effect from 1 October 2005, the MIC will reduce the requirements for First and Second class licenses to 5w.p.m. - solid copy for two minutes. The previous code requirements for these licenses were 12 and 9w.p.m. respectively. The MIC will drop the Morse requirement, now 5w.p.m., for the Third class license.

## Venue Change

With effect from 12 July the South Dorset Radio Society will be relocating to the Chickereil Youth Centre in Chickereil Village, it is not far from the old club site, it's just on the other side of the village. To mark the event the Club will be holding a Hot Potato Night with Table Top/Car Boot Sale.

All are welcome to attend the evening, but the Club's Secretary, Carol Hodges, would appreciate you letting her know if you wish to attend. You can contact Carol, either by E-mail at [carolonfraggletiscali.co.uk](mailto:carolonfraggletiscali.co.uk) or by phoning (01305) 820400 direct.

## Morse verses Text Messaging

The Powerhouse Museum in Sydney, Australia recently held a communications race between a 93 year old former telegraph operator, partnered by his 82 year old mate and a 13 year old girl, Brittany Devlin. The 'old timers' and the young lady were tasked to send a sentence from a teen magazine.

The gents sent the sentence in Morse code and Brittany transmitted it via SMS (Short Message Service) i.e. text messaging, on her mobile 'phone. The guys won by 18 seconds! The power of Morse lives.

As reported by 'SSB Utilities' author, Ben Hogan.

## Summits On The Air

The Summits on The Air website has recently been enhanced by the addition of a new alerting and spotting system. Known as SOTAwatch, this has been developed by Jon GM4ZFZ and allows users to post their forthcoming activation plans.

The activation plans are then sorted into date/time order for the convenience of the many avid chasers in the programme. The spotting system works in a similar way to DX clusters and provides chasers with a means of real-time live spotting of activations in progress. The SOTAwatch system should also help any activator that might be struggling for that elusive fourth contact!

The SOTA award programme has also just launched a new facility called SPOTlite, which allows summit activators to post real-time information on their activities to the Internet using a mobile 'phone. The information is automatically disseminated to the whole SOTA community using SOTAwatch.

SPOTlite is especially useful for summit activators in areas far from other radio amateurs (but in range of the mobile 'phone network). This is another first for the Summits on the Air award programme, which aims to use appropriate new technology wherever possible to enhance the award scheme. SPOTlite has been created by Jon GM4ZFZ.

SOTAwatch and SPOTlite can be accessed via [www.sota.org.uk](http://www.sota.org.uk)



# Launched At Dayton

The annual Dayton Hamvention, which takes place in Ohio, USA is traditionally the place for the radio 'giants' to announce new radios and this year was no exception with Icom and Yaesu unveiling the latest in radio gems.

The main event of the show was the launch of the new Icom IC-7000 transceiver featuring all sorts of innovations including two d.s.p., digital i.f. filters, two manual notch filters, a digital voice recorder, a 2-mode band 'scope and a 63.5mm TFT display that can also act as a TV monitor. This new rig is the same form factor as the IC-706. Perhaps it is the successor?



Yaesu meanwhile had on show all three model variations in the '9000 range. The FTDX-9000 is said to be a ground breaking h.f./50MHz Elite Class Transceiver featuring unmatched close-in dynamic range, flexible

selectivity choices due to its advanced 32-bit d.s.p. filtering, a high-resolution TFT display, and high power 200 and 400W versions will be available!

At the time of going to press it was unconfirmed as to when or if the new Icom and Yaesu radios will be available for the UK market and at what cost. So, keep an eye on these pages, the Icom UK Ltd. and Yaesu UK Ltd. websites for the news as it happens!





## Recreating ENIGMA

**A**s a tribute to the work of the Voluntary Interceptors (VIs) 60 years ago the Scarborough Special Events Group were on the air as **GB2HQ** from GCHQ Scarborough over the VE Day anniversary weekend in May.

In September 1939 the radio receivers of all radio amateurs were ordered to be confiscated, but many Amateurs volunteered to become Voluntary Interceptors in their own homes. These VIs assisted the Allies in their task of intercepting encrypted ENIGMA messages transmitted in Morse code, which were passed to the code breakers at Bletchley Park.

To commemorate the occasion of the VE Day Anniversary, members of the Scarborough group were given special permission by Ofcom to broadcast an enciphered message of tribute on the Amateur Radio bands using a Second World War Enigma machine. This was the first time in more than 60 years that an ENIGMA enciphered message had been heard on the air and is something that will probably not occur again.

As a further tribute GCHQ invited all licenced



amateurs and listeners to submit a copy of this ENIGMA message and they will award a full colour certificate, signed by the director, for a 100% accurate intercept. There will be a charge of £3 to cover costs with any profits donated to GCHQ Charities Fund.

A copy of the message can be sent to **G0000** along with a QSL card. Full details can be found on the Scarborough Special Events Group website at [sseg.co.uk](http://sseg.co.uk). The group have posted the ENIGMA settings used on the day, which will allow so anyone to download ENIGMA software from the web and decipher the message.

## Robot Records at RIAT

**M**achines are set to vie for a place in the history books this summer when the most ingenious robots in the UK will gather at the Royal International Air Tattoo (RIAT) at RAF Fairford in Gloucestershire for the first Guinness World Record attempts for sprinting and rope climbing. Professor Noel Sharkey from Sheffield University, a world famous expert in robotic technology and artificial intelligence, will present the challenge on July 16-17.

Prof. Sharkey is well known as chief judge on the TV series *Robot Wars* and commentator for BBC's *TechnoGames*. He said: "I am really looking forward to seeing some of the old rivals compete again to settle their grudges". Some of the all-time robot greats from television will take part in 'Guinness World Records' Robots with Noel @ RIAT'. Among them will be the famous Skeletron, by Ray and Matt Tait, winner of the NESTA prize for robot rope-climbing; Scuttle, by Mike Franklin, the fastest sprinter from *TechnoGames*; and Cybersnail, claimed by its creator Adrian Marshall to be the world's slowest robot, plus other TV favourites.

The robots will compete against each other to set official sprint and speed climb records in both heavyweight and lightweight divisions. A Guinness World Records' adjudicator will be on hand to validate each of the record attempts.

Professor Sharkey said: "Competitions like this are a great way to keep the young interested and enthusiastic about engineering and to keep the public informed about the kind of ingenious back-street engineering that can be done with motivation, enthusiasm and a lot of recycled bits. With university recruitment in engineering and computer science falling year on year, we need to show how and why engineering can be as exciting as any other subject".



Prof Noel Sharkey with his emotional robot eMo

## Ofcom Accept CARS View

**O**fcom has now published its conclusions on the Digital TV Switchover Consultation to which the Chelmsford Amateur Radio Society (CARS) contributed. Ofcom have accepted CARS request for early adoption of 8K carriers to permit Sudbury and some new relays to be run at much higher power for decent TV reception (and with enough 64QAM capacity for extra channels/HDTV options as well).

Thanks to the efforts of **Murray Niman G6JYB** CARS produced a first class technical response to this consultation, which helped win Ofcom over. The CARS response can be seen at

[www.ofcom.org.uk/consult/condocs/pods/responses/](http://www.ofcom.org.uk/consult/condocs/pods/responses/) and the Ofcom Statement can be seen at

[www.ofcom.org.uk/consult/condocs/pods/statement/](http://www.ofcom.org.uk/consult/condocs/pods/statement/)

One outcome of this is that the old ITV Digital Boxes along with some very early iDTVs will not be compatible, so the message is to avoid getting one as they won't work in a few years time. If international clearance is obtained there will be some amazing increases in Freeview signal strengths when it starts in 2008.

For further information regarding CARS contact the secretary Martyn G1EFL, Tel: (01245) 469008, E-mail: [info2005@g0mwrt.org.uk](mailto:info2005@g0mwrt.org.uk) Website: [www.g0mwrt.org.uk](http://www.g0mwrt.org.uk)



Murray Niman G6JYB's efforts in producing a first class response to Ofcom's digital switchover document has given positive results.

## Bolsover Special Event

**T**he Bolsover & District Radio Society are again organising a special event station to commemorate the birthday of Peter Fidler, a Bolsover man who helped chart a large area of Canada. The event takes place over the weekend of the 13 & 14 August when **GB2PF** will take to the air.

The GB2PF station will be activated on as many bands as possible and will be operated from the grounds of the Coalite Sports and Social Club off Moor Lane in Bolsover. More information can be obtained by contacting **David Ackrill G0DJA** on (01246) 824994 or via E-mail to: [dave@g0dja.co.uk](mailto:dave@g0dja.co.uk)

## World's First DRM Module

**R**adioScape, the world leader in Software Defined Digital Radio solutions recently launched the RadioScape RS500 module that can receive DRM (Digital Radio Mondiale), as well as DAB (Digital Audio Broadcast), f.m. with RDS, l.w., m.w. and s.w. to form the basis of the world's first affordable, integrated, multi-standard, digital radio receivers. The RS500 is based on RadioScape's innovative radios' architecture, enabling re-use of existing applications and features previously developed for the RS300L DAB/f.m.module.

Many of the innovative features available on the RS300L have been directly implemented on the RS500 module, accelerating time to market for a fully featured receiver design. The RS500, for example, immediately supports capabilities such as the highly popular Pause, Rewind and Record to MMC card features as well as the ability to display and use Electronic Programme Guide (EPG) data.

Andrew Moloney, Marketing Manager for Receivers at RadioScape explained "Because we create our modules using radios - our own advanced Software Defined radio architecture, it has been possible for us to add DRM in an affordable and user friendly form to our existing

range of receiver capabilities. The RS500 is size and pin compatible with our very successful RS300L, enabling radio manufacturers to migrate existing designs to the RS500, rapidly bringing to market ranges of receivers, which include DRM-capable designs, in time to catch the pre-Christmas 2005 sales".

The RS500 is based on the Texas Instruments TMS320DRM350 digital signal processor-based (d.s.p.) baseband, the first integrated digital baseband that supports both DRM and DAB standards, for which RadioScape designed the DRM baseband stack. The radio's architecture, which is only available on RadioScape modules, extends the DSP's basic capabilities, and seamlessly manages uploads of the appropriate RadioScape software stack and/or applications to change functionality to suit the requirements of the moment. This significantly improves the user experience, masking transitions between different broadcast standards by automatically listing all services alphabetically regardless of transmission type so that users select by content and avoiding the need for manual band switching.

Modules will be sampling in August of 2005, with production following shortly thereafter. RadioScape forecasts that multi-standard,



multi-band receivers based on the RS500 could have end user prices below £130 - almost a quarter the price of existing DRM receivers in the market.

Peter Senger, DRM Chairman and Deutsche Welle COO commented "Until now there have only been a limited number of DRM receivers available. This new module from RadioScape will open up the market with easy to use, consumer priced, multi-standard receivers in the same way that the company helped open up the DAB market. The broadcasters are already in place with dozens of broadcasters currently transmitting around the world".

For more information on DRM take a look at [www.drm.org](http://www.drm.org) and for Radioscape: [www.radioscape.com](http://www.radioscape.com)

## Welsh RAYNET

**W**elsh Dragons may be a thing of myth - but this one was certainly real in its form of an award presented to the South Gwynedd RAYNET Group. The South Gwynedd RAYNET Group were recently awarded the Welsh Dragon' award by its donor, Mr Simon Lloyd Hughes. The presentation took place at a special joint meeting of the Porthmadog Amateur Radio Society and the Meirion Amateur Radio Society held in the Porthmadog Yacht club in Porthmadog, Gwynedd, North Wales.

Mr Hughes said that the award, designed by his wife, was to give recognition to the group of Radio Amateurs that had given the best benefit to the community in Wales in the past Year. The award was accepted on behalf of the RAYNET group by their chairman Mr Gervaise Chavasse GW4URJ.



The members of the South Gwynedd RAYNET Group with Mr Simon Hughes, front centre seated, holding the award.



Mr Simon Lloyd Hughes, on the right, presenting the Dragon Award to the South Gwynedd RAYNET chairman Mr Gervaise GW4URJ.

## Thurrock Closed on Saturdays!

**D**on't panic, Thurrock is not really closed on Saturdays but Haydon Communications has had to amend its opening hours. Due to the increasing demand of mail orders being placed via their website Haydon Communications has had to close their Thurrock showroom on Saturdays to allow them more time to process website orders. It will remain open Monday to Friday between 0900 and 1600. The West Midlands showroom will remain open Saturdays.

Mike Haydon hopes that the change of opening hours will not inconvenience customers of the Thurrock store and reminds all customers that orders can be securely placed via their website at [www.haydon.info](http://www.haydon.info) any time of day, seven days a week.

## Out of this World!

Members of the **Norfolk Amateur Radio Club** are hoping for clear skies during the weekend of the 25 & 26th June when **GB6NAS** takes to the air from Seething Observatory as part of the Norwich Astronomical Society's 60th anniversary celebrations. The event will include s.s.b./c.w. operation across the h.f. and v.h.f. bands, but stations contacting GB6NAS on SSTV and ATV promise to be treated to a glimpse into outer space as live images will be beamed from the telescopes housed in the observatory's two domes.

All Amateur Radio stations contacting GB6NAS will receive a special 'out-of-this world' colour QSL card featuring some of the best work of Norwich Astronomical Society's team of astrophotographers. Everyone is welcome to visit the observatory during the weekend, and particularly on the Saturday night - remember to bring a hat and gloves just in case those clear Norfolk skies bring a cool Norfolk climate! Members of Norwich Astronomical Society will be on hand during the event to give guided tours of the observatory and to answer any astronomical questions.

The Seething Observatory is located approximately eight miles south east of Norwich and details of how to find it are available from [www.norwich.astronomicalsociety.org.uk/info/finding.htm](http://www.norwich.astronomicalsociety.org.uk/info/finding.htm) The Norfolk Amateur Radio Club is a thriving organisation with over 80 members and anyone interested in radio, communications or electronics is welcome to join. The club meets weekly on Wednesday evenings from 1900hours at the Norwich Aviation Centre, Norwich Airport. Full club, contact and programme details can be found at [www.norfolkamateurradio.org](http://www.norfolkamateurradio.org)



The 20 foot Norwich Astronomical Society's dome against HaleBopp (picture courtesy of Steve Mooreone of NAS members)

## SSETI Express Launch Date



Members of the AMSAT-UK SSETI Group.

The launch date for SSETI Express and the three cubesats *UWE-1*, *Xi-V* and *NCube II* has now been confirmed as Thursday 25 August with the 26th as a back-up. Pre-launch Kepler elements are expected to become available shortly.

The satellite has now completed all its pre-launch tests and is presently back in the clean room undergoing a final checkout and the cubesats are currently being loaded into their T-POD launchers. Current plans show that the satellite will be packed and ready for despatch on the launch site during the last week of June. There is a webcam available at [www.sseti.gte.tuwien.ac.at/WSW4/webcam.htm](http://www.sseti.gte.tuwien.ac.at/WSW4/webcam.htm) as well as other photos and the integration logbook, which can be found at [www.sseti.gte.tuwien.ac.at/WSW4/express\\_downloads.htm](http://www.sseti.gte.tuwien.ac.at/WSW4/express_downloads.htm)

SSETI Express will automatically downlink general telemetry at 9600bd on 430MHz and it will also be possible for radio amateurs to request

specific downloads. In addition it's planned that the 38400bd telemetry transmitter on 2.4GHz will also be available for amateur voice operation as a Mode U/S transponder after initial tests on the satellite have been completed.

AMSAT-UK provided the 2.4GHz transmitter for the satellite and a presentation on SSETI Express will be given at the AMSAT-UK Space Colloquium, which is being held over the weekend of 29-31 July at the University of Surrey in Guildford. All short wave listeners and radio amateurs are welcome to attend.

Day passes for the event or 2/3 day packages covering meals and accommodation are available. For more details on how to get these contact **Sophie Haigh**, Tel: (01483) 689888 E-mail: [s.haigh@sstl.co.uk](mailto:s.haigh@sstl.co.uk)

For information on AMSAT-UK and how to get involved contact secretary **Jim Heck G3WGM**, Tel: (01258) 453959, E-mail: [g3wgm@amsat.org](mailto:g3wgm@amsat.org) or take a look at [www.uk.amsat.org](http://www.uk.amsat.org)

## rallies

\* 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.

**June 26:** The West of England Radio Rally is to be held at The Cheese & Grain Venue, Market Yard, Frome, Somerset. Doors open 1000 till 1600. The rally will feature trade stands, club and society stands, free car parking, talk-in on 2m, disabled parking, hot and cold refreshments. Contact **Shaun G8VPG** on (01225) 873098 or visit [www.westrally.org.uk](http://www.westrally.org.uk) for more information.

**July 3:** The York Radio Rally is to be held at York Racecourse. Doors open at 1015 for disabled visitors, 1030 for everyone else. There will be free parking, refreshments and a good selection of trade stands. Contact **Arthur Palfrey** on (01904) 413342 or mobile (07841) 120738 or [yorkradioclub.net](http://yorkradioclub.net)

**July 10:** The 42nd Annual Cornish Rally (Radio, Computers & Electronics Fair) will be held at the Penair School, Truro. Doors open at 1030 and refreshments will be available, along with a Bring & Buy, Morse tests, demonstrations and lots more. More information from **John G4LJY** at [g4lly@dsl.pipex.com](mailto:g4lly@dsl.pipex.com) or from **Ken G0FIC** at [ken@jarray.freereserve.co.uk](mailto:ken@jarray.freereserve.co.uk)

**July 17:** The 23rd McMichael Rally will take place at the Reading Rugby Club, just off the A4 at Sonning, East of Reading, Berkshire Talk-in (GB6MMR) on 522/44. There will be a large boot sale on level site, indoor traders area and demonstrations by special interest groups, plenty of free parking with disabled parking on level ground, snack bar and licensed bar with real ale, outdoor BBQ-weather permitting! Admission is just £1.50 per person. More information from **Min** on 0118-972 3504 or E-mail: [g0jms@radarc.org](mailto:g0jms@radarc.org) Trader and booking information from **Andy** on 0771 739 7899, E-mail: [m5alg@radarc.org](mailto:m5alg@radarc.org) or visit <http://go.to/mcmichaelrally>

**July 17/18th:** Portland Amateur Radio Club are holding their rally as an attraction at the Portland Steam and Vintage Show, Southwell Business Park, Portland. There will be a large marquee and the 'anchor' stand will be The Shortwave Shop. Other features will include WXSat and WXFax demos, hopefully a c.w. local test - all standards, a Bring & Buy, RFARS, involvement of Portland Island Computer Club, RAYNET, and other attractions. Admission to the rally is free as it is part of

the steam and vintage show, which people pay to enter. There will be ample parking and overnight camping space plus security guards. **Rod Wild 2E0CTS.**

**July 30:** Martin Lynch & Sons' Summer Barbecue & Boot Fair. [www.hamradio.co.uk](http://www.hamradio.co.uk)

**July 31:** Colchester Radio Amateurs are holding their annual rally at St. Helena School, Colchester located next to the A313 by-pass. Talk-in will be provided. There will be a Bring & Buy and a main Essex dealer will be attending, as well as special interest groups. Refreshments will also be available. Contact **Garry M0JH** on (01621) 818620, E-mail: [m0jjh@despammed.com](mailto:m0jjh@despammed.com)

**August 6:** The Rugby Amateur Transmitting Society are holding their Annual Rally at the Stanford Hall, Lutterworth, Leicestershire. Contact **T.M. Humphries** on (01455) 552519 or E-mail: [thumph3426@aol.com](mailto:thumph3426@aol.com) for more information.

\* **August 7:** Flight Refuelling ARS Hamfest will be held at the Flight Refuelling Sport and

Social Club, Merley, near Wimborne, Dorset. Details from **Mike** on (01202) 883479 or check out the website at [www.frars.org.uk](http://www.frars.org.uk)

**August 7:** The Lorn ARS are holding their Radio Rally in Crianlarch Village Hall, junction of A82/A85, 12 miles north of Loch Lomond. There will be the usual stalls and entrance fee is £1. Doors open 1030 for disabled visitors and 1100 for others. Details at [www.gm0lra.freeuk.com](http://www.gm0lra.freeuk.com) or contact **Shirley** at [gm0erv@dsl.pipex.com](mailto:gm0erv@dsl.pipex.com) or **John GM8MLH** on (01838) 200304.

**August 12:** The 12th Annual Junk Night of the Cokenzie & Port Seton Amateur Radio Club will take place at the Cokenzie & Port Seton Community Centre, South Seton Park, Port Seton. Entrance fee is just £1 and all proceeds will go to the British Heart Foundation. Tables are available on a first come, first served basis. There will be disabled access and a raffle at approximately 2100. Refreshments will also be available. Contact **Bob Glasgow GM4UYZ** on (01875) 811723 or E-mail: [bob.gm4uyz@btinternet.com](mailto:bob.gm4uyz@btinternet.com) for further information.

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**DEREGULATION**

**=**

**DEATH OF  
AMATEUR RADIO  
IN 5 YEARS**

**YOU DO THE MATHS !**

Imagine a country where the “friendly” radio administrator says “I’m feeling generous you can have your amateur radio licence for free and tell you what for life as well”. Two years later the friendly administrator says “actually this licence for free, is expensive to run - no more licences are required, anyone can operate without a licence”. A little later the not so friendly regulator says “these amateur radio operators cause all sorts of interference problems and someone else wants to buy their bit of the spectrum – lets ban amateur radio and sell their spectrum!”.

**COULDN'T HAPPEN HERE COULD IT? IT COULD !**

**So back the RSGB in the protection of Amateur Radio from any form of Deregulation**

**JOIN THE RSGB**

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Tel. 0870 904 7373 [www.rsgb.org.uk](http://www.rsgb.org.uk)



# AOR SR2000

## FFT Scanner and Display

**The holy grail of scanners is speed and accuracy. If you're looking to cover lots of spectrum for activity then those parameters are a paramount. The new SR2000 offers both and a spectrum display to boot...interested? You should be! Jack Weber tells all.**

At various times, the progress of radio has been radically shifted by the arrival of new technologies, which were so compelling that they took over as soon as the price and performance were right. Both the superhet and the phase-locked loop have had this kind of impact and the spectrum analyser is starting to do it now. Like the superhet and the PLL in their day, a spectrum analyser doesn't just make radio better, it makes radio so much better that it takes it to a new level of capability.

### Seen the Trend

AOR have seen the trend and have done more than most to drive it forwards. Their SDU range of add-on spectrum monitors has been around for some years and clearly demonstrates how useful it is to see a large chunk of spectrum in detail and in real time. So far though, we've barely begun exploiting the full potential of what spectrum analysers can do. It's time now to move on to the next stage.

What AOR have done with the SR2000 is to combine a high-grade receiver with a wide-band spectrum analyser to create a single stand-alone unit. That's a logical next step, emphasising the fact that this sort of spectrum display is no longer just a luxury accessory but is rapidly becoming an integral part

of operating a modern receiver. More important than that though, the SR2000 is the first consumer receiver to offer an ultra-fast scanning facility called FFT Search. This technique uses the spectrum analyser's Fast Fourier Transform to scan a 10MHz block of spectrum in under a second and deliver a list of every signal there.

You've never seen anything like this before, but if it sounds vaguely familiar, just cast your mind back to five years ago. At that time, AOR announced a revolutionary receiver called JT2000 that had FFT Search among its various novel features. A prototype was demonstrated in public and everything looked set for a prompt launch, but then things went strangely quiet. For whatever reason, the JT2000 never made it to market and the prospect of FFT Search faded out of reach.

So, is this finally the long awaited release of the JT2000? No, it isn't. As far as I can tell there's nothing directly in common between the two designs other than the fact that they both provide FFT Search. However, from a user's point of view, it's the capability that matters not the details of how it's been achieved. So, in that sense, yes this is what we've been waiting for ever since the JT2000, even though it's a different receiver.

At first glance, the SR2000 looks exactly like AOR's current stand-alone spectrum display, the SDU5600 – same case, same screen, same control layout (see Fig. 1). Look more closely and you'll see that some of the labels have been changed, but that's about it. Round the back, it's more of a give-away. The mysterious blanking plate that was always there has been replaced and now sprouts a host of additional connectors for antenna, headphones and so on.

As you'd expect from AOR, the build quality of the SR2000 is excellent – everything fits just so and the insides

● Fig. 1: The front panel has exactly the same control buttons as the SDU5600, but with some functions changed.





● **Fig. 2:** The back, showing the three jumper leads that are needed to connect the receiver and spectrum analyser boards.

are beautifully neat and tidy (see Fig. 2). Yet there's no hiding the fact that the receiver has been retrofitted to an existing product. The obvious sign of this is that three jumper cables are needed at the back to join the receiver and spectrum display boards together (see Fig. 3). Even the 12V d.c. supply goes in at one hole, out through another and then back in at a third. It's no problem, but it does slightly dent the sleek professional look. Fortunately, all the jumper cables are included, as is a substantial power supply brick.

## Dominant

Dominating the front panel is a backlit 125mm colour l.c.d. screen. This is clear and bright with good contrast, which makes it very easy to read even under a wide range of lighting conditions. In addition there's a power switch, a 26-button keypad and one rotary control. The buttons all have a crisp action that provides good tactile and audible feedback. The control knob is disappointing though – it's far too small and lightweight, the grip is uncomfortable, the finger hole is tiny and it has all the dynamics of a dishcloth. In its original role as an adjustment for the SDU5600 it was passable, but as the tuning knob of a high-end receiver, it's really not up to the job and I do hope that AOR will consider upgrading it.

Antenna connection is via a 50Ω BNC socket and there are two mono mini-jacks for headphone and loudspeaker output (there's no built-in speaker). An 8-pin mini-DIN accessory socket provides high and low-level audio outputs as well as a direct output from the f.m. discriminator which can be used for decoding FSK and other modes. There's also a 9-pin D-type socket that lets you connect the SR2000 to a PC, which can be used both for control of the unit and for data capture from it. The default protocol is RS-232, but Universal Serial Bus (USB) is available as an option.

The receiver itself is not a brand new design, but is essentially the a.m./f.m. section of AOR's top of the range AR-ONE. Not a complete full-specification AR-ONE, but certainly the main core of one. Where it's been cut back is

that you don't get coverage below 25MHz, nor any facilities for single sideband or c.w. reception. There's been a certain amount of downgrading in performance and features too, but nothing that's likely to bother anyone except some professional users.

The design is a triple-conversion superhet covering 25MHz to 3GHz in one continuous sweep. The first i.f. operates at either 255.3 or 744.3MHz depending on where you're tuned. The second and third i.f.s are at 10.7MHz and 455kHz respectively. There are 15 pre-programmed tuning steps ranging from 0.1 to 100kHz and including the usual fractional values of 6.25, 8.33 and 12.5kHz. For coping with less common bandplans, you can create any custom step size you want in multiples of 0.1kHz up to a maximum of 100kHz.

Frequency stability is quoted as 1p.p.m. That's down from the superb 0.1p.p.m. of the AR-ONE, but it's still excellent by the standards of consumer receivers. Anyway, it's a trivial sacrifice considering that it must have helped considerably in keeping the price down.

The available modes are a.m., s.n.f.m., n.b.f.m. and w.b.f.m.. Each has its own fixed i.f. bandwidth - 300kHz for w.b.f.m., 12kHz for n.b.f.m. and 6kHz for a.m. and s.n.f.m.



● **Fig. 3:** With the top off, there's very little to see inside. The flat screened housing contains the receiver module, the spectrum analyser board is hidden underneath.

There are no other filters available. Signal levels can be controlled with a three-step attenuator offering 0, 10 or 20dB of attenuation at the antenna input and there's a preamplifier of unspecified gain (about 22dB judging by the SR2000's own signal measurement) that can be switched in or out. Quoted a.m. sensitivity for 10dB SNR is an impressive 0.6μV below 225MHz and 0.8μV above that. I presume, though the specification doesn't say so, that these figures were obtained with the preamp on and attenuator off.

## Control

Most receiver functions are controlled from the main keypad, often in combination with the Function key. There are also three buttons alongside the control knob which switch its operation between Volume, Squelch and Frequency setting. Unfortunately, there are no buttons for up/down step tuning so your only option when tuning manually is to enter a frequency with the numeric keys or to use that control knob.

The spectrum display part of the package is essentially like a standard SDU5600. It's an FFT spectrum analyser that's applied to the receiver's 10.7MHz i.f. This allows it to display up to a 10MHz bandwidth - i.e. 5MHz either side of the centre frequency. The FFT updates 5 times per second, effectively giving a real-time display for all but the fastest changing signals.

The most basic way of operating the SR2000 is as a manually tuned receiver, with the spectrum analyser being used as a bandscope - see Fig. 4. This is the default mode that appears when you switch on so all you need to do is input a frequency on the numeric keypad and press the MHz button to enter it. To change the reception mode, you press the Mode button, twiddle the knob to make your selection and then press MHz, which always doubles as an Enter key to confirm your selection.

There are nine v.f.o.s, each storing the full quota of receiver settings so you can set the receiver up individually for various bands and types of signal. This is very useful if you regularly monitor different bands because you can switch between them without having to individually change mode, step and so on. Bizarrely though, there's no way of selecting a specific v.f.o. directly, instead you have to cycle one by one through all of them!

During use, the top part of the display shows all the current settings for the receiver including volume, mode, squelch, attenuator, step size and, of course, the currently tuned frequency. Below this are displayed the settings of the spectrum analyser. Most important of these is the Span, which you can set directly to any value within its range of 160kHz to 10MHz. While you're working in the v.f.o. mode, the received frequency is always at the centre of the display with the two end points being at Span/2 either side.

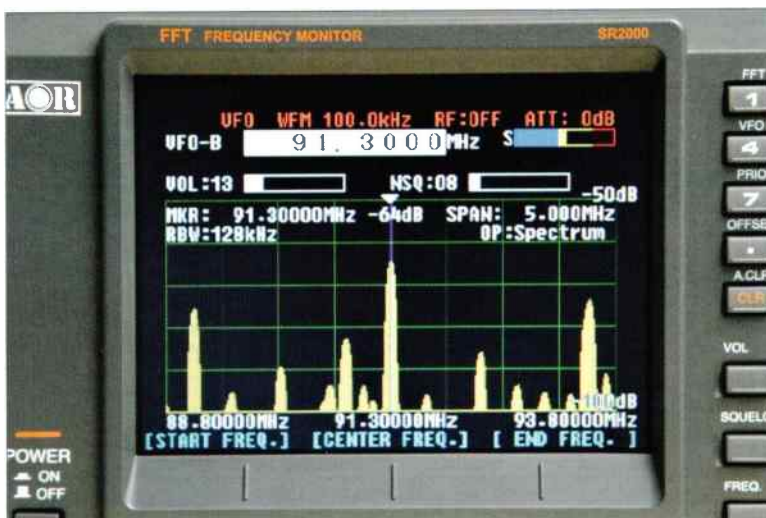
To help you move quickly to an off-centre signal, there's a vertical marker, which you can position manually or set so that it will automatically find the strongest signal in the display window. Either way, a single button press will then re-tune the receiver to the marker frequency.

One limitation of this basic display mode is that, if you're looking at a channelled band, the channels may not correspond exactly to the displayed FFT steps. The SR2000's screen provides 320 pixels across the width of the spectrum graph. This means that any data that's derived from the screen is limited to a resolution of Span/320. For example, if you're seeing a 10MHz Span, then each pixel represents a block of 31.25kHz. The result is that there may be several stations lumped together into one displayed reading. Even if there's only one station, simply placing the marker there and auto-tuning to it is no guarantee that you'll actually land on the station's exact frequency.

For these situations, the SR2000 provides a Step Resolution mode in which the frequency step between each pixel is set by the user, and the span is left to sort itself out accordingly. So, if you're in a band with 12.5kHz channel spacing then each point across the spectrum display would correspond to one channel and you'd see 320 channels at a time. The Span is now fixed at 3.9875MHz (= 12.5kHz x 319) and can't be changed, but it does mean that you can set the marker exactly on an active signal.

### Peak-Seeking Marker

There's also a Channel Scope mode, which lets you set a display step size as well as start and end frequencies (within the limits of what the display can accommodate). You can



● Fig. 4: In normal v.f.o. mode, the display acts as a bandscope showing signals within a span up to 10MHz wide. The marker, which is in the centre here, can be used to tune quickly to another signal.

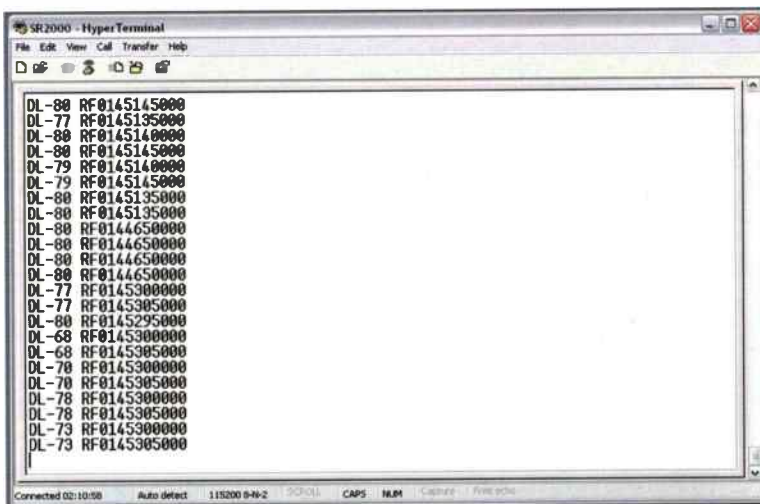


● Fig. 5: The FFT search lists its results in eight different colours to show the relative signal strength.

then tune around and use the marker just within that range. One advantage of this is that it stops a peak-seeking marker from being captured by strong out-of-band signals. For example, on the 50MHz amateur band I found that the marker was always being hijacked by local baby monitors just below 50MHz. Using the Channel Scope, this isn't a problem.

The memory system is very comprehensive and appears to have been taken directly from the AR-ONE. It provides 1000 memories arranged in ten banks. Each one stores the frequency and mode as well as a 12-character text label. Memories can be recalled individually or scanned sequentially within a bank. There's also a Selection Scan option which allows you to scan just a subset of frequencies within a bank by marking them in advance. In addition, you can assign a priority frequency which will be checked at regular intervals (from 1 to 99 seconds) while you're scanning or doing anything else.

When a memory scan is in progress, the spectrum display disappears and is replaced by a results list showing the frequency of every signal that exceeds the squelch level. You can hear each one as it's added to the list and you can



● **Fig. 6:** The results of an FFT search are automatically streamed through the serial port and can be read in a simple program such as Windows' HyperTerminal. The last line here shows that there was a signal at -73 dB on 145.305 MHz.

select any result from the list and transfer it to the v.f.o. for longer monitoring. Unfortunately, there's no way to save the whole list. The process of selecting a frequency is rather clumsy too, as it involves repeatedly tapping the Up and Down keys to step a marker through the list until you reach the frequency you want. If your fingers are too slow or the results come too rapidly, you may never get there because, once the screen has filled up with its maximum of 40 results, it simply starts overwriting them from the beginning. A Pause button would have helped enormously.

In addition to memory scan, there are two search modes which can be applied to any of 40 search banks where you define a frequency range, mode and step size. In Normal Search the receiver tunes step-by-step across the search bank looking for any signal that will open the squelch. To skip unwanted signals you can define up to 40 pass frequencies per search bank.

The FFT search operates entirely differently. For a start, it's not a function of the receiver but of the spectrum analyser and happens entirely within the DSP (Digital Signal Processor). The principle reason it's so fast is because the receiver's tuning doesn't change, but stays fixed at the centre frequency of the search span. All the results emerge from the FFT calculation, which is applied in one go to the whole 10MHz i.f. bandwidth.

### Dividing A Range

Any FFT works by dividing a frequency range into a large number of equal steps, or bins, and, in effect, calculating the signal level within each bin. These values may be displayed graphically as a plot of level versus frequency, which is how we normally see the output of a spectrum analyser, or they could be displayed numerically as a long list of frequencies and levels. What FFT search does is to take that list of numbers, compare each one against a chosen threshold level and discard all those that fall below it. The rest are displayed as a list of frequencies with the signal level denoted by colour - Fig. 5. It's very neat, and very fast.

To set up an FFT search, you first need to pick a search bank. This merely defines the frequency limits for the search, its other parameters are irrelevant. Next you set a frequency step for the FFT - this isn't like the tuning step in normal search because you're not checking discrete frequencies separated by a step, you're looking at everything happening within the step. If it's too wide, you may get several stations

appearing as a single reading; if it's too narrow, then any broad signal will appear as several adjacent results. Finally, you need to define the level threshold. Squelch means nothing in this context so you adjust the threshold graphically on the spectrum display.

Set it going and it will analyse everything within its 10MHz window in just 0.85 of a second. It makes no difference whether there are dozens of signals present or none, the time taken is always the same. If you want to search a wider range, it automatically gets stitched together from those 10MHz blocks and takes proportionately longer. To put this all into perspective, scanning 100MHz with a conventional scanner set for 10kHz steps will take 3 minutes 20 seconds at a search speed of 50 steps/second. The SR2000's FFT will cover the same range in just 8.5 seconds. That's nearly 24 times as fast.

I'm sure that every new SR2000 user will, as I did, run a



● **Fig. 7:** The waterfall display shows signals over time. Here we see activity in a busy PMR band.

full 25MHz to 3GHz FFT scan just to be amazed at how fast it happens. And at 4 minutes 13 seconds it is amazing. Having done it once though, you'll see that it's a pretty futile exercise. What really makes the FFT's ultra-fast scan speed so important isn't that you can cover lots of spectrum, but rather that you can scan and re-scan a band very rapidly. If your interests take you to the sort of bands where brief and infrequent signals pop up at erratic times on unpredictable frequencies, then the SR2000 is simply unbeatable. It's not so much about finding lots of signals, but about finding very elusive signals. And that explains why there's also a normal search mode, because sometimes speed doesn't matter and all you want to do is stroll through a band checking any steady signals that are there.

### Same Limitation

On the downside, both search modes suffer from the same limitation of only being able to display 40 results before they start being overwritten. The FFT is so fast that it could easily exceed that number in less than a second. Also you can't define pass frequencies in FFT search, so if you're hunting an intermittent signal among several constant ones, the list will quickly fill up with endless repetitions of junk data.

This really is a problem and there's no solution other than to restrict FFT search to very quiet parts of the spectrum, or to transfer all the results to a computer and ignore the



receiver's own screen. Fortunately, this is fairly easy to do - the results are streamed automatically to the analyser's serial port and could be read in a simple terminal program on a PC (see Fig. 6). To get the most out of it though, you'd really need something more sophisticated. For the moment that means writing your own program as AOR don't currently provide any software for the SR2000. They say that some is in development, but there's no indication yet of when it will be released or exactly what facilities it will offer.

Even a basic control and data display program would be useful, but I hope that AOR, or some third party supplier, will go beyond that because there's enormous potential here for doing clever things with software. For example, one approach that's used in professional monitoring is to have a fast receiver - such as the SR2000 - operating purely as a signal hunter and transferring all its results in real time to a computer. The computer checks for signals or patterns of activity that are of interest and immediately passes any relevant frequency to one of several hand-off receivers which do all the actual monitoring. I'm sure there are many scanner users who would dearly love this sort of facility and it's now within reach if you already have a PC, as well as another scanner or two that can be controlled from it.

### Classic AOR Characteristics

In use, the SR2000 showed all the classic AOR characteristics - excellent performance, top-class audio and an approach to ergonomics that's...well, shall we say - eccentric. It will take time and several readings of the manual to get to grips with it. But even when I got annoyed at some of the awkward and hard to remember key combinations, the quality of reception kept winning me back.

Compared to my normal wide-band receiver, there were simply more signals to be heard. Just as important was their improved intelligibility, both strong and weak signals were often easier to understand. No doubt, thanks in part to the good audio circuitry in the SR2000. The squelch also works well, opening and closing quite cleanly without nasty thumps or clicks.

When it came to finding signals, all the scan and search modes worked flawlessly and the FFT search was an eye opener. In apparently deserted bands where you'd be very lucky to find anything at all by simply tuning around or using the normal search, it revealed frequencies that were in active, but very occasional, use. In busier parts of the spectrum, it's of less value. You certainly wouldn't use it in the f.m. broadcast band and even airband, which is quite crowded where I live, generally overwhelmed it. Although, this wouldn't be the case if the data stream was being intelligently managed by a computer.

Apart from helping you to hear signals, spectrum analysers are a good way to measure them. The SR2000's S-meter is very rudimentary, but there's a constant display of signal level at the marker frequency, which means you can check the strength of any signal, not just the one you're tuned to. To enhance this facility, you can also select various calculation modes. Most useful of these is MAX mode, which replaces the dynamic spectrum display with one that holds the maximum value of level at each frequency and builds up over time. This is essentially equivalent to FFT search, but with a graphical rather than numerical output. As such, it avoids the overflow problem and I found it an

excellent way of spotting infrequent signals in crowded spectrum such as airband.

Also welcome was the SR2000's waterfall display - see Fig. 7. Waterfalls are extremely useful for revealing weak carriers that you might not otherwise be aware of and for spotting any brief signals that are gone before you notice them. Despite its tiny size, the SR2000's waterfall is worth having, though I do wish the scroll rate could be adjusted or even frozen. As it is, it's determined by the FFT span - the narrower the span, the faster it scrolls and signals sometimes fall off the bottom far too quickly.

### Pleasure To Use

There are still some minor bugs to contend with. For example, the Configuration menu correctly remembers all your settings except the one that turns off the annoying key beep. There are a few other oddities too, but they're all fairly minor. On the whole, the SR2000 performed very well and was a pleasure to use. In my opinion, its biggest weakness is ergonomics. Too many functions, not enough controls, resulting in some actions requiring several, or even many, key presses when one would have been enough. The SR2000's biggest strengths are performance and simply the pleasure of having a first rate receiver and a wideband spectrum analyser together in one box and so closely integrated.

At a list price of **£1589 including VAT** the SR2000 isn't cheap but it is good value. Consider that the SDU5600 is listed at £1099, so you're paying £490 for the FFT search and a receiver that's close to AR-ONE standard. That sounds pretty good to me. But bear in mind that this isn't just a souped-up scanner and it won't suit everyone.

The FFT search is its unique feature. If you can see a clear need for this then the SR2000 is right for you, but you'll need to use it with a PC in order to get the full benefit. If FFT search isn't essential, then the SR2000 is still good value, but you could consider buying the SDU5600 and a compatible receiver such as the AR8600, AR5000A, Icom IC-R8500 or AR-ONE. You'll get greater coverage, more modes and better ergonomics, but you may have to pay more.

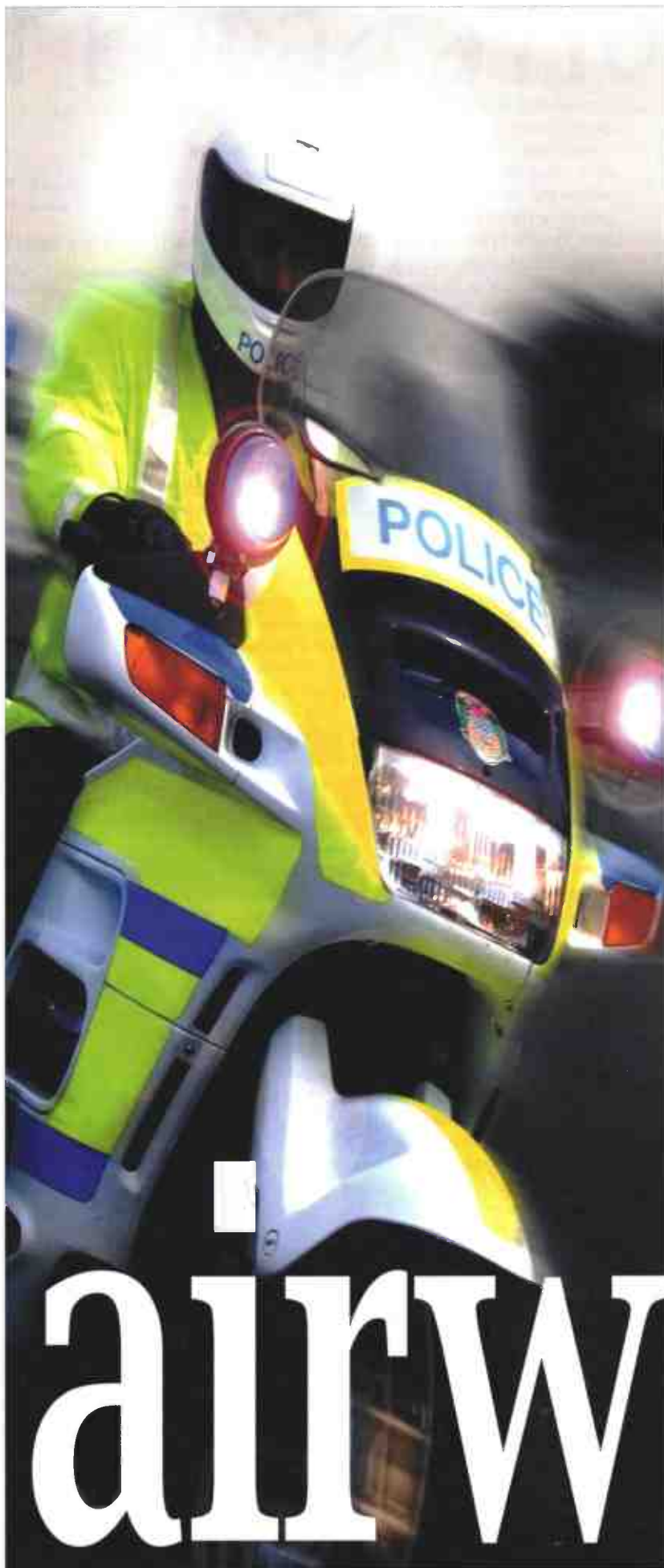
On the other hand, there are very real practical advantages to this self-contained unit. It's small and light (just 3.3kg) and it runs off a standard 12V supply so you could easily take it travelling or use it in a car. As a mobile signal-finding device it should appeal to any scanner user. For amateurs too, a portable high-resolution bandscope and signal finder could be of great value when working mobile or during contests.

### Most Significant Product

What is certain is that this won't be the last we'll hear of FFT search and, as the first consumer-level receiver to offer it, the SR2000 is definitely one of the most significant new products we're likely to see this year.

Thanks go to AOR UK Ltd. for the loan of the review SR2000. AOR remind us that the SR2000 is CE approved and first stocks will be available by the end of May 2005. For more details please contact: **AOR UK Limited, Unit 9, Dimple Road Business Centre, Dimple Road, Matlock, Derbyshire DE4 3JX. Tel: (01629) 581222 or Web: www.aoruk.com**

SWM



**Dave Roberts looks at the development and the interest for the scanning enthusiast of Airwave from its basic origins through the Tetra stages to the system in use today.**

**T**o set the scene here is an excerpt from *The Times* newspaper dated 22 June 1952. Dateline 21 June 1952 - Preston.

*"When Sir David Maxwell Fyfe, the Home Secretary, inspected the Lancashire Constabulary here yesterday he opened one of the most advanced police wireless systems in use. It is the newest development of a force which was a pioneer in the use of wireless and radio telephony. The Chief Constable, Colonel T E St. Johnston, recalled that the Lancashire Constabulary first installed wireless in 1926, in order that messages in Morse could be exchanged between a number of fixed stations throughout the county. In the past 21 months crews of police cars had made some 3000 arrests."*

The first police personal radios were issued in Lancashire, manufactured by a sergeant and an assistant from the force, the design was soon commercially made and was issued to police throughout England. The 'Lancon' police radio became familiar to many officers in the 1950s and 1960s. Lancashire Constabulary also introduced the first 'Panda' car in 1965. An ex-CID Ford Zephyr was painted in two-tone light blue and white so as to be more visible. Light blue was chosen because the Chief Constable had attended Cambridge University in his youth and light blue was his lucky colour!

It seemed that history was repeating itself when the new TETRA police radio system operated by MM02 (now O2 Airwave) was trialled by the Lancashire force. Police officers, like workers in other occupations, will usually moan about their equipment - the cars are slow and unreliable, the uniforms itch, the waterproof clothing isn't and the radio doesn't work.

# airwave

## The Radio Doesn't Work!

Radio communications truly became a lifeline for emergency service staff in the fifties. There were so called 'black spots' on the coverage map where radio signals didn't penetrate. The frequencies used for the police radio systems at this time were in the u.h.f. 450-466MHz range and at v.h.f. 88-108MHz.

The World Administrative Radio Conference in 1979 decreed that the British police v.h.f. frequencies should be reissued to sound broadcast services and that the police, who were operating in the middle of that range, would have to shift. They were given until 1989 to complete the move and by that year police frequencies in the 146 and 147MHz area had been allocated together with base station frequencies in the 150MHz region.

Then along came cellular portable telephones. The British public grasped the concept with both hands and ears and within a few years if you didn't constantly have a 'mobile' glued to one ear or the other you were looked on as a mutant.

Previously seen as a natural resource, the frequency bands suddenly became a commercial property to be sold to the highest bidder, by a government that assumed rights of ownership. The telephone companies fell over themselves to spend shareholders money, literally, on thin air. This commercial exuberance created a maelstrom of interest from service providers eager to increase profits.

While this was ongoing the emergency services, and the police in particular, were still operating their systems as they had done for decades. The u.h.f. system had, essentially, not changed and the v.h.f. radio schemes had just moved higher up the spectrum with fundamentally the same sort of equipment that had always been in use.

The opportunities that now presented themselves to government, commercial enterprise and the emergency services were legion. As Her Majesty's Government had now assumed ownership of the airwaves they could sell them.

So they:

- \* Took little used 380-395MHz frequencies from the military.
- \* Made them available to private communications companies on condition that they supplied a digital service to approved customers.
- \* Made the existing emergency service frequencies available for sale to communications companies for mobile communications device use.

Everyone's happy! The Government makes money on the frequencies that they have sold, the police and emergency service people get a new radio system and big business gets to sell fancy digital radio systems to the police other emergency services etc., and to the general public so that they can watch Hollywood movies and play space invaders on their telephones.

## Single Digital Comms System

So, in the mid-1990s the government considered that there should be a single digital communications system for all the public safety agencies. The development and implementation of this idea was named the Public Safety Radio Communications Project. The digital standard that was decided upon by the Home Office was called Terrestrial Trunked Radio, TETRA for short.

TETRA is an open standard for digital trunked radio and it was decided that a Project Definition Study should be carried out in order to establish the specification and definition for the

new service. Over 60 organisations tendered for the job that was eventually awarded to an outfit called Quadrant consisting of British Telecom, Nokia, TRW and Motorola.

It was decreed that the police would have overall control of the system and an approved list of other users was drawn up. The approved users list includes the military, NHS, fire, ambulance and blood transfusion services. Local Authority Emergency Planning Departments are included, as are mountain rescue services and practically anyone else that they can persuade to pay for it, including private ambulance services and some rail projects.

The system is now known as Airwave and has been accepted by all the British Police Forces. Completion of the national coverage is expected this year.

## What Does Airwave Do?

As is the norm the end user gets a radio, now called a 'terminal', this radio can resemble a 'walkie talkie' type radio, a mobile telephone or the normal type of mobile two-way radio set. This, however, is where the similarities end.

First, being a trunked system Airwave allows communications to be established via 'talkgroups'-clutches of users who are all on what we would previously describe as the same channel. As with normal channelised communications the users can talk with each other, or with their dispatcher at the police station.

The talkthrough facility can be enabled or disabled as usual. When a user transmits, his or her identity is sent to the others on the talkgroup and is displayed on the liquid crystal display on their set. In itself this is not necessarily ground breaking stuff.

The user can, however, while still maintaining his watch on the talkgroup, make calls as he would on his mobile telephone to either telephones within the forces' internal system or to the Public





Switched Telephone Network (PSTN). In theory, calls can also be received from the public on the radio - sorry terminal but many forces are having difficulty with this.

Talkgroups can be established for different users. An intelligence or surveillance unit will be able to establish their own group that is not visible to other users who will have no idea of its existence as their sets will not be authorised to log-on to that exclusive talkgroup. Should an officer and his radio drop out of range of the main system then the set can seek other Airwave terminals within range and utilise those as nodes to relay the signals back into the main system-clever stuff.

The radios can also be used in what was previously known as 'back-to-back' operation but what the system engineers call Direct Mode Operation (DMO) There are channels reserved for this use. As far as the user is concerned the terminal then becomes a normal two-way radio, albeit with encryption and with a maximum range of about 3km.

Back at the police control room the radio operator has his or her own Dispatcher Terminal. He sits at his computer screen and has control of one or more of these aforementioned talkgroups. Every time the p.t.t. on the radio is operated the screen displays the details of the person to whom the radio is issued and the talkgroup

Talkgroups can, of course, be controlled from a dispatcher terminal not located in the local control room. This facility will be used when a specialist unit wishes to keep control of their own units without the staff in the area control room being aware of their actions. It is therefore possible for a major intelligence type operation to be run in any part of the UK from any other part of the UK. Yes, Airwave allows for a whole lot of 'sneaky' stuff to be done!

### TETRA Tricks

Other neat TETRA tricks, include an emergency button that when hit, puts the radio into transmit, enabling the control dispatcher to hear what is being said near the user's set. Should a terminal be lost or stolen the dispatcher can 'stun' or 'kill' the set.

Stun temporarily disables the radio so that it can't be used in receive or transmit at all until such time as it is re-enabled. Kill does just what it says. The terminal is wasted permanently and will now only be of use as a conversation piece or paperweight.

Many of the terminals now have a GPS receiver included. This is handy as the position of the set can be constantly beamed to the dispatcher enabling them to task resources more efficiently. Known as Automatic Vehicle Location or AVL it also puts a stop to such antics as the 'Far Away Club' that was an unofficial part of one police force's social scene. Members would see just how far away they could travel on a night shift. They ended up on the receiving end of some heat when a police Range Rover was involved in an accident in the Champs Elysees, Paris at the dead of night!

A big selling point for the system has been, that although TETRA is an open standard, it supports end-to-end encryption. This feature has sold it to the rank and file officers many of whom possessed a somewhat paranoid view that every bad guy in Britain owned a scanning receiver, the knowledge to program it and a full list of their local frequencies.

I remember watching video footage taken from a police helicopter during which a stolen VW Golf was being driven at Starship speed by some looney who was probably on a mass of mind altering chemicals. As the VW screamed through the traffic, a crew member in the chase vehicle hollered into his radio, "They're scanning, they're scanning".

Now, I have owned dozens of scanners and not one of them would have been usable in a vehicle travelling at that speed, with a high noise level in the car, whilst the radio and passenger were being chucked about inside. Not one.

As I watched the tape I laughed aloud and pondered that the passenger would probably barely be able to pray for his life, let alone play with a little radio. When the car was stopped the passenger fell out and threw up- guess what-no scanner on board.

### Massive Investment

Investment in base station equipment has been massive. Whereas the old police systems would have perhaps five v.h.f. relay sites and 50 or so u.h.f. base locations per police force, that total number has been multiplied several times in order to ensure extensive geographic coverage.

There is now no separate v.h.f. or u.h.f. system. It's all one network and it's all on u.h.f. Officers can therefore be in one part of their area and monitor an operation ongoing very many kilometres away.

As time has passed more police forces have migrated to the Airwave system and this has resulted in a requirement for individual terminals to have their software upgraded in order to allow national roaming. In much the same way that your

"Of the one hundred and fifty thousand police officers in the UK we understand that one hundred and seventeen thousand are currently using Airwave"



'pay-as-you-go' mobile needs a SIM upgrade to permit you to use it abroad, so the Airwave sets need refreshed software to allow them to log-on to talkgroups in use by other force areas. This means that should a police force require assistance from another, the visiting officers radio sets will be permitted to work on the talkgroups in use by the requesting force.

Another advantage is that should an operation be ongoing in different parts of Britain, all the individuals involved can be on the same talkgroup wherever they may be. This makes life a lot simpler when they all have to mash doors in at exactly the same time in locations hundreds of kilometres apart.

## Gateway

Another 'advantage' is that a supervisor can be in his vehicle a long way away from his normal working area and still monitor what his people are doing by listening to his home force talkgroups.

Another neat facility is the ability of a police force or other organisation to install a gateway into an area or building that would normally not have coverage due to physical difficulties with signal paths. In this instance a transportable/fixed Direct Mode Operation gateway can be installed in the building. In effect this means that a small box could be left inside a building with an antenna on the roof.

Should hand portable radio coverage be required within the building then the gateway can be remotely activated by the control room to allow hand portables to operate. All the calls made on that gateway can then be recorded at the control room as is usual with all emergency service communications whether by radio or landline, that are made to, or from, any control facility.

The software controlling the individual sets can be updated fairly easily and so constant development and improvement is possible. Currently the Lancashire Constabulary are using their third generation of Airwave radio terminals, that's how quickly development occurs in this field.

Data can also be sent via the system although this facility hasn't been utilised by many forces at present. Eventually, the system will allow image transfer of fingerprints, maps and pictures to be sent to mobile terminals. The operators claim that the radios run high quality audio in that should an officer be operating in a noisy environment such as a vehicle running with sirens sounding or an individual officer working in a noisy football crowd, then the set has a high degree of spurious audio rejection, resulting in the extraneous noise being reduced in order to make the user more clearly audible to those listening to

his transmissions.

Of course this system was intended to be a trans European standard but many of the European countries have embraced differing systems, so that the concept of European police agencies operating in radio harmony has pretty much been consigned to the confidential document shredder.

What has concerned the Europhiles is that all the encryption microchips are manufactured by Motorola USA and there is a requirement that all such devices have their encryption standards and codes lodged with the USA National Security Agency. This will lead to comments that the British taxpayer cannot monitor his local police radio system but the American authorities can and those comments appear to have some justification, although I can't imagine why the NSA would want to listen to British police dealing with jobs and domestic disputes.

## Ready For Service

Once a force has signed up to the system-guess what - they all have, then the Airwave people get cracking and once they are ready to go a Ready For Service date is agreed. From this date the police force is contracted to Airwave for 15 years. This clearly will not apply to some other users who may not expect that corporate longevity but it gives an idea of the confidence that exists in the Airwave system.

Base station transmitters are supplied by Motorola and then the individual police or other services take contracts with other companies to provide the TETRA Terminals. Sepura and Cleartone are currently big players in this field together with Nokia, Ericsson and, of course, Motorola themselves. Accessories such as covert kits are made by any number of contractors but the terminals themselves can look like a normal mobile radio set or hand-held unit, or like a mobile telephone.

As for problems, you would have to have been living on another planet to have not heard of all the concerns regarding the possible adverse effects on the health of those using the system and those living near the base station transmitters. Local protest groups have sprung up in areas where the base stations are located and it must be said that these people are not the usual group of beards, kaftans and sandal wearers that attach themselves to any old anti-establishment cause. These are decent ordinary people who are seriously concerned about the possible effects on the health of the residents in their area.

"Some areas of Wales, Devon and Cornwall have yet to fully make the transition to Airwave"

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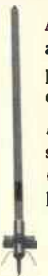
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Comments from John Griffiths  
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Practically every form of illness has been attributed to the Airwave system, from cancers and headaches to stillbirths. The thrust of the objections is that the TETRA transmissions pulse at 17.6Hz, although it is claimed that the base station transmitters transmit a steady signal and only the mobile and portable sets send a pulsed signal. This frequency is close to the 16Hz frequency that apparently is that utilised by human brainwaves except after ten pints of old ale.

The claim made is that the TETRA pulsing can adversely affect the physical well being of the brain. Protestors have picketed base station sites and have pressured their MPs and councillors. The Police Federation of England and Wales have also voiced their concerns regarding the safety of the system.

The 'official' line is that there is no evidence to suggest that TETRA signals are a danger to health. It seems that there are certainly two diametrically opposing views on this subject and only time will tell whether the health issues are valid. The problem is that should it be determined that there is a danger, it will be far too late for those people adversely affected.

## Fancy System

TETRA is basically a fancy mobile 'phone system for the emergency services. It operates on a Time Division basis that allows for up to four users to share one frequency. Their signals are all allocated a time slot and the controlling channels that are simultaneously received by the radio, coordinate those time slots with the base station transmitter.

The mobile or hand-held set is constantly checking signal strengths from all the base stations that it can hear and will seamlessly swap from one base station to another when it detects a stronger signal path with the channel in use and time slots being changed as the radio moves into the sphere of the new base station. The channels carry data about the eligibility of the set to remain on the circuit and time coordination signals plus other control data. Dispatchers can also remotely switch a set into transmit without the individual user even being aware that his radio is transmitting.

## Functionality

As far as functionality is concerned there have been problems. Some officers are scathing about the claims made for the radios. They are adamant that TETRA operation in high noise environments is certainly not what is claimed by the manufacturers.

Some Airwave users are unhappy about their ability to connect with their dispatchers. A word of advice here folks - if you don't get through at first, don't, whatever you do, take your finger off that push-to-talk switch. Just leave it right there. Remove the digit and you'll lose your place in the call queue!

More seriously for the firearms staff there is the difficulty of 'digital lag'. You will experience this with your mobile telephone if you have one.

There is a small delay with all digital transmissions. If you have a digital satellite TV you can check this for yourself by tuning the digi box to BBC1 and do the same on your analogue tuner. Switch between the two and see just how far behind the analogue signal the digital transmission is received. *There is also the fact that the signal pops into space and is then relayed back again to take into account.* Ed

It doesn't matter in *Coronation Street* but for an armed officer a fraction of a second can make all the difference between a 'shoot' and 'no shoot' decision. This is why armed units are sticking with old analogue f.m. radios for the time being.

Intelligence and surveillance units are also reporting troubles. For example one complaint is that the portable radio won't work in the covert harness as the antenna ends up tucked underneath the operators armpit.

To get the set to function it's necessary to suspend it upside down in the rig and this is uncomfortable. There are currently a whole new system of covert rigs being developed for Airwave sets that should overcome this difficulty.

## The Cost

Then there is the cost. British Telecom begat MMO2. MMO2 begat O2 who in turn begat Airwave. None of the above named are noted for philanthropy. These are businesses wholly dedicated to making a healthy profit for shareholders.

It should come as no surprise that although a tremendous amount of investment has been made by O2 in the Airwave project, they stand to make a tidy sum out of it as well. Call levels will be set and if this amount of airtime is exceeded then user organisations may expect to receive higher bills. Likewise coverage.

Should a new housing project be constructed then extra Airwave coverage will be required. This will attract additional charges as pricing is dependant on the area served. Also, if a major incident occurs Airwave will arrange emergency coverage, but a bill will be generated.

## What about the Hobbyist?

Set your scanner to search between 390 and 395MHz in 12.5kHz steps. This will locate your base station transmissions.

A 380-385MHz search with the same step size will locate mobiles. I find the signals easier to locate using a.m. reception mode. The following 'low-end' channels are reserved for Direct Mode Operation:

MHz	MHz
390.0125	380.0125
390.0375	380.0375
390.0625	380.0625
390.0875	380.0875
390.1125	380.1125
390.1375	380.1375

If you hear the beastly buzz on the above frequencies then you can be sure that there is someone using DMO pretty close to where you happen to be.

That, however, is it! That's all the information that you are going to get. Apart from being a digital signal, as I stated previously, the whole shebang is end-to-end encrypted.

Please don't consider wasting your time asking when a scanner will be available to decode it so that you can listen to the town centre punch-up channel on a Saturday night. There will not be any scanner to decode these signals for decades, if ever.

## The Future

As to the future, it seems that the other emergency services are likely to migrate to Airwave and this may eventually lead to combined emergency service control facilities, probably run by private contractors and not the services themselves. This will cut costs and although many of the service chiefs are currently opposed to this idea, it will be seriously considered by the bean counters. Currently several police forces have established their own call centres and some have contracts with commercial call centre operators for overflow calls in times of major incidents or crises.

Will the time come when your local police officers are controlled by a dispatcher in India? The technology exists and so does the financial pressure. Wait and see... **SWM**

We are indebted to *The Times* for the use of the 22 June 1952 quotation.



# Scanning Scene

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

Iraq is still big news. It may not be as hot an item as it once was, but our military personnel and contractors are still there and to them it's certainly still high on the list of priorities. Insurgents and guerrilla fighters don't have an awful lot to do most of the time apart from working out ways of how to kill people. So they get to be quite good at inventing ways of doing it.

The use of the Improvised Explosive Device (IED) has long been a feature of such conflicts. In Northern Ireland the paramilitary groups became very proficient at such operations and this is now the case in Iraq. In the latter country the terrorists are taking advantage of the fact that coalition forces utilise radio communications when on the move during convoy operations.

The USA military have been using the American equivalent of the PMR446 system that, in the USA, is known as Family Radio Service (FRS). Personnel are using these sets 'on base' and, although they shouldn't, while on the road. It follows therefore that the terrorists are using the same radio equipment in order to set off the IEDs. Not a good situation.

The answer to this particular problem is the deployment of what amounts to a scanner in reverse. A normal radio scanner checks a number of frequencies for a received signal. In the case of this particular counter measures tool the radio in use is a modified FRS set connected to an amplifier. It transmits on a number of frequencies in order to locate a receiver.

The FRS set is hooked up to a small chip that instructs the set to transmit for one second on all 22 FRS channels and 38 CTCSS tones. The whole sequence takes about 16 minutes but a one second transmit time has to be set in case the radio that is connected to the explosive has a battery economiser enabled, thus delaying the squelch opening.

With an amplifier of about 5W the troops can hopefully detonate any IEDs with the device before they can get to them and be harmed. There are more sophisticated devices, one such system is known as 'Warlock'. A development of an earlier jamming unit called 'Shortstop', Warlock will jam radio detonators and enemy communications systems.

An airborne system known as 'Compass Call'

can perform a similar function but these are not always readily available. Likewise 'Buckeye' an airborne photographic surveillance system is efficient but not always around when you need it. That's why a relatively unsophisticated system is often found in use. USA troops are also utilising low band f.m. troop radios and Voice over Internet Protocol (VoIP) 'phones on high u.h.f. frequencies.

## Jamming Units

GSM jamming units are also gaining in popularity amongst coalition forces, as Iraq's



GSM900 cellphone system has, of course, been misused in order to set off explosive devices. It's simplicity itself. The mobile handset is wired-up so that when the 'phone is called the voltage applied to the sounder is applied to a detonation circuit – BANG! And with many coalition troops running around in soft

skinned vehicles these IEDs have been successful. Should you happen to find yourself in a convoy in any of these places remember the last and first vehicles in the convoy are more likely to be hit, in that order.

## Radio Regulation Enforcement

Those whose job entails enforcement of radio regulations have their work cut out more and more. A brief scan through the on-line sales sites shows just what they are up against. Apart from hand-held transceivers available for practically every frequency from v.h.f. to light there are h.f. radios galore that operate pretty much anywhere.

One of the latest crazes that the vendors have cottoned onto is that the amateur bands at v.h.f. and u.h.f. seem to be unpoliced. There is a character knocking out a u.h.f. transmitter that's built into a DECT cordless phone.

The idea is that you install one in your target's office or property in order that you can hear his 'phone calls. Like most of these 'telephone line' devices it runs from the 50V d.c. phone line and of course is eminently detectable - and illegal. The sale comprised the cordless phone set containing the transmitter and an Alinco DJ-X3 scanner to pick-up your

neighbour ordering his pizza.

The thing that is particularly interesting is that the gadget transmits on 434.075MHz. Yup, that's in the 70cm amateur band. With the v.h.f. amateur bands being increasingly used by illegal operators it's certainly well worth scanning around the amateur spectrum for this sort of thing.

Now, I like the Alinco DJ-X3 a lot but I wouldn't pay £250 quid for one paired with an illegal, and not very sophisticated, radio bug. It seems that no-one else would either as it didn't attract one single bid on the auction site and I don't believe that it sold.

## Importing Scanners

Some people are importing their scanners from the USA these days. The Uniden Bearcat UBC-246T, that I referred to in February, is a fine little radio but at the time of writing doesn't appear to be available here due to not having received the 'CE' certification required for sales in Europe.

Much of the CE marked gear is so badly made that it shouldn't be allowed to be sold anywhere and I wonder whether the certification is only designed to keep out American goods? Anyway, the UBC-246 is being imported privately by some and they are mighty pleased with it. It has a 'Close Call' feature that tunes the radio to any signal received and it also decodes the CTCSS and DCS tones in use. That's slick.

In time it will no doubt find its way to these shores in marketable numbers. With the exchange rate being favourable to the UK buyer at the moment it may be tempting to buy from a USA dealer. You can be lucky but if the UK Customs decide to open your package the charges that they levy will sour the deal considerably.

A mate of mine coveted an antenna analyser from the US. The dollar price was less than half of the UK cost of the item. He rubbed his hands and 'phoned MFJ, plastic in hand.

Sadly, the UK Customs & Excise took a peek at the parcel. They levied import tax, a handling fee and then VAT on the lot. The total cost amounted to just £40 less than he could have purchased it here.

Now that is a reasonable saving but I don't subscribe to the view that UK dealers rip-off the hobbyist. They have higher taxation, and more rigorous legislation, to which they must adhere, than almost anywhere else in the world.

If we are going to continue to enjoy the choice and service offered by UK dealers, then we should support them. I can honestly say that the service that I have received from all the UK dealers has always been first rate. Having lived in the USA and Canada I can assure you that some of the well known companies there are not as affable as our boys.

Finally, as far as sport is concerned I have no interest, unless you put petrol in it. But for those that do, a correspondent on the Internet reports that he has heard Rugby League referees' radio microphones on frequencies at 820MHz. There are many radio mic w.b.f.m. frequencies between 500 and 900MHz. Wide band f.m. is a mode of which I am guilty of ignoring. I'll have to pay more attention in the future!

# Air Traffic Control?

Part Two

**Ian Doyle looks forward to summer and gives us a glimpse behind the scenes at RIAT. He continues his look at the Air Traffic Control activity in the busy skies above RAF Fairford, The Home of The Royal International Air Tattoo.**

**A**s I mentioned last month, Fairford is seldom used on a regular basis, it has no aircraft actually based there unlike the UK's other USAF bases, RAF Mildenhall and RAF Lakenheath. Fairford actually belongs to the RAF, but is loaned to the USAF who maintain it year round on a care and maintenance basis, in order to have it available at short notice should the need arise!

Actual movements are relatively light even during exercise periods. During the RIAT the increase in movements and tempo is significant and operational authority passes from the USAF to a team of UK based air traffic controllers. This team assumes responsibility for air traffic control both on and around the base. A senior Air Traffic Controller reports to the airfield Operational Director, they are appointed to head the team. The Ops director can normally be seen around the airfield during the show in one of the Ops vehicles callsign 'Merlin'. The temporary transfer of power is no disrespect to our American Cousins, simply an acknowledgement that their British based counterparts, many of whom, have been heavily involved in previous Air Tattoos are simply more familiar with the different operating procedures, which prevail at UK airshows. In 2004, RIAT attracted over 300 aircraft.

By its nature, RIAT is truly International and features movements from the RAF, NATO, a number from the former Soviet Bloc and of course the United States and Canada. One of the more interesting aspects of monitoring RIAT is the varied and interesting variety of callsigns often used. Unlike the civil sector, the military tend to adopt callsigns that may relate to the Air Force in question, a Squadron or Wing or a particular mission. In some instances individual pilots even have their own callsign in, *Topgun* style.

## Witness The Arrivals

Such is the popularity of RIAT, that in recent years the organising committee has allowed the public onto the base on the Wednesday, Thursday, Friday before the event and Monday afterwards in order to witness many of the arrivals and departures. A list of movements is normally available for a modest sum that details arrival and departure times with callsigns, unit, type of aircraft and other information.

In some quarters, the arrival days might best be described as somewhat relaxed, strung out as they are normally over three days. Although Thursday is normally the busiest day, with Friday being used for practice. This is in stark contrast to departure day, Monday, when seemingly everyone wants to get off the

airfield at the earliest possible opportunity.

Fortunately, over 10% of total movements at RIAT belong to the USAF who have always supported the airshow well over the years. These arrivals are relatively straightforward with aircraft originating from bases in USA, normally exiting via Shanwick 'Oceanic' airspace, along various Entry/Exit points adjoining London, Scottish and Shannon Airspace. Exact entry points into the UK will obviously depend on the flight routing taken over the Atlantic and this in turn will depend largely on the Jetstream conditions.

Following hand-off to LACC or London Mil, subsequent vectors will allow the aircraft to fly either along or outside the UK civil airways system as directed.

It is possible for an arrival to be given a more direct routing straight to Fairford, however this will depend on traffic flows around the UK and the type of radio equipment carried on the various aircraft. Most military aircraft are equipped with both v.h.f. and u.h.f. radios, especially the larger transport types. However, about 5% do not carry the v.h.f. radios needed to cover the civil airband frequencies, so this will also have a bearing on the routing that is given by the controlling authorities. As a general rule aircraft on the civil airways system will be handled by LACC, aircraft outside the airways system come under the control of London Mil West or rather as it's now called, Swanwick Mil.

## Busiest Routings

One of the busiest routings will see aircraft entering UK airspace over Strumble Head (STU) Near Fishguard, West Wales, descending along the Upper Air Route (UL9) under civil airways jurisdiction direct to Fairford. As the aircraft approaches the base from the West it will leave the airway in the decent with a hand-off from LACC to London Mil West (Swanwick). Within approximately 40km of Fairford, control will pass to Brize Radar who will co-ordinate final radar vectors into the local landing pattern.

Aircraft arriving from bases, which are located in the more Southerly States of the USA, might well arrive over another UK entry point Lands End (LND), after an initial call to the civil sector on passing (LND) arriving aircraft may be handed to the military who will then vector them direct onto a military airway system known as a TACAN route, TR1 is a direct track from Lands End (LND) to Yeovilton, Somerset (VLN) aircraft are then cleared in the descent to an area to the South of the airfield with handoff onto Brize Norton (BZN).

There are an approximate mix of six civil and one military TACAN route that potentially could be used, for aircraft arriving from the South West, in order to track all these routes a good professional UK Airways chart is essential. In my view, Aerad charts are mandatory for monitoring flights in the UK, they can be obtained from the SWM Book Store, see page 41 of this issue. The charts required are those produced by 1 AIDU Northolt, for the South *UK(L)1 En Route Low Altitude, Southern Region* and *UK(H)2 En Route High Altitude, British Isles*. As an aside, the organisation producing the charts has a work force of 125 service and civilian personnel, the unit is responsible to the Ministry of Defence (Assistant Chief of the Air Staff) for the publications and distribution of all permanent, unclassified information concerning any aeronautical facility, service, procedure or hazard required by UK personnel directly concerned with the operation and safety of aircraft.

On the Mil Airway charts the civil way-points along the airways are marked with bold black lines interconnecting the various beacons. The military

**"It's a 'RIAT' in the busy skies above RAF Fairford."**

## Primary Frequencies predominantly used by aircraft arriving from the West

### London Mil West /Swanwick u.h.f.

244.375  
245.1  
245.25  
245.00  
245.175  
245.25  
247.275  
255.925  
261.025  
257. 275  
262.975  
268.975  
270.00  
275.475  
276.025  
283.525  
290.575  
340.25 Lon Mil

### London Mil West /Swanwick v.h.f.

126.25  
128.7  
133.3  
133.9  
135.15 Lon Mil

### LACC Brecon, Bristol, Lands End Sector West

129.375  
133.6  
134.75 LACC  
126.075  
132.95 LACC

■ Royal Navy Sea Harrier  
Pic Robert Kysela.



■ RAF Tornado F3 Pic  
Paul Rainsford.



TACAN routes however are marked rather more faintly as a number of adjoining letter 'T's lying horizontal in the following pattern —] —] —] —].

In addition to these maps of the sky a good frequency and callsign guide are pre-requisites to good listening. In this regard *Airwaves 2005* and *Callsign 2005* are simply a must when it comes to military aircraft listening. Both guides are also available from the SWM Book Store .

## Assumes Control

Once Brize Radar assumes control, the aircraft are held then queued for landing in a similar fashion to their civilian colleagues approaching a major civil airports such as Manchester or Heathrow. But aircraft type can vary, the local Brize Controllers can be handling up to 30 aircraft at one time. These may consist of a mixture of fast, highly agile fighters, to large heavy tankers, transports and bombers, interspersed of course with the odd national aerobatic team, possibly consisting of up to 10 aircraft in a tight but loose formation. It must also be borne in mind, that many pilots although briefed in advance may not be quite familiar with both the local terrain and the Fairford landing procedures, for many it will be the first time that they have approached and landed at Fairford. At this point one can start to see the professionalism that needs to be employed in order to safely navigate movements in and out of the base.



■ Russian-built MI-8 (MI 17) transportation and Multi-Mission Helicopter.

It must also be remembered that UK airshow restrictions are quite naturally severe, with safety being paramount, this normally means that airshow participants who are taking place in the actual flying display will be required to practice and become intimately familiar with their surroundings prior to the show itself. These ongoing movements in and out of the base must also be scheduled with aircraft that may still be arriving, this is particularly so on the Friday as the odd stragglers arrive.

To be concluded...

**"Arguably, The Greatest Show On Earth."**

## London Control/Military

London Military West moved into the civil ATC Operations room at the Swanwick London Area Control Centre (LACC), on 12 May 2005. London Military East will remain at West Drayton for several more years yet, no date for the final move has been set but it may be late 2007 or early 2008. The London Terminal Control Centre (LTCC), now plans to move to the LACC now in September 2007. Once the LTCC moves to Swanwick the civilian West Drayton site will be closed totally, leaving just London Military East.

Connected with the move of London Military West, there has been a minor restructuring of the military airspace. Some frequencies have been moved from London Military West to coming under the control of London Military LJAO (the London Joint Area Organisation), which is already located at Swanwick. The LJAO Sectors are a co-ordinated joint civil and military *en-route* service that provides Air Traffic services through the busy UK airways structure from 54.30° North down to the Southern UK FIR Boundary. (54.30° North is a line running East/West across the UK almost crossing the airfield at Durham Tees Valley airport, (formally Teeside).

These frequencies are all designated as Initial Contact Frequencies (ICF) for each of the new areas. There was no mention in the changes of the following LJAO frequencies 233.8, 291.075 and 299.8, all LJAO Southeast, there was also no mention of the LJAO North frequency, 264.825. As they were not listed as deleted, I have assumed that they are still in use. This has hopefully been borne out by the fact that 233.8 has been reported since the changes, plus I have heard the Swanwick Central Secondary on 270.0 after the changes took place. Unfortunately, I have had limited time to monitor these unlisted frequencies before this column was due at the Editorial Offices so, I will tidy up any loose ends next month and if possible include a map of the redefined areas.

The callsign for the former London Military West will now be Swanwick Mil and the callsign for London Military East will be London Mil. Judging by the traffic I have monitored today, it will take a little while for the pilots to get used to calling Swanwick and not London! The new listing for Swanwick Military frequencies LJAO is (hopefully) as shown in **Table 1**.

Whilst on the subject of London Military it

was interesting to hear 245.0 a few days ago. This is a rarely reported frequency which operates as a standby for London Mil/Swanwick and has also been reported in the past acting as a Special Tasks Cell.

## RIAT 2005 & The C-141C

By mid-May the aircraft participation list for RIAT 2005 at Fairford was already starting to look fairly healthy but even at this relatively early stage a couple items had appeared and then been deleted from the list, A US Navy E-2 Hawkeye for example. (For a participants listing go to

[www.airtattoo.com/AirTattoo/showcontent.asp](http://www.airtattoo.com/AirTattoo/showcontent.asp) and click on Aircraft Participation.

Following on from last months comments about the C-141 Starlifter, it was interesting to see that the 'Hanoi Taxi' has been included on the RIAT list. This historic Starlifter, (66-0177 now a C-141C), was so named as it was the first aircraft to start transporting USA prisoners of war out of Hanoi in Operation Homecoming on 12 February 1973.

The aircraft is to be retired from service on the 33rd anniversary of the start of the Hanoi airlift on the 12 February 2006. It is to make the very short journey across the airfield from its current base to be put on display at the United States Air Force Museum at Wright Patterson Air Force Base. The aircraft has been given an historic paint scheme in the once familiar white and grey that it wore when it flew with the 63rd Airlift Wing in 1973. I assume that it will retain this scheme when visiting Fairford. It's strange how times change, a few years back a C-141 on the airshow listing would not have warranted a second thought, now it will be a nostalgic trip down memory lane!

Listed in **Table 2** is our annual review of the frequencies in use at Fairford included those allocated specifically for the Royal International Air Tattoo.

## Scottish Control Changes

Following on from the change to the Southwest sector earlier in the year when the frequency 130.975 was added to the sector, further changes have now taken place. 129.225, which was the Dean Cross South frequency is the new frequency for the Moray Sector. The old Moray Sector frequency, 133.875 is withdrawn. 126.25, which was a Scottish spare frequency is also withdrawn. A new frequency 135.525 has been allocated to the Dean Cross South Sector. One *SWM*

reader has told me that he believes that the Southwest Sector has been renamed the Rathlin Sector, (presumably after Rathlin Island, which is off the Northeast coast of Northern Ireland). So far, I can find no official confirmation of this name change, can anyone help? The current Scottish Control frequencies are listed in **Table 3**.

## METMAN

One callsign that was once again heard in our skies during May 2005 was METMAN. Previously used by a Hercules W.2 (XV208), which was flown by the Meteorological Research Flight (MRF), operating out of Boscombe Down. This Hercules was withdrawn from use some time ago and was sold to the Royal Netherlands Air Force in the Autumn of 2004. The MRF has now been reborn under a new guise and operates a BAE 146-301 (G-LUXE) which is described as a Large Atmospheric Research Aircraft. It is now under the control of the FAAM, (Facility for Airborne Atmospheric Measurements), the FAAM is a joint collaboration between The Meteorological Office and the Natural Environment Research Council. The aircraft is owned by BAE Systems and is operated by Directflight out of Cranfield.

## Heathrow SVFR

Back in the May issue I rather belatedly mentioned the change to the Heathrow Special VFR frequency to 125.625MHz. The old frequency 119.9 has now been reported by two *SWM* readers as back in use but in not quite such a high profile operation. It appears that it is now being used for Gliding operations up on the Dunstable Downs West of Luton. With thanks to **Jim** from Bedford and former *SWM* columnist **Graham T**.

## Offset Frequencies

**Brian P** has E-mailed me with a question as follows. "I was given a scanner at Christmas and have become an avid airband listener but I do not understand how offset frequencies work, can you explain?". This is a subject that I've not touched on for three or four years, but with the first UK 8.33kHz spaced frequency now in use, it looks like good timing to answer this relevant question.

The basic principal of offset frequencies is to allow the same frequency to be broadcast from more than one transmitter site giving a greater area of radio coverage than for a single frequency. The usual occurrences of this being within Area Radar, (*en-route*), such as London Control or London Military. It is always essential

to have a guard area around each frequency so that it does not bleed into adjacent channels, consequently, modern 25kHz frequencies are effectively cut into three segments.

Airfield frequencies such as Gatwick Tower on 124.225 are centred on that frequency and do not use offsets, consequently they have a natural guard area either side. En route frequencies such as London Control on 129.1 (Lakes Sector), is broadcast from the transmitters at Preston with a plus 5kHz offset and from Kelsall with a minus 5kHz offset, (offsets are usually  $\pm 5$  or 7.5kHz). This means that as long as the filters in the transmitter are set accordingly then the same frequency can be broadcast simultaneously from the two transmitters without them interfering with each other.

The receiver bandwidth in the aircraft, (or your radio), will be a wider setting and consequently will allow reception of either transmission without differentiating between either offset. If you have the facility on your radio to alter the filtering, (a.m. narrow, a.m. wide, etc), you could tune in to a local *en-route* transmitter site, (if available), and switch between filters and tune up and down to see the effect of the offset frequencies.

The system works fine as long as frequency allocation is carefully planned. In a perfect world, (which of course, it isn't), each allocation will alternate between airfield and *en-route* frequencies, the centred airfield frequency providing automatic guarding between the two. Two airfield frequencies next to each other is also not a problem with a bigger guarded area. But in theory you cannot allocate two *on-route* frequencies next to each other. If this were to happen the lower and upper offset of each frequency would cause interference.

I am sure that this highlights to readers the potential problems of introducing 8.33kHz spacing with the reduced bandwidth and the need for great care needed with frequency allocation. The first UK 8.33kHz spaced frequency, London Control on 132.84 has no allocations close to it, the closest lower frequency is Scottish Control on 132.725 and 132.9 a UK Airshow common frequency is the nearest frequency above it. So no problems with the guard area in the UK. But it is interesting to note that in France another 8.33kHz frequency country, 132.83 has been allocated to Brest Control, Sector ZU which is one of its Northeast Sectors, just 10kHz away! If this Brest frequency was broadcast from two transmitters with a plus and minus 5kHz offset then the problems would begin. I haven't heard 132.83 in use for a while so perhaps the conflict has already occurred!



■ Not the 'Hanoi Taxi' Starlifter but another unusual variant, Starlifter NC-141A 61-2777 seen on the ramp at Edwards AFB in 1994.

**Table 1: Swanwick Military Frequencies (LJAO)**

128.7	West ICF (Ex London Military West)
133.9	Central ICF
135.15	Southwest ICF (Ex London Military West)
127.45	Northwest ICF
233.8	Southeast
245.175	West ICF (Ex London Military West)
245.25	Northwest/Special Tasks
251.225	Southeast ICF
254.275	Northwest ICF
264.825	North/Special Tasks
270.0	Central Secondary
275.35	Central ICF
275.475	Southwest ICF (Ex London Military West)
291.075	Southeast/TBC
299.8	Southeast/TBC

**Table 2: Fairford RIAT Frequencies**

Approach	123.55	RIAT 2002 - 2004
Approach	124.275	Brize Norton Radar
Approach	127.25	Brize Norton Radar
Approach	134.55	RIAT 2004
Approach	311.825	Brize Norton Radar
Approach	342.45	Brize Norton Radar
Delivery	124.55	RIAT 2003 & 2004 Monday Departures
Ground	119.15	
Ground	259.975	
Metro	257.75	Weather Information
Operations	139.90	Dragon Mobile SOF/U-2
Operations	240.225	Dragon Mobile SOF/U-2
Operations	249.75	Fairford Ops
Operations	249.975	Fortress Control
Operations	379.475	Dragon Ops/U-2
Radar	119.0	Brize Norton Radar
Radar	277.35	Brize Norton Radar
Radar	376.625	Brize Norton Radar
Tower	119.15	v.h.f. Primary
Tower	120.375	RIAT 2004
Tower	128.975	RIAT 2002 & 2003
Tower	126.225	RIAT 2004 Standby
Tower	337.575	u.h.f. Primary

**Table 3: Scottish Control (EGPX)**

119.875	Flight Information Service/FIS
121.325	Humber Sector
123.775	Antrim Sector
124.5	Tay Sector
124.825	TMA/Galloway Sector
125.675	Southwest Sector Primary (Rathlin)
126.3	TMA/Talla Sector
126.925	Montrose Sector
127.275	West Coast Sector
129.225	Moray Sector
130.975	Southwest Sector Secondary (Rathlin)
132.725	Central Sector
133.675	Hebrides Sector
134.775	Tyne Sector
135.525	Dean Cross South Sector
135.85	Dean Cross North Sector (TMA Also)

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\*DSP Noise & notch filters (Opt)  
\*Super HF performance  
\*Automatic Tape recorder option



**£489 C**

## Sony Receivers

### SONY ICF-SW-7600

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



**£119 B**

## Mizuho Active Loop Antenna

### UZ-77 Ultra Loop

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



**£89.95 B**

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

## Global Receiver ATU

### GLOBAL AT-2000

\*150kHz - 30MHz  
\*Low pass filter  
\*SO-239 socket  
\*Size: 150 x 67 x 145mm  
\*Weight 300g



Get the best from your receiver, match your antenna to the antenna socket impedance of the receiver. The AT-2000 has a 'Q' switch which adjusts the front-end selectivity to match the band and QRM conditions. As the unit is passive, no power supply is necessary. Matches long wires, and coax systems.

**£89.95 B**

## Power Stations

### FD 7021

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

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### CH-1-150

Power station with built-in 150W inverter.

\*12V out up to 15A \*230V out up to 150W \*200K candle power spot \*Dual fluorescent lantern \*Cigar socket \*Blinking warning light \*Cartridge fuse \*AC wall charger.



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## Watson Dipole Antenna

### WDP-30

\*1 - 30MHz  
\*8.5m long  
\*10m feeder with PL259's  
\*Impedance 50 Ohms  
\*Balanced, Low noise



Especially for use with receivers. Comes with balun, wire, insulators and 10m feeder with PL259's for Balun to receiver connection. Easy to put up, either straight or inverted V. Ideal for small gardens.

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## Optoelectronics Frequency Counters

### X-SWEEPER

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\*FM Analogue  
\*64x128 graphical display  
\*2000 Memories  
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\*Pwr: 8xAA alkaline or AC adaptor (optional) 12V DC 350mA  
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**£1399.95 C**

XPLORER **£659.95 B**

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Digital Frequency Recorder, 60MHz-2.6GHz

SCOUT **£299.95 B**

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CUB **£129.95 B**

Mini Counter, 1MHz-2.8GHz, LCD display

## Watson Frequency Counters

### WATSON FC-130

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\*Internal ni-cad battery  
\*Whip Antenna \*AC Charger



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HUNTER **£49.95 B**

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SUPER HUNTER **£149.95 B**

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## bhi DSP Equipment

### bhi NES 10-2 MKII

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NEIM-1031 **£129.95 B**

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## Watson Audio Equipment

### WATSON SP-2B

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\*Includes patch lead  
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\*Weight 0.85kg **£29.95 B**



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NEW

**£179.95 B**

## Watson Handheld Antennas



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WSMA-450 **£12.95 A**

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WDB-32 **£12.95 A**

BNC 2m/0cm Rubber Duck 4.5cm long

WSMA-7000 **£14.95 A**

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WHX-7000 **£14.95 A**

BNC 2m/70cm Rubber Duck 20cm long

WHSM-270 **£19.95 A**

SMA 2m/70cm Rubber Duck 40cm long

WHXX-270 **£19.95 A**

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SMA Reg/Gain 25-1900MHz 21cm long

W-801 **£12.95 A**

BNC Reg/Gain 25-1900MHz 21cm long

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World Radio History



# COMPUTERS & RADIO

## PART 3

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**Jack Weber continues his in-depth look at the way in which computers can enhance your radio set-up. This month Jack looks at various programs that allow the capture, manipulation and storage of received audio.**

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So far, our exploration of how computers and radio can work together has concentrated on the r.f. side of things - using spectrum analysers to extract detailed information from carrier signals. There is still a great deal to pursue in this area and I'll come back to it later, but this month I thought we'd look at the audio end of reception.

In a sense, everything that's been covered so far has been to do with audio because the spectrum analysers that we've been using can't process r.f. directly and need to have it converted down to within the audio spectrum. Even so, programs like *SpecLab* and *Spectran* were primarily designed to provide information about radio signals, not audio signals. Now we'll turn to programs that were specifically designed for audio.

There is a vast range of audio software going all the way from completely free to painfully expensive. Fortunately, the needs of radio monitoring are fairly simple compared to multi-track music recording, which means you can achieve a great deal at the bottom end of the price range. Also this is an area where Macintosh users benefit. The Mac has excellent audio facilities and there is plenty of good software for it.

---

### Enormous Benefits

If you've happily been using a cassette recorder or MiniDisc with your receiver you may wonder why you'd want to switch to a computer. Well, the benefits are enormous. Not only can you record hours, even days, of audio without ever having to change tapes or discs, but you can then see a visual timeline of that whole recording and jump straight to any interesting looking spot (see **Fig. 1**). No more lengthy spooling and then hoping you'll hit the right area. You can schedule recordings by time or activate them automatically whenever your receiver hears something. You can time stamp recordings to display the actual time of recording during playback. Computers also offer unequalled facilities for processing sound to help you extract the last bit of meaning from a poor signal. The ability to slow down speech without altering its pitch or to apply very precise and steep-sided digital filters is not something you'll give up once you've tried it.

Before you can do any of that, you'll need to get the audio into the computer and change it into digital form. Most PCs now come with a soundcard built-in. If yours doesn't have one, then they're not expensive to buy either as expansion cards to go inside or as external boxes that plug into a Universal Serial Bus (USB) port. If possible, use the Record or Aux output from the receiver, rather than the Headphone or Ext LS outputs, and connect to the Line-In socket of the soundcard. Laptops often only provide a Microphone input, which is more sensitive and can easily overload, so you may need to turn down the levels to get usable results. With most Macs, there's no need for a soundcard, just plug into the Audio In socket. Bear in mind that line-level inputs on Macs and PCs are stereo, but Microphone inputs on laptop PCs are normally mono, so you'll need different plugs or leads.

If any of this causes problems, an easy alternative is to use an audio-USB adapter. Every new computer these days has USB sockets and you can get very good results even with a simple adapter like the Griffin iMic. It costs about £29, needs no power supply and works equally well under *Windows XP* or *Mac OS X* without any need for drivers. It's also a good solution for laptops that have difficult Mic inputs.

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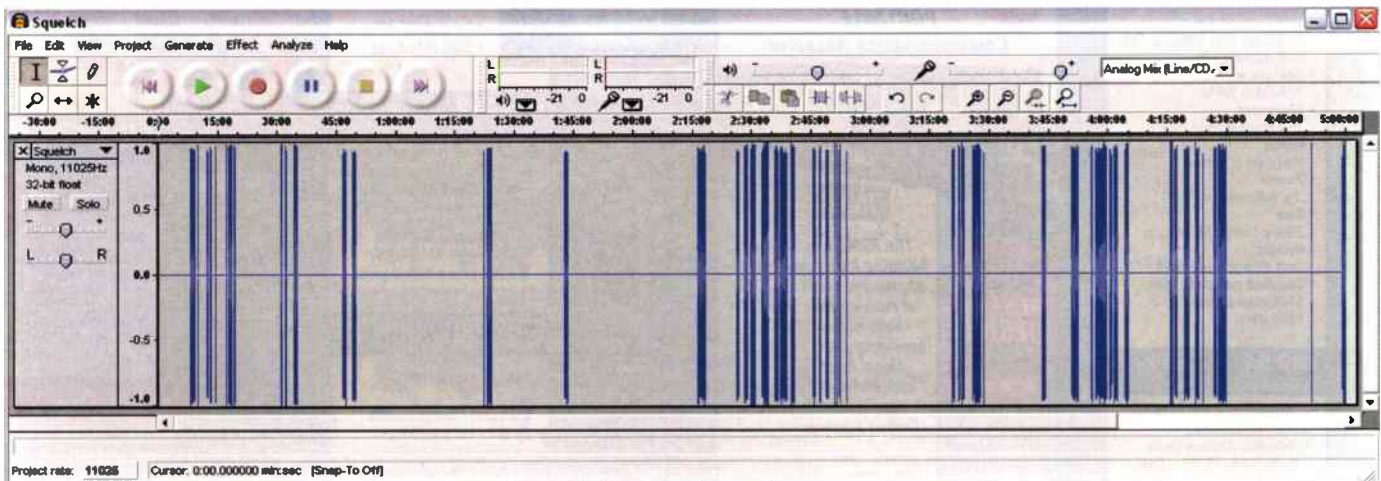
### Digital Bitstream

Having got it into the machine, the incoming audio now needs to be digitised. This often causes confusion so let's turn back to basics for a moment. Any audio signal can be sampled to produce a digital bitstream which can then be recorded, amplified, processed and edited entirely by digital means. At a basic level, the quality of this digital representation depends on two parameters - the sampling rate and the bit depth.

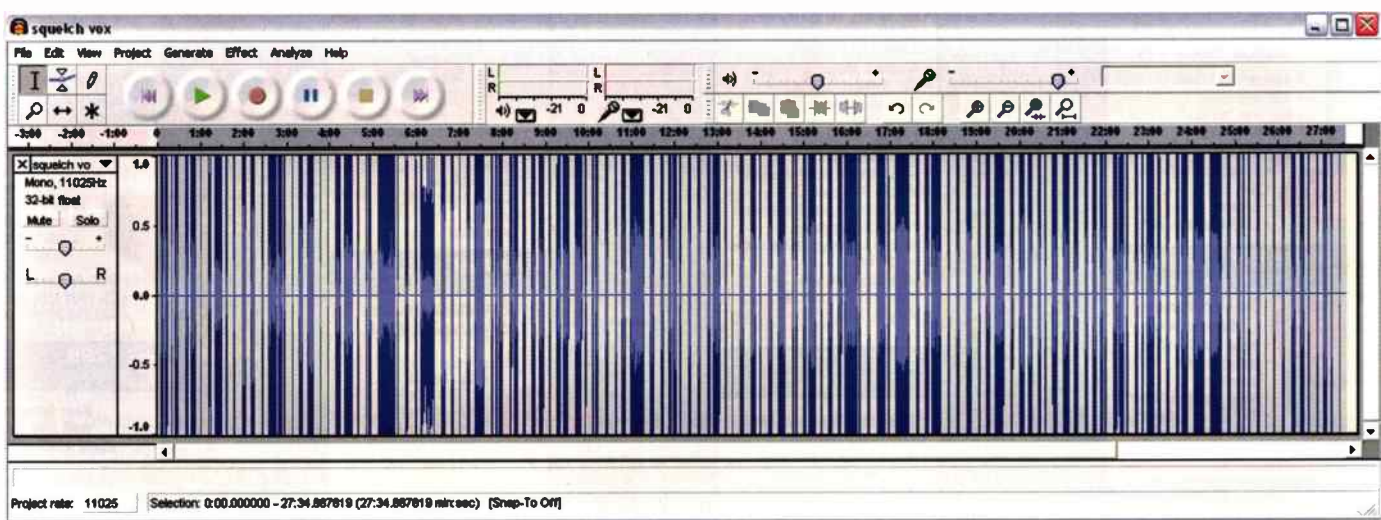
The sampling rate determines the overall bandwidth because you need to sample at no less than twice the highest audio frequency of interest. For music recording, sampling is normally done at a minimum of 44.1kHz and sometimes as much as 192kHz. In radio monitoring, the need for good i.f. selectivity severely narrows the recoverable audio bandwidth so we can safely sample at a much lower rate. Even at its widest i.f. setting no communications receiver will reproduce much above 9kHz. For s.s.b. the bandwidth may be just 2 or 3kHz, and less than 1kHz for c.w. Cutting back the sampling rate means that you can get smaller files without compromising the results.

The bit depth determines how many discrete levels of amplitude can be measured at every sample. For good quality music recording the depth is generally 24-bits or more. For radio monitoring you could safely use 16 or even 8-bits, but don't be tempted to go lower than you have to. When you're listening to marginal signals, they need all the help they can get. For most general short wave listening a rate of 11.025kHz at 16-bits will give excellent results. You could move up to 22.05kHz at 16-bits for good a.m. signals





● **Fig. 1:** This is the timeline of a five hour recording on a squelched airband channel with only sporadic activity. Being able to see all the blocks of modulation makes it easy to skip the silences in between. All you do is click at the point you want to hear and press Play. The application in use here is Audacity.



● **Fig. 2:** This is the same channel as in Fig. 1 recorded for five hours the following day, this time using a VOX option to eliminate all gaps over 30 second in duration. The complete recording now lasts just under 28 minutes, but still has easily visible gaps to break up separate periods of activity.

or for f.m. DXing, and down to 5.01kHz at 8-bits for c.w. You can often get away with less, but hard disks are cheap these days and a few Megabytes (MB) either way won't make much difference, whereas the quality difference may well do.

Sometimes you'll see recording parameters quoted as a bit rate. This is simply the product of sampling rate and bit depth. For example, 11,025 samples per second with 16-bits per sample gives a bitrate of 176,400 bits per second or 176.4kbps. At this rate, one hour of audio will fill just over 79MB of your hard disk, and a full 24 hours will take up about 1.9GB. With most desktop PCs now having at least 40GB hard disks, you could go on a fortnight's holiday and leave the recorder monitoring one channel throughout. Of course, finding time to listen to the results could be a problem.

## Numerous Formats

If these file sizes are too much for your hard disk, there are numerous compression formats, such as MP3, AAC and others that will squeeze the audio down dramatically. Many listeners use them for all recordings, but I would avoid compression unless necessary. Most of these compression

algorithms have been designed to give their best results with well recorded music. They weren't intended for the sort of noisy signals that emerge from a DX receiver. Often they'll work well, but I've also heard them degrade noisy signals quite noticeably.

Another good reason for not using compression is that if you're going to edit or process the sound later you may have to decompress the recording to make the changes, and then re-compress. That really does the sound no good at all. Far better to make an uncompressed master recording and then only compress the final version if you decide to keep it long term.

On *Windows* PCs the best format for initial recording is the PCM WAV file. On a Mac it's AIFF. Both of these are basic uncompressed formats that should retain everything that came out of the receiver. They're also compatible with just about every piece of audio software.

The range of applications available for recording audio onto a computer's hard disk is enormous. Most of these are aimed at music recording and many of them provide facilities, such as MIDI or multi-track recording, that aren't relevant here. Hardly any were developed with radio monitoring specifically in mind, but there are a few that stand out as better suited to radio tasks.

Pretty much any recording software will provide equally

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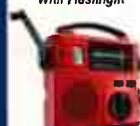


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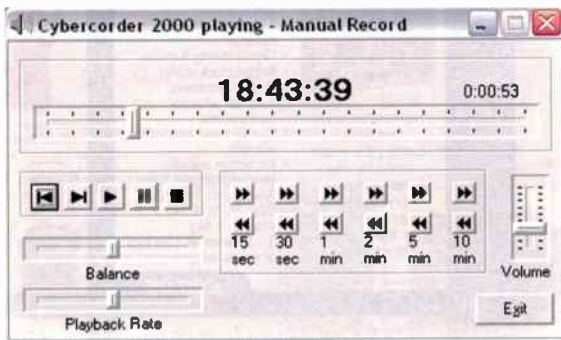


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- **Fig. 3: Cybercorder 2000** is one of the few applications to offer timestamping, which allows it to play back a recording and display the original time corresponding to each moment in the recording.



multiple times. Some programs don't offer this at all, and some only allow one on and off setting. The best ones let you set as many recording times as you like, with the option of daily or weekly repeats and the ability to switch off any event temporarily without having to re-enter its details again later.

VOX recording lets you save disk space by keeping the recorder on standby and then starting to record as soon as audio appears. When the audio stops again, it will stop recording. You could use this feature as an alternative to scheduling if your receiver has its own timer. More importantly, though, it can be very useful if the receiver is squelched and sitting on a channel with only intermittent activity on it, as in Fig. 2.

Pre-record is useful if you like to stop and start the recorder manually whenever you hear something interesting. What it does is to continually record into a buffer of about 10 - 30 seconds duration. When you press Start, the buffer ensures that you don't lose the bit of audio that prompted you to begin recording.

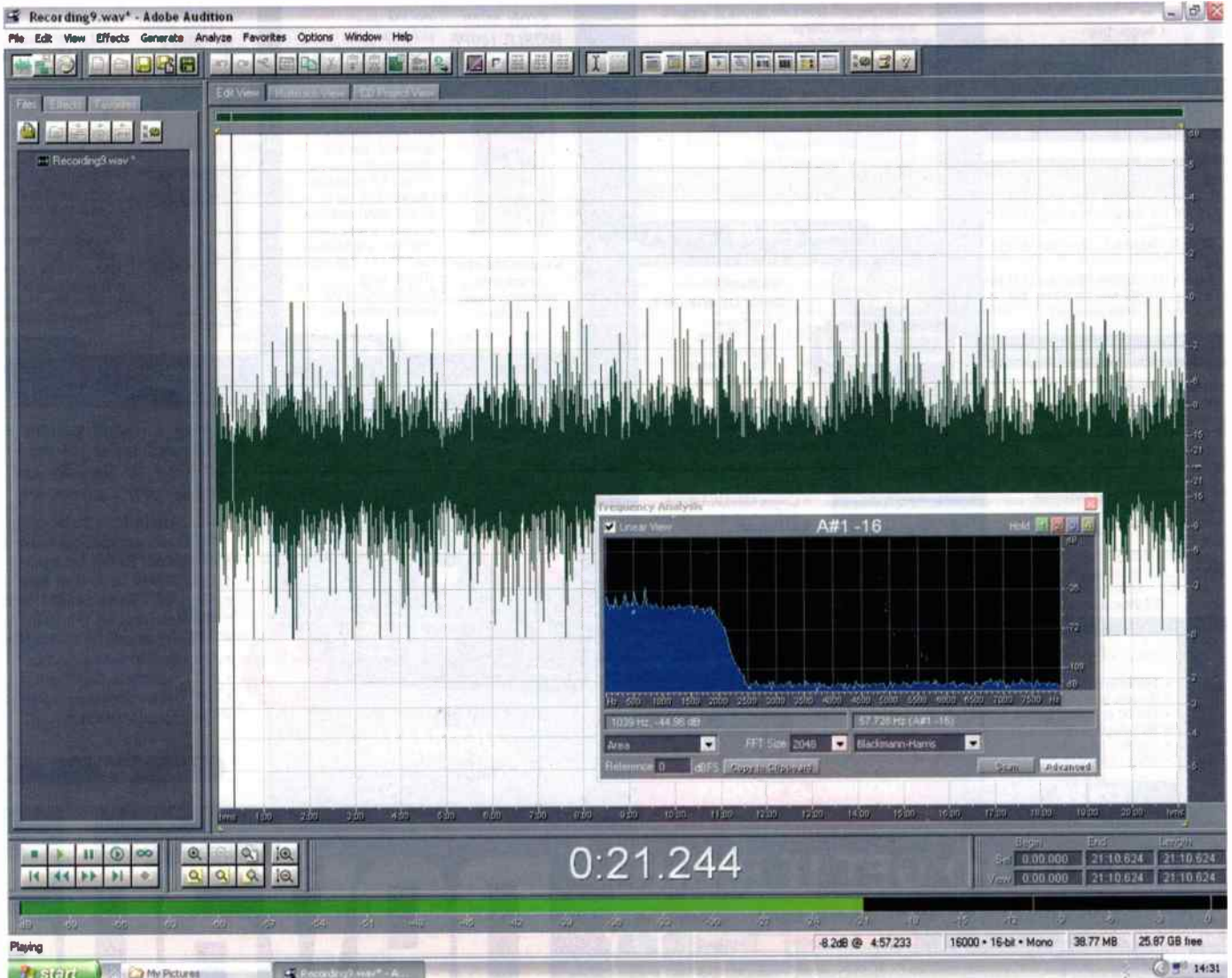
Time-stamping is always useful because it allows you to play back a recording and see instantly at what time a particular signal or ID appeared (assuming, of course, that your computer's internal clock was correctly set). Many audio recording programs can put the time and date of the

- **Fig. 4: Adobe Audition's editing view** with an inset spectrum display of the recording. You can clearly see the receiver's i.f. filter limiting the bandwidth at 2kHz and also some interfering tones.

good audio quality so that isn't really a factor, it's the little extras that make the difference. There are four features that I'd look for in particular - scheduling, automatic sound activation (VOX operation), pre-recording and time-stamping. You might not need them all, but each of them is significant for different types of radio use.

### Scheduling

Scheduling is important because for unattended recordings you'll want a program that can turn itself on and off



recording into the file name, but within the recording all you'll see displayed is the elapsed time. This means that you're constantly having to add and subtract hours, minutes and seconds in order to calculate what the clock time was. Also, for broadcast listening, it lets you quickly find those top-of-the-hour times when an identification is most likely to occur.

With those features in mind, the dozens of recorder applications that are available get cut down to a handful. I don't know of any program that does everything just right, but here are some that come close. On Windows PCs, I'd look first at *Cybercorder 2000* and *Total Recorder Pro*. Both have flexible scheduling facilities and a clear interface. *Cybercorder 2000* offers time-stamping, but not VOX or pre-record, see Fig. 3. *Total Recorder Pro* can't do time-stamping, and its VOX facilities are a bit awkward, but it does have pre-record and the ability to automatically break long recordings into separate files. Many applications can't handle files above 2GB in size, so if you plan to record continuously for many hours or days then this could be useful. A third option is *RecAll*. At one time it was the only program to offer time-stamping and became popular for that, but with no scheduling or pre-record, and a rather basic interface, it's now a less obvious choice.

One of the few programs that's specifically aimed at radio users is *Xcorder*. Its VOX facilities are very flexible, but scheduling is limited to just one timer event and there is no continuous timestamping or pre-record. However, it works well and it's free, making it the cheapest option here.

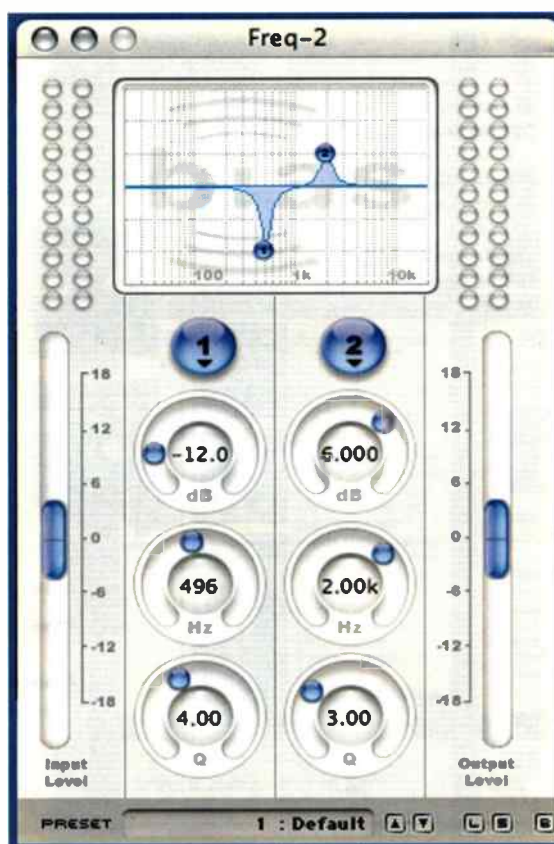
For the Mac I would suggest either *Audio Hijack Pro* or *Sound Studio*. Both programs come with good scheduling features as well as VOX operation. Unfortunately, I don't know of any Mac-based recorder that provides time-stamping, so that isn't an option.

## Extremely Useful

Which recorder is best for you will depend on exactly what you want to use it for. At the higher frequencies where squelch becomes effective, VOX can be extremely useful, but it's of little value lower down. Scheduling on the other hand is of more use on h.f. and below, but may be less important with the unpredictable operation of many v.h.f. stations. I'd always rate time-stamping highly, but some people happily do without it. Given the low prices of these recorders and the fact that they can all be downloaded and tried out before you have to pay, it's no great problem to give them all a go and see which ones you like. And it won't break the bank even if you end up buying two to cover all eventualities.

All of these programs can record in either stereo or mono. Of course, mono takes up only half the disk space so it's more economical, but bear in mind that you can use a stereo recorder with two receivers simultaneously. All you need is a splitter cable that links a stereo mini-jack to two mono jack sockets or phono sockets which can then connect to the audio output cables from the two receivers. Maplin sell some that are already made up if you don't fancy assembling your own.

Once you've made a recording, any of the above programs will also let you play it back, but to make the most of your PC's potential you'll need something more specialised. For a start, it's useful to have an editing program so that you can extract any short segments that you want to keep. Second, you'll often want to tweak the audio to help



● Fig. 5: This is a two-channel parametric equaliser in a VST plugin. It provides a notch or boost at any two frequencies with variable level and Q. To set it you just turn the knobs with the mouse or drag the filters around on the graph.

make it more intelligible. Forget about old-style Tone controls, with computer software you can do all sorts of things that would have been virtually impossible or, at least, impossibly expensive, with analogue electronics.

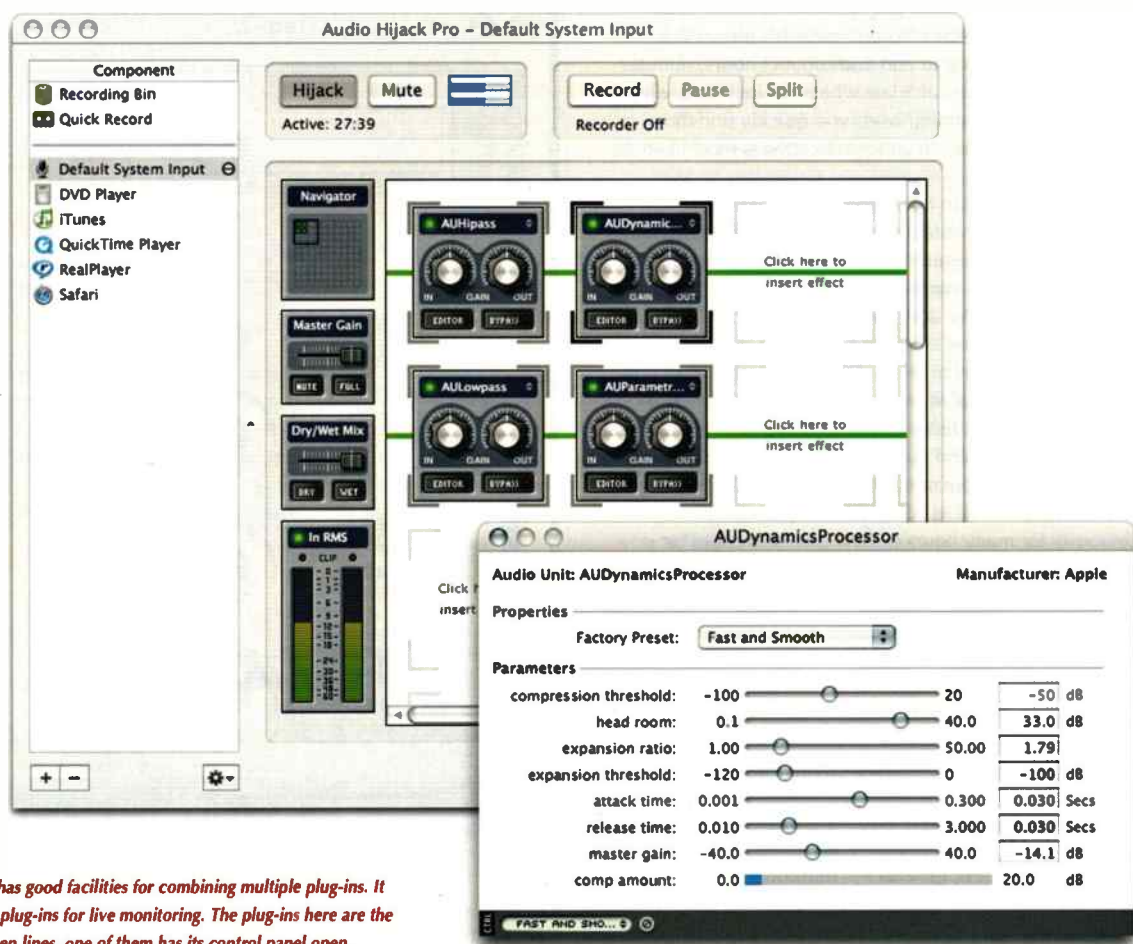
Among the options are parametric filters that can attenuate or boost any frequency with fully adjustable Q for sharp or broad response, compressor-limiters that are useful for cutting back interference spikes, speed changers that are helpful for making speech more intelligible, and normalisers which can proportionately adjust the level of a recording so that the peaks reach a defined limit. With some applications, you could even divide up the audio frequency spectrum, apply different effects to each band and then re-combine them to give the overall result you want.

## First Choice

As a first choice for editing and basic processing, I'd recommend *Audacity* because it's absolutely free and better than some applications that you do have to pay for. It runs on both Windows PCs and Macs and is quite easy to use.

If you need more audio processing power and don't mind paying for it, there are several professional programs that can be extremely useful. To my mind the best of them is *Adobe Audition* (previously known as *Cool Edit Pro*), which runs on Windows PCs - Fig. 4. As well as sophisticated editing abilities, it provides audio spectrum analysers to help you visualise the sound together with a wide range of processing options including noise reduction and a good selection of digital filters. At around £250 it may be hard to justify, but if you want the best, this is it. You can try it out free of charge for 30 days before buying.

A useful audio application on the Mac is *Bias Peak LE*. It's not as powerful (or as expensive) as *Adobe Audition* but



● Fig. 6: Audio Hijack Pro has good facilities for combining multiple plug-ins. It also makes it easy to use plug-ins for live monitoring. The plug-ins here are the four blocks joined by green lines, one of them has its control panel open.

its editing facilities are first rate and you can considerably extend its capabilities with the use of plug-ins. Plug-ins are small programs that perform a single task within the context of the main program. They're very widely used and all the big audio applications are designed to work with them. The main advantage is that you can pick and choose the facilities you want without the whole program becoming bloated by all the features you don't want. Also you're always working within a familiar environment and not having to change applications all the time.

The great majority of plug-ins are intended for producing musical sounds or for creating effects such as reverb, phasing and so on. Obviously these are of no help in our context, but there are also many useful ones that provide such things as filters, graphic equalisers, limiters, compressors, etc.- Fig. 5. Some you have to pay for, but many are entirely free. There are literally thousands of plug-ins to choose from and they're easy to find online, just search for audio plug-ins.

### Various Standards

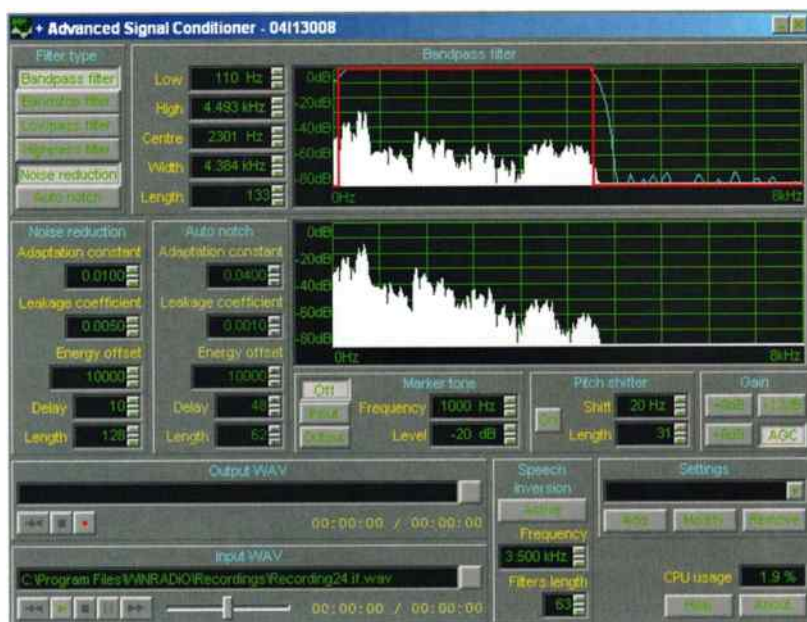
Just as you can't mate a BNC plug with an N-type socket so you need to make sure that the plug-ins you choose are compatible with the software 'socket' provided by the application. There are various standards - Virtual Studio Technology (VST) is the most widely used, but DirectX, Nyquist and others are also common. Apple also has a plug-in type called Audiounit for use with Mac-based

applications, and several Audiounits are included in the Mac operating system. Fortunately, there aren't too many compatibility problems - many plug-ins work equally with Mac and PC applications and also most applications will let you use more than one type of plugin.

Communications receivers, even the most expensive ones, tend to offer very little in the way of audio controls beyond an a.f. gain knob and possibly a primitive tone control. Noise blankers and notch filters, especially those that auto-tune, are worth using, but they won't always provide optimum results and you can often improve the audio by doing further processing in the computer or even by using the computer to do it all. Sometimes, for example, you may need to eliminate two heterodyne whistles - the receiver can't cope with that but it's easily done in a computer. Also, you could quickly set up a shelf filter or a very steep high-pass filter to improve s.s.b. signals, and you'll get much better results than by fiddling with the receiver's controls.

In general, computer audio applications assume that you're taking sound from a previously recorded file on the hard disk because that's usually what's most appropriate for music recording. For radio use you'll often want to apply effects and plugins to live audio and monitor the result directly, perhaps without recording it at all. This shouldn't be a problem as long as you have a full duplex soundcard. Nowadays almost all of them are, but older half-duplex cards are still around. All current and recent Macs have full duplex audio so there shouldn't be any problems there.

The screen grab shown in Fig. 6 shows how several plug-



● **Fig. 7: Audio processing in the WinRADiO Advanced Digital Suite. This integrates various filters and other audio functions into a software defined receiver rather than requiring a separate audio application to be active.**

ins can be combined to provide a completely customised arrangement of filters for live monitoring. The application here is *Audio Hijack Pro* and it's being used with four plug-ins. The two on the left are low and high-pass filters acting as a crossover at 1.6kHz, the low band has a high-Q notch filter applied to remove an 800Hz heterodyne whistle, the high band goes through a compressor that has the effect of reducing hiss and improving intelligibility. If the compressor had been acting on the full audio, it would have made the sound rather boomy, which is why the crossover was set up. Clicking the Dry and Wet buttons lets you compare the pre- and post-processed sound. If the effect is right but too strong, you can also mix between the wet and dry signals to get an intermediate result. *Audio Hijack Pro* costs just \$32 (currently about £17.20) and all the plug-ins used here are free, which shows just how cheaply you can achieve an extraordinary level of performance.

## No Need To Fiddle

Although some plug-ins can appear over-complex, with many controls to adjust, there's no need to fiddle with them every time. Instead you can save a range of settings for each individual plug-in as well as complete plug-in combinations, and then recall them by name from a menu. The other advantage of running all the audio through an arrangement like this is that recording is instantly available at the press of a button - no need to worry if there's enough tape left on the cassette or if you've remembered to switch on the MiniDisc.

A general purpose audio application combined with a good range of plug-ins will tackle most jobs, but specialist tools can be useful at times. One that's worth mentioning is *The Amazing Slow Downer*. This is available for both Windows and Mac OS X and it does just what the name says - it slows down audio (it can also speed it up, but that's less useful) without changing the pitch. This can be very effective for extracting weak voice signals from a noisy background, especially if you're listening out for a call sign or phonetic

letters. At \$40 you may think twice about buying it for very occasional use but, as with most software, you can download a trial version and see if it's the sort of thing you need.

Audio software has developed so rapidly that there's really little point now in using anything else unless you don't have access to a computer. However, the present pattern of relying on applications and plug-ins from the music business hopefully won't continue. Among the trends that I believe will drive receiver development over the coming years are software defined radio. With a move towards graphical interfaces, using i.f. and a.f. spectrum analysers, rather than just knobs and buttons, to control the receiver as well as to display what it's receiving. Then we'll be able to click and drag on the displayed audio spectrum to adjust filters, levels, equalisation and so on.

## Integrated Facilities

One benefit of this will be that we can expect much better audio facilities to become integrated into our receivers. There's no reason, for example, why audio plug-ins couldn't work directly with the audio section of a computer-based receiver rather than needing an intermediate application. And when that happens we can expect many more radio-specific features to become available. My WinRADiO G313 receiver already has optional software built in that provides, among other things: bandpass filters, an audio spectrum analyser, adaptive noise reduction and speech inversion - Fig. 7. I'm sure it won't be long before these sorts of features are the norm rather than the exception. Until that happens, there's a wealth of useful audio software out there that you can use with any receiver.

Jack will be back with more computer essentials for radio enthusiasts in September SWM.

## SOME USEFUL URL'S

- [www.griffintechology.com/products/imic/](http://www.griffintechology.com/products/imic/) - Griffin iMic. It's available from UK computer retailers for about £29.
- <http://skyhawktech.com/index.html> - Cybercorder 2000 for Windows.
- [www.highcriteria.com/productfr\\_trPRO.htm](http://www.highcriteria.com/productfr_trPRO.htm) - Total Recorder Pro for Windows.
- [www.sagebrush.com](http://www.sagebrush.com) - RecAll for Windows.
- [www.softpedia.com/get/Multimedia/Audio/Other-AUDIO-Tools/Xcorder.shtml](http://www.softpedia.com/get/Multimedia/Audio/Other-AUDIO-Tools/Xcorder.shtml) - Xcorder for Windows.
- [www.rogueamoeba.com/udiohijackpro](http://www.rogueamoeba.com/udiohijackpro) - Audio Hijack Pro for Mac.
- [www.feltip.com/products/soundstudio/](http://www.feltip.com/products/soundstudio/) - Sound Studio for Mac.
- <http://audacity.sourceforge.net> - Audacity for Windows and Mac.
- [www.adobe.com/products/audition/main.html](http://www.adobe.com/products/audition/main.html) - Adobe Audition for Windows.
- [www.bias-inc.com/products/peakLe/](http://www.bias-inc.com/products/peakLe/) - Bias Peak LE for Mac.
- [www.ronimusic.com](http://www.ronimusic.com) - Amazing Slow Downer for Windows and Mac.

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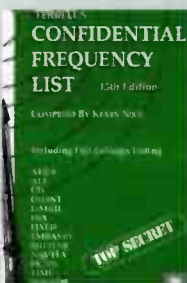
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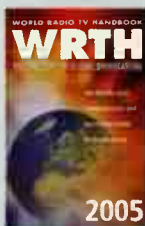
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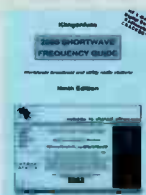


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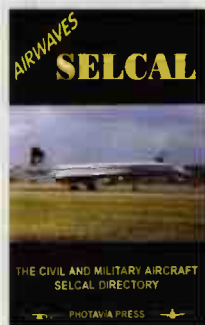
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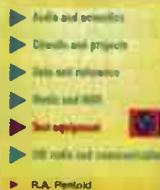
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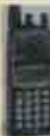
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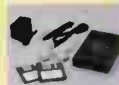
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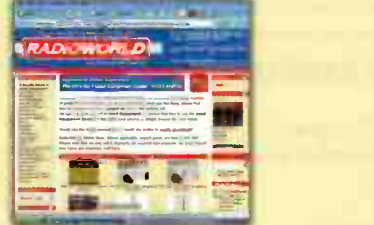
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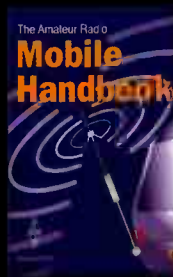


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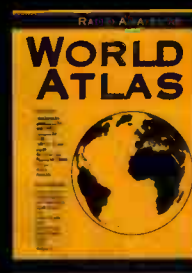


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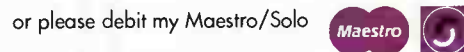
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# DX

## Television

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**A**pril showed signs of a much awaited improvement in long-distance reception when a minor Sporadic-E opening into Italy on the 8th broke the eerie silence, followed by more sustained activity on the 20th and 28th. Unfortunately, activity shot back into hibernation and even with May now in its second week the band remains dead!

### Reception Reports

**Tony Jones** (Basildon) wrote in to say "The first meaningful Sporadic-E opening materialised on 20 April at 1500 with 'In Diretta', an Italian chat show appearing on Channel A from RAI UNO". Over on E4, a Scandinavian channel, possibly Norway, was present airing a topical programme about the Far-East with Vietnamese architecture, narrated by a long-haired blonde lady in her late twenties sitting at a desk then discussing the programme with her colleagues. The signals were strong, with occasional fading, until about 1730.

Hoping that Band I will be awash with signals this summer, Tony's set-up is now quite complex with a selection of receiving antennas, D-100 and D-500 tuners, three video recorders and multi-standard TV receivers.

Initial loggings on the 28th from 0753 by **Peter Barber** (Coventry) include DR-1 (Denmark) Channel E3, HRT (Croatia) E4, Italian stations Tele A E2, TVA A and RAI UNO on Channels A and B. At 0926, an unidentified E2 station was present with a '1' symbol, followed by RTL KLUB (Hungary) R2 and at 1150, two stations were present on E4, one with a large offset which could be separated using the narrow bandwidth setting on his D-100 tuner. NOVA TV (Czech Republic) R2 and Canal Plus (Corsica) L2 surfaced around midday with multiple signals continuing well into the afternoon.

**Peter Barclay** (Sunderland) scanned the band from 1300 and was surprised (and relieved) to find TVE-1 (Spain) E2 with the 'Telediario' news, particularly following the rumours that the outlet had closed. Between 1319 and 1403, an assortment of Central European stations emerged including SF-1 (the Swiss German-language network) on E2 and E3 (Bantiger and Uetliberg transmitters respectively) with a pop music show, TSR-1 (the Swiss French-language network from La Dôle), ARD (Germany) with a wide-screen film on E2 and E4, Canal Plus (France L3) with an encrypted programme and RAI UNO (Italy) on Channel B.

### Tropospheric DX

**George Garden** (Edinburgh) regularly scrutinises the weather forecasts for tropospheric enhancement possibilities and on the 21st a high-pressure system was predicted moving eastwards over Norway and Sweden.

Sure enough, with the antenna pointing towards Norway, the NRK P3 service was identified by RDS on 91.8MHz at around 2055 from the 60kW Bjerkeim transmitter. By 0012 the following day, NRK P3 was heard best on 91.1MHz from the 120kW Bokn outlet. George often finds the reception paths alternate between these two frequencies, with the two transmitters never received simultaneously!

Other Norwegian transmitters identified include Gulen (39kW) on 88.0 and 97.6MHz, Halden (75kW) on 94.1MHz and Greipstad (57.5kW) on 97.0MHz with NRK P3, Bergen (46kW) on 99.0MHz (NRK P3) and Gulen (7.8kW) on 101.4MHz with NRK P4.

TV reception was less dramatic with only very weak pictures from NRK-1 on Channel E6 at 2041 on the 21st but by 0232 on the 22nd, TV2 on Channel E44 supported good colour signals by closedown. Later that day (early evening) Peter Barclay (Sunderland) discovered Denmark (DR E5) and various Dutch stations including Omroep Fryslan on E28.

### Spain Still On-Air

Reports have confirmed that the Spanish Madrid E2 transmitter is still operating despite rumours that it may have closed earlier this year, or was running on reduced power; its switch-off date is now scheduled for September 2005. Madrid may have been switched off temporarily last January to flush out viewers still relying on its broadcasts. This technique may have been used when the Izaña (Tenerife) E3 outlet suddenly went off the air in December 2003 but was later reported operational again. The United Kingdom used similar techniques when digital e.r.p. levels were ramped up as an experiment to establish how far levels could be raised without degrading co-channel analogue broadcasts. The viewer complaint level was used to assess its impact and, more crucially, accurately identify the geographical locations affected.

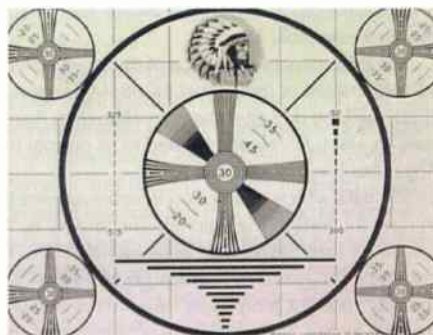
Signal deprivation in Band I has hit hard in the south-west where **Simon Hockenull** (Bristol) is still eagerly waiting for his first Sporadic-E opening. Simon relies on loft antennas fed via an amplifier but during the summer a variable attenuator is necessary to prevent overloading from strong Sporadic-E

signals. **Stephen Michie** (Bristol) insists that the first few months of 2005 were the worst in living memory for Band I reception. By all accounts he is right!

**Brian Manley** (Welling) received excellent strength signals from various Belgian and Dutch transmitters on the 25th. The best Dutch station was NED-3 from Goes on E35 in stereo with full text. The co-sited regional station operated by Omroep Zeeland on E54 was also present.

### Ken Edwards

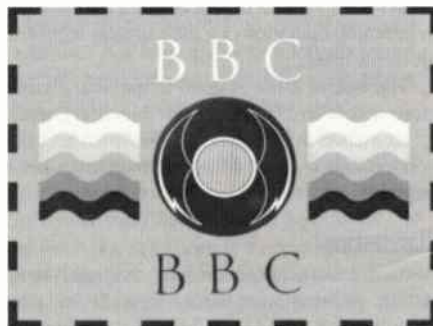
We're sorry to have to report the sad news that veteran DXer **Ken Edwards** (East Sussex) passed away in early May. Ken was particularly active with long-distance TV experiments in the pioneering days of the late 1950s and early 1960s at his Welsh coastal home in Aberystwyth. On one rare occasion he successfully received an Indian Head test card from the USA via Sporadic-E. In his university days, Ken compiled many reports about solar activity and propagation.



■ Fig. 1: The famous RCA Indian Head test card.



■ Fig. 2: An identification caption used many years ago in the USA by WBBM-TV (affiliated to CBS) in Chicago.



■ Fig. 3: This BBC Tuning Signal was first transmitted 50 years ago on 19 August 1955.

### Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to:- **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS**. We can also use off-air pictures stored as JPG files on PC discs, good-quality VHS video and 'low-speed' (x4 maximum) DVD recordings.

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

# LM&S

Long, Medium & Short Wave Bands

● **Martin Peters** 11 Filbert Drive, Reading RG31 5DZ

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Dxers:-

- A Vic Prier, Seaton
- B Rhoderick Illman, Oxted
- C Bernard Curtis, Stalbridge
- D Simon Hockenull, Bristol
- E Mike Casey, Manchester
- F Freddy McGavin, Dublin

**T**hanks to **Bernard Curtis** for his monthly crop of logs. Bernard writes "what with the Bavarian station in Munich going over to DRM on 6.085MHz, not to mention Luxembourg on 6.095MHz and Deutsche Welle on 6.140MHz, the band is becoming one long buzz, end-to-end".

Bernard goes on to decry the demise of the 'BandScan' strand (me too - there's less beer money for yours truly!) and hopes that 'LM&S' is in safe hands. As far as I am aware, Bernard, we can all sleep easy for the foreseeable future...

**Vic Prier** caught the Voice of the Islamic Republic of Iran on 15.080 instead of their usual 15.085MHz (or is it still 15.084?) for a short spell the day after the plan change in April. Ten minutes after tune-in, the transmission flipped to its normal frequency. Engineer's finger trouble, I would say.

Vic asks which country code abbreviations to use when sending in contributions to the column. The answer is, those that we printed last year's June SWM; also to be found in WRTM. There's also a complete list available at [www.geckos-haunt.org/LMS/](http://www.geckos-haunt.org/LMS/) just click on the ITU code list entry to be taken to the details. If you don't have Internet access, then there will be a repeat of the listing in an issue of SWM later this year.

Whilst on the subject, I'm stitching together a list of instructions, which contributors may wish to use as guidance when sending in logs. I'll be sending this out to the regulars in due course. In the meantime, if you're considering submitting your logs to the column for the first time, just write or E-mail me, requesting a copy.

**Simon Hockenull** wrote in with his usual comprehensive listings. He also misses the 'BandScan' column. Gee! Thanks, guys! Simon's says his favourite catch of the month was on 1224kHz on 24 April, when an unusually strong signal was logged from Bulgaria's Vidin transmitter, which carries the *Horizonte* programme. Also, Simon has noticed a new French-language transmission after dark on 1584kHz. He is, as we say, looking into it.

Following on from last month's fascinating piece on **SW Radio Africa**, news just in that the International Press Institute awarded the station the 2005 "Free Media Pioneer" prize for being a "voice to the voiceless".

SW Radio Africa broadcasts to Zimbabwe and was recently victim to jamming operations by the Mugabe regime ahead of national elections there.

The station is not in good shape financially, and may have to close unless an 11th hour cash injection comes to the rescue.

Launched in 2001, SW Radio Africa broadcasts from studios in London, hiring short wave and medium wave transmitters, as required.

## Clandestine

As it's not that common to hear an English-language clandestine station, you may want to tune in while you can: 1600-1900 on any of the following, 15.145, 12.145, 11.770MHz. They also have outlets in the Tropical Bands: 4.825, 4.880, 3.300 and 3.365MHz. However, your chances of netting them at this time of year are poor.

**Radio Seagull** is set to launch on 1602kHz medium wave from a site in northern Holland. 1 July sees the official start but tests have already been observed. The English-language station will go out each night between 1700 and 0500 and shares the frequency with the daytime Dutch-language Radio Waddenzee. The format will be album oriented progressive rock.

Meanwhile, **Big L Radio London** started broadcasting on 1395kHz in mid-May. Cliff Richard and the Cheeky Girls cut the ribbon but a

## Tropical Band Table

MHz	UTC	Service	Country	Listener
2.371	2200	Unid - jazz music	?	B
3.210	0410	WWCR, Nashville	USA	A
3.255	0400	BBC World Service	G/AFS	A B
3.320	2159	Radio Sonder Grense	AFS	B
3.320	0420	Sierra Leone Broadcasting Service	SRL	A
3.345	0430	Channel Africa	AFS	A
3.350	0430	Radio Exterior Espana	E/CTR	A
3.910	1926	Reflections Europe	IRL	E
3.915	1712	BBC World Service	G/SNG	D E
3.955	0445	WYFR	USA/G	A C E
3.955	2125	KBS World	KOR/G	B E
3.965	0455	Radio France Int'l	F	A B
3.965	1805	Radio Taiwan	TWN/F	C E
3.965	2101	RFE/RL	USA/D	E
3.975	1901	Radio Budapest	HNG	D E
3.985	2008	VIRI	IRN	E
4.005	2130	Vatican Radio	CVA	A B E
4.460	2023	CNR 1	CHN	E
4.635	0125	Radio Tajikistan	TJK	E
4.760	0120	RFE/RL	USA/TJK	E
4.770	1943	FRCN Kaduna	NIG	E
4.775	0435	Trans World Radio	MCO/SWZ	A
4.783	2214	RTM Bamoko	MLI	E
4.800	2006	CNR1 Shijiazhuang	CHN	E
4.810	1935	Voice of Armenia	ARM	E
4.820	2145	Xizang Lhasa	CHN	E
4.830	0052	All India Radio, Jammu	IND	E
4.845	2140	ORTM Nouakchott	MTN	A E
4.860	0045	All India Radio, Delhi	IND	E
4.905	2148	Xizang Lhasa	CHN	E
4.910	0050	All India Radio, Jaipur	IND	E
4.910	2035	ZNBC Radio 1	ZMB	E
4.915	2150	GBC 1 Accra	GHA	A E
4.920	2130	Xizang Lhasa	CHN	E
4.930	1823	Voice of America	USA/STP	E
4.940	1932	Voice of America	USA/STP	E
4.960	0515	Voice of America	USA/STP	A
4.976	2054	R. Uganda Red Channel, Kampala	UGA	E
4.980	1746	PBS Xinjiang	CHN	E
4.985	0500	Radio Brasil Central	B	A E
5.005	2040	R. Nacional De Guinea Ecuatorial	GNE	E F
5.010	2131	All India Radio, Thiru'puram	IND	E
5.015	2135	Turkmen Radio	TKM	E
5.025	0525	Radio Rebelde	CUB	A
5.025	2032	Radio Tashkent	UZB	E
5.030	1848	Radio Burkina	BFA	E
5.035	2102	Voice of Vietnam, Nat. service	VTN	E
5.050	1850	Radio Tanzania	TZA	E
5.070	0530	WWCR, Nashville	USA	A E

## Long Wave Table

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

\* = dark

Listeners:-

- A Dave Peters, Cheltenham
- B Simon Hockenull, Bristol



fault at the Trintelhaven transmitter site took the station off the air almost immediately. Following repairs, Big L is back up and just audible here in Reading during the day; much better at night, particularly when Albania's 500kW Filake outlet is off the air. The station is keen to receive reception reports, either by E-mail: [rd@bigl.co.uk](mailto:rd@bigl.co.uk) or to **Box 7336, Frinton-on-Sea, CO13 0WZ**.

Those of you into offshore radio may like to know of a series of DVDs that have been produced by pirate radio magazine, *Offshore Echoes*. Each is between 60 and 90 minutes long, with Volume 1 looking at the early years, concentrating on the early years of Radios Veronica, Syd and Nord; Volume 2 covers REM Island and Radio Caroline; Volume 3 features Radio London and Radio City; Volume four focuses on the fort-based stations Invicta, K-I-N-G and Radio 390 whilst volume five describes a clutch of stations, from Radio 270 to New Zealand's Radio Hauraki. Each costs

£19.99, which is a lot to pay for a one hour DVD, but if you want to see high quality rare footage of the ships and the forts then this would seem the way to go.

[www.offshoreechoes.com](http://www.offshoreechoes.com) or write to **Box 1514, London W7 2LL**.

The future of **Radio Slovakia International** still hangs in the balance. A debate in the Slovak parliament with regard to the funding of national broadcaster STV rumbles on. A new system for collecting the licence fee is envisaged where every household supplied with electricity (rather than those owning a TV set) would have to pay a monthly fee. Evasion of licence fee payment is a problem in Slovakia but the hoped for increase in revenue who go partly to the beleaguered station.

In Norway, the 153kHz outlet in Ingoy was due to have carried out a series of long wave tests using **DRM**. I believe this is the first time DRM has been tried out on long wave so reception reports would be most welcome. If you recall hearing the characteristic drone of DRM between

23 and 27 May, now you know who it was.

**Star Radio**, a station backed by **Fondation Hirondelle**, is reportedly back on the air from Monrovia, Liberia. The station, launched in 1997, was supposed to provide balanced news reporting in this volatile part of the world. However, its licence was revoked by the then Liberian president, Charles Taylor.

Following his exile, the ban was lifted and at the end of May, the station was set to return. Star FM goes out in English and vernaculars on 104MHz f.m. to Greater Monrovia as well as for two hours a day on short wave. I E-mailed the studio to try and ascertain their short wave schedule. Still waiting. So, if you fancy hunting around, Star used to be heard on 3.400MHz at 0500-0800 and 5.880MHz at 1700-2000.

That'll do it for this time. Contributions, please, by the 10<sup>th</sup> of the month. Happy listening.

## Medium Wave Table

kHz	Service	Location	Country	kW	Listener
531	RNE 5	Many	E	10-25	E*
531	Utvarp Foroya	Akraberg	FRO	200/100	E
540	Radio Twee	Wavre	BEL	150	C D E
549	UCB Europe	Dundalk	IRL	70	C D E
549	Deutschlandfunk (DLF)	Nordkirchen/Thurnau	D	100	E
558	RNE 5	Many	E	5-50	D* E*
567	RTE 1	Tullamore	IRL	500	C D E
576	Sudwestrundfunk (SWR)	Mulhacker	D	100	E*
576	RNE 5	Barcelona	E	100	E*
585	FIP	Paris	F	8	E
585	RNE 1	Madrid	E	600	D* E*
594	HR Skyline	Frankfurt	D	250	D* E
603	France Info	Lyon	F	300	D* E*
612	RNE 1	Vitoria	E	10	D* E*
621	RTBF 1	Wavre	BEL	300	C E
630	Junis Radio	Djedeida	TUN	600	E*
639	Czech Radio 2	Prague	TCH	1500	E*
639	RNE 1	Many	E	10-300	D* E*
648	BBC World Service	Orfordness	G	500	C D E
657	BBC Radio Wales	Wrexham	G	2	C D E
657	RNE 5	Madrid	E	50	D* E*
666	Sudwestrundfunk (SWR)	Rohrdorf	D	150	D* E*
675	Arrow Classic Rock	Lopik	HOL	120	C D E
684	RNE 1	Seville	E	600	E*
684	RTS 1 Belgrade	Alecsinac	SCG	200	E*
693	BBC Radio 5 Live	Many	G	1-150	D
702	NDR 4	Flensburg	D	5	E*
711	Radio Bleu	Rennes	F	300	D E
720	BBC Radio 4	Lisnagarvey	G	10	E
729	RTE Radio 1	Cork	IRL	10	E
738	RNE 1	Barcelona	E	500	E*
747	Radio 747	Flevoland	HOL	400	C D
765	Option Musique	Sottens	SUI	600	E
774	BBC Radio 4	Enniskillen	G	1	C
783	MDR Info	Leipzig	D	100	E
792	BBC Radio Foyle	Londonderry	G	1	C
792	France Info	Limoges	F	300	E
801	RNE 1	Many	E	10-20	E*
810	BBC Radio Scotland	Westerglen	G	100	A* E*
810	Macedonian Radio 1	Skopje	MKD	1200	E*
819	Radio Euskadi	San Sebastian	E	10	E*
819	RAI Uno	Trieste	I	20	A*
819	Sud Radio	Toulouse	F	20	E*
837	France Info	Nancy	F	200	E
855	RNE 1	Murcia	E	300	E*
864	La City Radio	Paris	F	300	C E
873	American Forces Network	Frankfurt	D	150	E*
882	BBC Radio Wales	Washford	G	100	C D
891	Radio 538	Hulsberg	HOL	20	E
900	Radio Popular	Bilbao	E	10	A*
900	RAI Uno	Milan	I	600	E*
909	BBC Radio 5 Live	Many	G	0.25-200	C D
918	Radio Slovenia	Domzale	SVN	600/100	E*
927	Radio Een/927 Live	Wolvertem	BEL	300	C E
945	France Blue	Toulouse	F	300	E*
954	Czech Radio 2	Bmo	CZE	200	E
963	YLE Radio	Pori	FIN	600	E*
972	Nord Deutscher Rundfunk (NDR)	Hamburg	D	100	E
981	RTA 2	Algeirs	ALG	600/300	E
990	Deutschlandfunk (DLF)	Berlin	D	100	E*
999	COPE	Madrid	E	50	E
1008	Radio 10 Gold	Flevoland	HOL	400	E
1017	RNE 5	Many	E	10	E*
1017	Sudwestrundfunk (SWR)	Wolfsheim	D	100	E
1035	Radio Nacional	Porto Alto	POR	100	E*
1044	Radio San Sebastian	San Sebastian	E	10	E*
1044	Service	Location	Country	kW	Listener
1044	MDR Info	Dresden	D	20	E
1053	Radio Iasi	Uricani	ROU	1000	E*
1053	Talksport	Droitwich	G	500	C D
1062	Denmark Radio P3	Kalunborg	DNK	250	E
1071	Euskadi Irratia	Bilbao	E	50	E*
1080	SER	Many	F	5-10	E*
1089	Talksport	Brookmans Park	G	400	C D
1098	Radio Slovensko	Nitra	SVK	50	E
1116	RAI	Many	I	2-60	E*
1107	Talksport	Many	G	2	C
1125	BBC Radio Wales	Llandrindod Wells	G	1	E
1125	Radio 21	Houdeng	BEL	10	E
1125	Croatian Radio HR1	Deanovac	HRV	100	E*
1134	Croatian Radio HR1	Zadar	HRV	600	C F*
1143	COPE	Many	E	2-5	E*
1170	Radio Nacional	Miramar	POR	10	E*
1179	SER	Valencia	E	50	E*
1179	Swedish Radio	Solvesborg	S	600/300	A* E
1179	Radio Canada International	Solvesborg	CAN/S	600/300	E*
1188	Radio Twee	Kuume	BEL	5	E*
1188	Virgin Radio	?	G	?	D*
1197	Virgin Radio	Many	G	0.2-2	C D
1206	France Info	Bordeaux	F	300	D* E*
1215	Virgin Radio	Many	G	0.32-200	C D
1224	Radio Horizont	Vidin	BUL	500	E*
1224	Radio Popular	San Sebastian	E	10	D*
1233	Virgin Radio	Many	G	0.1-0.5	C D
1242	France Info	Marseille	F	150	E*
1242	Virgin Radio	Many	G	0.5-2	C D
1251	Radio 747	Hulsberg	HOL	10	E*
1269	Deutschlandfunk (DLF)	Neumunster	D	300	D* E*
1278	France Bleu	Strasbourg	F	300	E*
1287	RNE 1	Many	E	5-10	D* E*
1296	BBC World Service	Orfordness	G	500	E*
1314	NRK Europakanalen	Kvitsoy	NOR	1200	D* E
1323	BBC World Service	Limassol	G/CYP	100	E*
1323	Voice of Russia	Wachenbrunn	RUS/D	800/150	C D* E
1341	BBC Radio Ulster	Lisnagarvey	G	100	C E
1350	Radio Orient	Nancy	LBN/F	300	E*
1359	RNE 3	Madrid	E	600	D* E*
1368	Manx Radio	Douglas, IOM	G	20	A E*
1377	France Info	Lille	F	300	C D*
1386	China Radio Int'l	Sitkunai	CHN/LTU	750	D* E*
1395	Trans World Radio	Filake	MCO/ALB	500	C
1404	France Info	Brest	F	20	C D* E*
1422	Deutschlandfunk (DLF)	Heusweiler	D	1200/600	D* E
1440	China Radio International	Marnach	CHN/LUX	1200/300	A* C D* E*
1440	RTL	Marnach	LUX	1200/300	C
1476	Radio 1476	Vienna	AUT	60	A* E
1503	RNE 5	Many	E	2-5	E*
1512	BSKSA	Jeddah	ARS	1000	D*
1512	Radio Nederland	Wolvertem	BEL/HOL	300/25	A* C
1512	Radio Vlaanderen/Radio Een	Wolvertem	BEL	300/25	E
1530	Vatican Radio	Vatican City	CVA	150/450	A* C
1539	Evangeliums Rundfunk	Mainflingen	D	700/120	C D* E
1557	France Info	Nice	F	300	A* D* E*
1575	Radio Nouveaux Talents	Paris	F	5	E
1575	RAI Uno	Genova	I	50	E*
1621	Unidentified in Dutch language?		HOL	?	B*
1645	Unidentified in Dutch language?		HOL	?	B*

\* = dark

Listeners:-

- A Thomas Williams, Truro
- B Rhoderick Illman, Oxted
- C Peter Pollard, Rugby
- D Dave Peters, Cheltenham
- E Simon Hockenhill, Bristol

Continued on page 51 ►

### ARA-60 Active Antenna. £239.95

**Frequency range** • 40kHz-60MHz (full performance) 60-120MHz 2-3dB less gain  
**Output impedance** 50-75 ohm coaxial  
**Connector to Rx** PL type delivered as standard. Other standards can be fitted on request  
**Gain** 10dB +/-0.2dBs  
**Intercept Point** +50dBm IP 3rd order (10MHz/12V)  
**DC power supply** 11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)  
**Mast diameter** 30-50mm can be fitted  
**Dimensions** 115cm total length. Antenna tube 50mm x 160mm ideal for base stations

### ARA-2100 Active Antenna. £239.95

**Frequency range** 50-2100MHz  
**Output impedance** 50-75 ohms coaxial  
**Gain** 18dB-1000MHz  
 9dB-1500MHz  
 6dB-2100MHz  
**Noise figure** 1.5-2dB-1000MHz  
 1.8-2.5dB-1500MHz  
 2.5-4dB-2000MHz  
**3rd order IP** +38dBm typical  
 +22dBm  
**Output impedance** 50-75 ohms coaxial  
**Connector standards** N type connector at the antenna, BNC male connector to the receiver  
**Power supply** 12V DC at 160mA DC. Power supply for 230V AC is delivered comes with the antenna  
**Dimensions** Length 450mm  
 Diameter 90mm  
**Weight** 2kg  
**Accessories** Mains wall plug adaptor (230V A/12V DC), interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps

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 1250 memory channels, all mode.



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- World Clock
- Digital Voice Recorder
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- Weight (approx): 1.9 kg

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### New Product! Skyscan 747

Latest addition to the scanner scene is this wonderful 'large format' handle. In complete opposition to the norm, this scanner is internal battery powered but is nice and big thus making it easier to use with a massive LCD Display. Covering AIR BAND, FM BAND (87.3-108.1MHz) & the Marine band, this is a real bargain scanner.

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### Maycom AR-108

The AR-108 is a palm sized scanner covering 108 to 180 MHz. It gives the best possible receive sensitivity in the CIVIL AIRBAND. The radio covers 108 - 180MHz with the VFO covering this frequency in two bands. 108 - 136.975MHz for the Civil Airband and 136 - 180MHz for the rest of the VHF band. The frequency is changed by use of the up/down buttons on the selected digit. It holds a 99 memory bank for each of these bands, which are set independently. There are also facilities to lock in frequencies in the memories to pass on.



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## Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	B C D
603	Capital Gold	Littlebourne	0.1	B D
630	BBC Radio Cornwall	Redruth	2	D
630	BBC 3CR	Luton	0.2	C D
657	BBC Radio Cornwall	Bodmin	2	D
666	Classic Gold	Exeter	0.34	C D
729	BBC Essex	Manningtree	0.2	B
738	BBC Hereford & Worcester	Worcester	0.037	B C D
756	Magic Maldwyn	Newtown	0.63	B D
765	BBC Essex	Chelmsford	0.5	B D
774	Classic Gold	Gloucester	0.14	B C
792	Classic Gold	Bedford	0.275	B D
801	BBC Radio Devon	Barnstaple	2	B C D
828	Classic Gold	Bournemouth	0.27	D
828	BBC Asian Network	Wolverhampton	0.2	B C D
828	Classic Gold	Luton	0.2	D
837	BBC Asian Network	Leicester	0.5	B C D
855	BBC Radio Norfolk	Norwich	1.5	D
855	BBC Radio Devon	Plymouth	1	A
855	Sunshine 855	Ludlow	0.15	B C D
873	BBC Radio Norfolk	West Lynn	0.3	B
936	Classic Gold	West Wiltshire	0.18	C
936	Fresh AM	Skipton	1	B
945	Classic Gold	Derby	0.2	C
954	Classic Gold	Torbay	0.4	D
954	Classic Gold	Hereford	0.16	C D
963	Asian Club	Hackney	0.95	B D
972	Asian Club	Southall	1	C D
990	BBC Radio Devon	Exeter	1	D
990	Classic Gold	Wolverhampton	0.09	B C
999	Classic Gold GEM	Nottingham	0.25	B
999	BBC Radio Solent	Fareham	1	D
999	Valleys Radio	Ebbw Vale	0.3	D
1017	Classic Gold	Shropshire	0.63	D
1026	BBC Radio Jersey	Trinity	1	D
1026	BBC Radio Cambridgeshire	Cambridge	0.5	B D
1035	Kismet Radio	Crystal Palace	1	D

kHz	Service	Svc area/TX site	kW	SWL
1116	Valleys Radio	Ebbw Vale	1	C D
1116	BBC Radio Guernsey	Rohais	0.5	D
1152	Capital Gold	Birmingham	3	B C D
1161	Magic	Hull	0.35	B
1161	Classic Gold	Swindon	0.16	C
1170	Swansea Sound	Swansea	0.58	D
1170	Signal's Big AM	Stoke on Trent	0.2	C
1260	Classic Gold	Leicester	1.6	C
1260	Sabras Sound	Leicester	0.29	B
1287	Garrison Radio RSL	Tidworth	0.001	D
1296	Radio XL	Birmingham	10	B C D
1305	Capital Gold	Newport	0.2	C
1332	Classic Gold	Peterborough	0.6	B
1359	Classic Gold Breeze	Chelmsford	0.28	B
1413	BBC Radio Gloucester	Bourton/Berkeley Heath	0.5	B C*
1431	Classic Gold	Reading	0.14	D
1449	BBC Asian Network	Peterborough	0.15	B
1458	Sunrise	London	125	D
1458	BBC Asian Network	Birmingham	5	C* D
1458	BBC Radio Devon	Torbay	2	D
1485	Classic Gold	Newbury	1	D
1503	BBC Radio Stoke	Staffordshire	1	D*
1503	Forest of Dean Community Radio	Coleford	0.1	C*
1521	Forest of Dean Community Radio	Coleford	0.1	C*
1530	Capital Gold	Worcester	0.52	C D
1557	Classic Gold	Northampton	0.76	B
1566	County Sound	Guildford	0.8	C* D*
1566	BBC Somerset Sound	Taunton	0.6	D
1584	BBC Hereford & Worcester	Woofferton	0.3	C*
1602	BBC Radio Kent	Rustall	0.25	C* D*
1602	Desi Radio	Southall	0.07	C* D*

\* = dark

Listeners:-

- A Thomas Williams, Truro
- B Peter Pollard
- C Dave Peters, Cheltenham
- D Simon Hockenhill, Bristol

## Short Wave Table

MHz	UTC	Service	Country	Lang	SINPO	SWL
<b>0000-0600</b>						
6.020	0130	China R. Int.	CHN	Eng	55555	PP
6.045	0133	R. Romania Int.	RDU	Eng	45455	PP
6.055	0135	R. Exterior de Espana	E	Spa	44444	PP
6.195	0520	BBC World Service	G	Eng	45545	MC
6.200	0138	R. Prague	CZE	?	44444	PP
7.190	0115	R. Tashkent	UZB	Eng	45533	MC
7.250	0145	Voice of Russia	RUS	Eng	55555	PP
9.330	0030	WBCQ	USA	Eng	25433	MC
9.370	0017	WTJC	USA	Eng	24443	MC
11.920	0230	HCJB	EOA	Por	25443	MC
<b>0600-0900</b>						
5.920	0855	WTJC	USA	Eng	24231	RI
5.935	0725	WWCR	USA	Eng	54444	BC
6.005	0730	Deutsche Welle	D	Ger	44334	VP
6.855	0848	Family R.	USA	Eng	24232	RI
7.355	0725	WYFR	USA	Eng	55444	BC
7.355	0830	WYFR	USA	Eng	34333	VP
7.465	0600	WHRI	USA	Eng	54445	BC
9.370	0851	WTJC	USA	Eng	44333	RI
9.410	0820	BBC World Service	G/CYP	Eng	55434	VP
9.490	0807	R. Sweden Int.	S	Swe	55544	RI
9.545	0745	Deutsche Welle	D	Ger	54545	VP
9.710	0835	R. Vilnius	LTU	Eng	45544	SH
9.725	0858	University Network	USA	Eng	34333	TV
9.885	0735	R. New Zealand Int.	NZL	Eng	32223	BC
9.885	0840	R. New Zealand Int.	NZL	Eng	15421	SH
9.930	0745	WYFR	USA	Eng	55444	BC
9.930	0844	WYFR	USA	Eng	34343	RI
11.820	0614	R. New Zealand Int.	NZL	Eng	15443	MC
11.865	0712	TransWorld R.	MCO/ALB	Eng	35444	MC
13.580	0805	R. Sweden Int.	S	Swe	34433	RI
13.610	0812	China R. Int.	CHN	Chi	34433	RI
13.630	0816	R. Australia	AUS	Eng	23332	RI
13.640	0818	R. Sultanate Dman	DMA	Ara	24432	RI
13.660	0820	BBC World Service	G/CYP	Ara	32332	RI
13.665	0822	R. Rossii	RUS	Rus	44434	RI
13.700	0824	R. Netherlands	HDL	Dut	32342	RI
13.710	0715	China R. Int.	CHN	Eng	44444	TV
13.710	0826	China R. Int.	CHN	Eng	44434	RI
13.720	0828	R. Exterior de Espana	E	Spa	54444	RI
13.740	0832	Voice of America	USA/THA	Chi	34434	RI
13.780	0854	Deutsche Welle	D	Ger	34433	RI
13.830	0842	Croatian R.	HRV	Cro	35444	SH
15.085	0720	V. of the Islamic Rep. of Iran	IRN	Ita	55545	VP
15.115	0851	R. Cairo	EGY	Ara	33422	RI
15.120	0740	Voice of Nigeria	NIG	Eng	45323	VP
15.180	0842	BBC World Service	G	Ara	33333	RI
15.290	0830	R. Farda	USA/GRC	Far	34323	VP
17.580	0847	RTBF	BEL/D	Fre	33432	RI
17.630	0854	Africa No. 1	GAB	Fre	34444	RI
17.830	0715	BBC World Service	G/ASC	Eng	34323	VP

MHz	UTC	Service	Country	Lang	SINPO	SWL
<b>1800-1900</b>						
5.920	1842	R. Slovakia Int.	SVK	Eng	55444	SH
6.055	1844	R. Slovakia Int.	SVK	Eng	54434	SH
6.055	1852	R. Slovakia Int.	SVK	Eng	44443	MC
6.100	1836	Int. R. of Serbia & Mont.	SCG/BIH	Eng	34443	MC
6.115	1855	R. Tirana	ALB	Eng	43343	FM
6.120	1855	YLE R. Finland	FIN	Fin	55544	FM
6.165	1800	Croatian R.	HRV	Eng	44444	GG
6.195	1817	BBC World Service	G	Eng	44444	PP
7.360	1820	Vatican R.	CVA	?	44444	PP
9.420	1825	Voice of Greece	GRC	Gre	45434	SH
9.475	1828	R. Australia	AUS	Eng	33433	SH
9.480	1846	Voice of Russia	RUS	Eng	54444	SH
9.565	1830	Voice of America	USA	Eng	33433	RI
9.575	1845	RTM Morocco	MRC	Fre	43343	RI
9.615	1850	Voice of America	USA/G	Rus	43433	RI
9.630	1853	R. Romania Int.	RDU	Eng	33422	RI
9.635	1850	R. Romania Int.	RDU	Eng	55545	VP
9.775	1830	Voice of Armenia	ARM	Eng	44444	FM
9.785	1830	Voice of Turkey	TUR	Eng	44444	GG
9.890	1848	Voice of Russia	RUS	Eng	53434	SH
9.895	1823	R. Netherlands	HDL	Eng	34433	MC
9.915	1825	BBC World Service	G/CYP	Eng	53444	VP
9.935	1815	V. of the Islamic Rep. of Iran	IRN	Ara	45534	VP
9.950	1830	All India R.	IND	Eng	53444	VP
11.510	1840	Voice of Russia	RUS	Eng	34433	VP
11.620	1825	All India R.	IND	Hin	43334	BC
11.630	1835	Voice of Russia	RUS	Eng	54444	BC
11.630	1850	Voice of Russia	RUS	Eng	54544	SH
11.830	1805	R. Romania Int.	RDU	Eng	33442	MC
11.940	1845	China R. Int.	CHN	Eng	34433	SH
12.050	1810	R. Cairo	EGY	Ara	55534	VP
12.105	1842	Voice of Greece	GRC	Eng	44444	FM
13.605	1805	All India R.	IND	Eng	43444	BC
13.730	1817	R. Canada Int.	CAN/D	Eng	35433	MC
13.745	1820	BBC World Service	G	Rus	55555	BC
13.760	1816	China R. Int.	CHN	Eng	43444	MC
13.780	1820	WYFR	USA/GUM	Eng	25333	MC
13.820	1800	Croatian R.	HRV	Eng	34434	GG
13.830	1810	Croatian R.	HRV	Eng	35444	MC
15.345	1800	RAE, Buenos Aires	ARG	Spa	44444	GG
15.345	1850	RTM Morocco	MRC	Ara	44434	VP
15.400	1840	BBC World Service	G/ASC	Eng	45534	VP
15.410	1830	Voice of America	USA/ASC	Eng	45544	VP
17.830	1801	BBC World Service	G/ASC	Eng	25433	MC
21.470	1832	BBC World Service	G/ASC	Eng	45444	MC
21.655	1810	Voice of Russia	RUS	Eng	33333	FM
<b>1900-2000</b>						
5.775	1928	IRRS	I	Eng	45444	MC
5.930	1944	R. Prague	CZE	Cze	55555	DP
5.945	1905	DRF R. Austria Int.	AUT	Ger	45434	SH
5.960	1944	RAI	I	Eng	32432	SH
5.960	1955	RAI	I	Eng	44333	DP
6.010	1935	R. Sri Lanka	G	Eng	44434	FM
6.015	1930	Bible Voice Broadcasting	G	Eng	44444	FM

MHz	UTC	Service	Country	Lang	SINPO	SWL
6.055	1952	R. Slovakia Int.	SVK	Spa	34333	TW
6.065	1933	R. Sweden Int.	S	Eng	54444	FM
6.120	1947	YLE R. Finland	FIN	Fin	44444	TW
6.195	1914	BBC World Service	G	Eng	34333	TW
7.105	1945	R. Belarus	BLR	Eng	44344	FM
7.105	1950	R. Farida	USA/GRC	Far	55534	VP
7.150	1946	KBS World R.	Rus	24433	Rj	
7.155	1902	R. Thailand	THA	Eng	44444	FM
7.205	1952	V. of the Islamic Rep. of Iran	IRN	Eng	43343	FM
7.250	1957	Vatican R.	CVA	Eng	45555	MC
7.280	1930	R. Belarus	BLR	Eng	34434	GG
7.370	1910	WYFR	USA/RUS	Ger	45544	VP
7.380	1905	Voice of Russia	RUS	Eng	43344	FM
7.590	1903	AFRTS ( U.S.B )	USA/ISL	Eng	44444	FM
9.500	1910	R. Australia	AUS	Eng	33343	FM
9.500	1912	R. Australia	AUS	Eng	44333	FM
9.510	1940	TransWorld R.	USA/AFS	?	43443	RI
9.515	1944	KBS World R.	KOR	Rus	33432	RI
9.525	1958	All India R.	IND	Fre	34434	RI
9.670	1900	Voice of America	USA/THA	Eng	44433	RI
9.735	1935	Deutsche Welle	D	Ger	45434	VP
9.785	1919	Voice of Turkey	TUR	Eng	54444	FM
9.885	1905	R. Kuwait	KWT	Ara	55545	VP
9.890	1940	Voice of Russia	RUS	Eng	55555	VP
9.895	1912	Voice of Russia	RUS	Eng	33333	FH
9.950	1948	All India R.	IND	Eng	45444	MC
11.535	1925	Voice of Korea	KRE	Eng	33322	FM
11.590	1915	Kol Israel	ISR	Eng	54434	VP
11.605	1910	Kol Israel	ISR	Eng	54434	VP
11.620	1933	All India R.	IND	Eng	34442	MC
11.940	1941	China R. Int.	CHN	Eng	33333	FH
11.975	1926	Voice of America	USA	Eng	33333	FH
12.070	1958	Voice of Russia	RUS	Eng	43343	FM
13.780	1905	Deutsche Welle	D/?	Eng	43343	FM
15.150	1955	Voice of Indonesia	INS	Fre	34333	FM
15.630	1920	Voice of Greece	GRC	Gre	45323	VP
21.655	1917	RDP Internacional	POR	Por	25332	MC
21.700	1912	R. Exterior de Espana	E	Spa	35433	MC
<b>2000-2100</b>						
5.775	2031	IRRS	I	Eng	35444	MC
5.850	2000	R. Canada Int.	CAN/S	Eng	55555	GG
5.885	2005	Vatican R.	CVA	Eng	43344	FM
5.930	2014	R. Prague	CZE	Eng	45555	MC
5.945	2056	DRF R. Austria Int.	RUS	Ger	44434	RI
5.960	2000	China R. Int.	CHN	Eng	44444	GG
6.005	2001	BBC World Service	G	Eng	44333	DP
6.025	2000	R. Budapest	HNG	Fre	34333	TW
6.040	2040	Voice of America	USA/GRC	Eng	54444	FM
7.205	2020	V. of the Islamic Rep. of Iran	IRN	Eng	44444	DP
7.215	2023	Voice of Turkey	TUR	Tur	54434	DP
7.225	2026	Tunisian R.	TUN	Ara	44433	DP
7.250	2014	Vatican R.	CVA	Eng	55545	MC
7.285	2032	China R. Int.	CHN	Eng	54434	DP
7.290	2020	China R. Int.	CHN	Eng	43434	BC
7.300	2035	V. of the Islamic Rep. of Iran	IRN	Spa	54434	DP
7.360	2020	Family R.	USA/MDA	Eng	55545	VP
7.380	2059	R. Rossii	RUS	Spa	44444	RI
7.410	2052	All India R.	IND	Eng	44444	DP
7.450	2040	Voice of Greece	GRC	Gre	55534	VP
7.475	2045	Voice of Greece	GRC	Gre	55545	VP
7.935	2020	China National R. 1	CHN	Chi	45333	VP
9.375	2040	Voice of Greece	GRC	Gre	44434	VP
9.410	2055	BBC World Service	G/CYP	Eng	45544	SH
9.460	2028	Voice of Turkey	TUR	Tur	54444	DP
9.525	2002	R. Kitia?	?	?	43443	RI
9.570	2045	R. Exterior de Espana	E	Eng	55545	VP
9.600	2039	China R. Int.	CHN	Eng	55544	DP
9.645	2008	Vatican R.	CVA	Eng	44444	FM
9.670	2045	Voice of America	USA	Eng	54444	DP
9.680	2015	R. Thailand	THA	Fre	44444	FM
9.730	2055	Voice of Vietnam	VTN	Eng	32233	FM
9.855	2054	China R. Int.	CHN	Eng	42332	DP
9.855	2055	R. Kuwait	KWT	Ara	42332	DP
9.880	2058	R. Kuwait	KWT	Ara	43343	DP
11.765	2000	R. Canada Int.	CAN	Eng	43344	GG
11.790	2018	China R. Int.	CHN	Eng	44444	FH
11.860	2005	V. of the Islamic Rep. of Iran	IRN	Eng	45545	MC
11.905	2047	R. Tashkent Int.	UZB	Eng	44443	MC
11.975	2010	Voice of America	USA/STP	Eng	25433	MC
12.070	2011	Voice of Russia	RUS	Eng	44444	FH
12.085	2011	R. Damascus	SYR	Eng	23332	FM
15.150	2007	Voice of Indonesia	INS	Eng	34443	FM
15.195	2021	TransWorld R.	USA/GUM	Eng	35443	MC
15.290	2013	R. Exterior de Espana	E	Eng	54444	FM
15.325	2000	R. Canada Int.	CAN	Eng	43344	GG
15.400	2029	BBC World Service	G/ASC	Eng	35433	MC
15.410	2045	Voice of America	USA	Eng	23442	MC
15.445	2045	Voice of America	USA	Eng	25443	MC
15.455	2021	Voice of Russia	RUS	Eng	44444	FM
15.825	2050	WWCR	USA	Eng	25443	MC
17.680	2017	Voz Cristiana	CHL	Spa	33333	FM
18.930	2013	R. Taiwan Int.	TWN/USA	Fre	35343	MC
18.980	2028	WYFR	USA	Eng	35433	MC
<b>2100-2200</b>						
5.800	2135	R. Bulgaria	BUL	Eng	43333	DP

MHz	UTC	Service	Country	Lang	SINPO	SWL
5.875	2143	BBC World Service	G/CYP	Ara	55444	DP
5.885	2153	Vatican R.	CVA	Ita	44444	TW
5.960	2109	China R. Int.	CHN/?	Eng	44534	SH
5.960	2122	China R. Int.	CHN	Eng	33333	FH
6.025	2115	R. Budapest	HNG	Eng	44444	MC
6.055	2105	R. Japan	J/G	Eng	44534	SH
6.085	2132	R. Sweden Int.	S	Eng	44444	FH
6.075	2152	Deutsche Welle	D	Ger	54434	DP
6.100	2105	Int. R. of Serbia & Mont.	SCG	Eng	32233	FM
6.130	2158	R. Free Europe	USA/?	Scr	33332	DP
6.180	2105	R. Japan	J/G	Eng	32432	SH
7.105	2104	R. Belarus	BLR	Eng	33443	MC
7.120	2130	R. Tirana	ALB	Eng	45433	MC
7.360	2121	Family R.	USA	Eng	53444	DP
7.380	2111	Voice of Biafra	USA/AFS	Eng	34443	MC
7.420	2106	R. Ukraine Int.	UKR	Eng	43344	FM
7.450	2130	Voice of Greece	GRC	Gre	54433	DP
7.500	2124	R. Bulgaria	BUL	Eng	44444	FH
7.570	2131	Voice of Korea	KRE	Eng	34433	MC
9.330	2110	WBCQ	USA	Eng	24332	RI
9.375	2116	Voice of Greece	GRC	Gre	44434	RI
9.390	2118	R. Sweden Int.	S	Swe	44333	RI
9.425	2120	All India R.	IND	Hin	23432	RI
9.440	2123	Deutsche Welle	D	Eng	43343	RI
9.445	2140	All India R.	IND	?	44444	TW
9.460	2132	Voice of Turkey	TUR	Tur	44444	RI
9.495	2135	Deutsche Welle	D	Ara	44333	RI
9.535	2142	R. Romania Int.	RDU	Eng	33333	FH
9.600	2127	China R. Int.	CHN	Eng	44444	FH
9.950	2105	All India R.	IND	Eng	54434	DP
9.988	2143	R. Cairo	EGY	Eng	44444	FM
9.990	2117	All India R.	IND	Eng	33322	TW
11.695	2105	R. Australia	AUS	Eng	44444	FM
11.715	2133	All India R.	IND	Eng	34442	MC
11.760	2111	R. Havana Cuba	CUB	Eng	33333	FM
11.855	2102	R. Japan	J	Eng	33333	FH
11.940	2154	R. Romania Int.	RDU	Eng	33333	FH
12.160	2116	WWCR	USA	Eng	44444	TW
13.615	2112	WEWN	USA	Eng	35444	MC
13.630	2115	China R. Int.	CHN/MLU	Eng	23432	MC
13.750	2105	University Network	USA/CTR	Eng	35343	MC
13.800	2102	WYFR	USA	Eng	24433	MC
15.205	2124	Deutsche Welle	D/RRW	Eng	35433	MC
15.400	2145	BBC World Service	G	Eng	44433	TW
15.785	2150	WHRI	USA	Eng	44333	TW
<b>2200-0000</b>						
5.945	2200	DRF R. Austria Int.	AUT	Ger	44444	TW
6.155	2203	DRF R. Austria Int.	AUT	Ger	54444	DP
6.165	2205	Croatian R.	HRV	Cro	54444	DP
7.175	2212	China R. Int.	CHN	Eng	44444	FH
7.345	2233	R. Prague	CZE	Eng	55555	FM
7.410	2213	All India R.	IND	Eng	34333	TW
7.520	2345	WHRA	USA	Eng	54444	BC
9.445	2222	All India R.	IND	Eng	33333	FH
9.740	2218	BBC World Service	G	Eng	42333	TW
9.890	2320	Deutsche Welle	D/RRW	Eng	25333	MC
9.910	2207	All India R.	IND	Eng	33333	FH
13.615	2225	WEWN	USA	Eng	22222	TW
13.620	2200	R. Australia	AUS	Eng	44433	TW
15.600	2255	R. Taiwan Int.	TWN/USA	Eng	35533	SH
15.745	2208	WEWN	USA	Eng	35444	MC
17.680	2315	Voz Cristiana	CHL	Spa	35444	MC

For the logs between 0900 and 1800 please see  
[www.geckos-haunt.org/LMS/](http://www.geckos-haunt.org/LMS/)

DXers-	MC	Mike Casey
BC	Bernard Curtis	PP Peter Pollard
DP	Dave Peters	RI Rhoderick Illman
FH	Francis Heame	SH Simon Hockenhull
FM	Freddy McGavin	TW Thomas Williams
GG	Gerald Guest	VP Vic Prier

The SINPO code is used for broadcast station reports, here is an explanation of the code.

Signal Strength  
5 excellent  
4 good  
3 fair  
2 poor  
1 barely audible

Interference  
5 nil  
4 slight  
3 moderate  
2 severe  
1 extreme

Noise  
5 nil  
4 slight  
3 moderate  
2 severe  
1 extreme

Propagation Disturbance  
5 nil  
4 slight  
3 moderate  
2 severe  
1 extreme

Overall Merit  
5 excellent  
4 good  
3 fair  
2 poor  
1 unusable

### Equipment Used:

Bernard Curtis - Realistic DX-390 + outdoor wire  
Dave Peters - WinR. G313i + random wire + Palstar MW550P  
Tuner/Pre-Amp  
Francis Heame - Sharp WQT370 or Yaesu FRG-7 Vega Selena + wire  
Freddy McGavin, Dublin - Roberts RC828 + indoor wire  
Gerald Guest - Roberts RC818 + 10m wire  
Michael Casey - Roberts RC828 + CTU9 + 60m indoor loop or outdoor 75m inverted dipole  
Peter Pollard - Sony ICF-2001D + whip  
Rhoderick Illman - Kenwood R5000 + wire or Sony AN1  
Simon Hockenhull - Grundig YB400 + whip  
Thomas Williams - Grundig YB400 or YB206  
Vic Prier - Fairhaven RD500VX + Datong AD-270 or vertical

# Info<sup>in</sup> Orbit

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● **E-mail** info.orbit@pwpublishing.ltd.uk **Website** www.astronomer.plus.com

**T**his column includes a summary of GEO's second Symposium - held once more at the Leicester National Space Centre. Also, the Ukrainian satellite *SICH-1M* falls silent as it approaches re-entry from a failed orbit.

## NOAA-N (18)

May was a nail-biting time for watchers of the NOAA-N launch. Originally scheduled for launch on 11 May, the wind forecast was adverse for two days, and then electrical problems were diagnosed causing further delays. Then a vent hose somehow became disconnected, and because this could possibly allow hydrocarbons into the payload fairing nose cone where NOAA-N was fixed, the Saturday launch was scrubbed. Because of orbital restrictions, the next launch attempt was set for 19 May, then advanced to 20 May.

I watched launch live via the Internet; the roar of the engines was as dramatic as ever. All went perfectly and NOAA-N was re-christened NOAA-18 in its new orbit. It was switched on as planned and the imaging systems were activated. During early orbits the infra-red imager cannot be used for some days because the transparent

surfaces have to be allowed to de-gas before they are cooled, otherwise they would be contaminated. Consequently, during the first few days, only the visible channels are operational. This results in the v.h.f. (137MHz) transmission comprising adjacent visible images instead of the more usual visible and infra-red images side-by-side.

The imagers were switched on after the daytime passes had almost completed over Britain, so I set my system to record the overnight passes in my absence. I recorded both passes. One of the first day-time visible-light images was received by **John Nott** in Victoria, Australia at 0406 on 21 May - see **Fig. 1**. This was of course received on 137.9125MHz - the new a.p.t. frequency. **Peter Hayes** also recorded an early pass, using a narrow-band receiver to minimise the pager problems that will adversely affect many a.p.t. users in Britain. Somewhat earlier (overnight), I recorded my first h.r.p.t. image. NOAA was using an early-orbit h.r.p.t. transmission with the opposite polarity to the

normal (right-circular) one - so my reception was poor. The following day, NOAA activated the new h.r.p.t. frequency with standard polarisation - and I received a perfect pass - see **Fig. 2**.

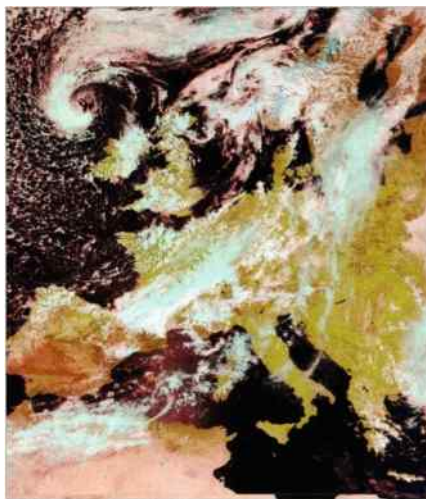
## Pictures From Britain

**George Newport** sent in **Fig. 3** showing once more what current software can do to enhance otherwise black-and-white images. A latitude and longitude grid is superimposed, ocean and sea regions are shown in shades of blue, land in shades of green, and clouds shown in white with inset colours indicating probable precipitation. Country outlines are also indicated making this a picture worthy of use by a geography class!

Another sunny day recorded by **Kevin Hughes** of Tamworth is seen in the NOAA-17 a.p.t. image - see **Fig. 4**.



■ **Fig 1: NOAA-18 a.p.t. 0406 21 May from John Nott.**



■ **Fig 2: NOAA-18 h.r.p.t. 1253 22 May Southampton.**

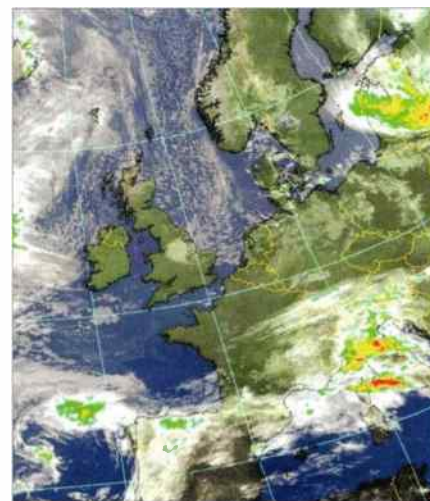
## Ukraine To Launch SICH-2

The First Deputy General Director of the National Space Agency of Ukraine (NSAU), **Valery Komarov** recently said at a press conference that Ukraine is planning to launch the in-house-built *SICH-2* satellite: "We will launch the *SICH-2* early in 2006". According to Mr Komarov, the new satellite was built based on new design engineering solutions, although no further details have been revealed. Last year Ukrainian launch vehicles launched 15 satellites, including the Cyclone-3 launch of the second and third Ukrainian satellites, *SICH-1M* and *Micron*. The NSAU is developing other space project designs, including a lunar module as part of the new USA initiative. Future *SICH* spacecraft are expected to continue the practice of transmitting on various frequencies including 137.40MHz. Meanwhile, no further transmissions on 137.40MHz have been reported from *SICH-1M*.

## GEO's 2005 Symposium

The **Group for Earth Observation** held its second Symposium at the end of April, attracting a record numbers of delegates. **Les Hamilton** kindly provided me with a summary of events because I was unable to attend while in hospital. The Symposium was held at the **Leicester National Space Centre** and provided an extremely busy day for all those attending. Seating was at a premium; all the speakers faced a packed conference room leaving several members standing at the back. It was also a race against time to fit everything into the program before the Centre closed at 1700.

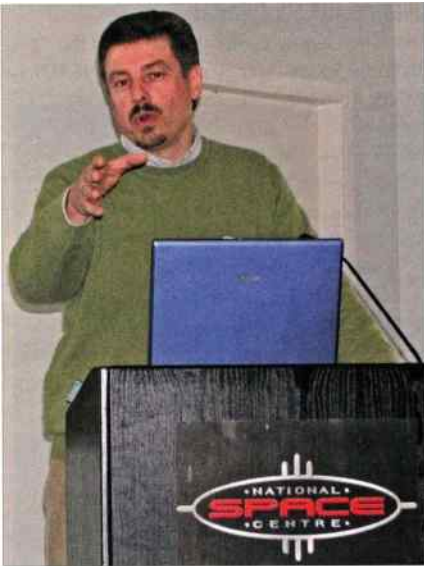
Following a short welcome from GEO chairman **Francis Bell**, the morning session was chaired by **Peter Green** who introduced the audience to **Mike Grocott**, **Gordon Bridge**



■ **Fig 3: NOAA-12 0525 10 May from George Newport.**



■ **Fig 4: NOAA-17 1134 11 May from Kevin Hughes.**



■ Fig 5: Ed Murashi addresses GEO.

and **David Taylor**. Mike detailed the work at Callington Space Centre, emphasising in particular how the recent installation of MSG stations had provided great inspiration to their students. Gordon followed with a discussion on the combination of *METEOSAT-8* channels in meaningful ways, and explained how careful selection of colour could help to distinguish snow from fog, pick out thunderstorms, and even detect sulphurous fumes emitted from factories and volcanoes. The morning session was completed by David Taylor who reviewed updates to his various software applications during the past year, and mentioned the imminent release of *GeoSignal-5*, which allows users to combine any of the *METEOSAT-8* channels using colour schemes of their own choice.

Among those attending were several members from the Dutch *Werkgroep Kunstmanen*, **Ed Murashi** - see Fig. 5 - from America, and two visitors from Italy. **Arne van Belle** and **Rob Alblas** set up separate *METEOSAT-8* receiving stations, and demonstrated live reception throughout the day. Arne used **David Taylor's** renowned *Datamanager* software suite - see Fig. 6 - while Rob implemented the *XRIT2PIC* display software he created himself - see Fig. 9. **John Tellick** took advantage of the afternoon sunshine to go outdoors and demonstrate dish alignment using a satellite signal meter - see Fig. 7 - while David demonstrated how to install the *Tellique* software from scratch. During these demonstrations there was also



■ Fig 7: John Tellick's dish alignment workshop.



■ Fig 6: Arne van Belle's live *METEOSAT-8* system.

the added attraction outside the Space Centre of the GB4FUN station van operated by **Carlos Eavis**.

### Afternoon

The afternoon was hosted by **Cecilia Taylor** and opened with a fascinating overview of the USA weather satellite program from **Ed Murashi**. A compelling speaker, Ed provided a wide-ranging talk starting with the development of the earliest experimental TIROS satellites, taking us up to the NOAA N-prime mishap, outlining the GOES geostationary program and finally looking to the future with the convergence of the civilian and military programs in the NPOESS programme.

Ed was followed by **Fred van den Bosch**, who explained how he runs a fully automated *METEOSAT-8* station, describing how he had organised the collection of files from different sources to facilitate the process. He then discussed how he could automatically create useful products using *Digital Atmosphere* scripting, and demonstrated a thunderstorm prediction algorithm in the form of a coloured overlay on a *METEOSAT-8* image (all achieved automatically). The final speaker was Rob Alblas, who explained in detail how his *XRIT2PIC* software operated and included a number of exciting animations in his presentation.

Finally, to round off a packed and exciting day, **Francis Bell** chaired the first GEO AGM, and for the benefit of new members, provided some background information on GEO as a limited company. An overview of the group's finances followed, and finally a general question and answer session. Proceedings were wound up with a vote of thanks from **David Painter**. Some of the pictures were kindly provided by **Cecilia** and **David Taylor**; the others from **Les Hamilton**.



■ Fig 8: David Simmons demonstrating *Tellique* software installation.

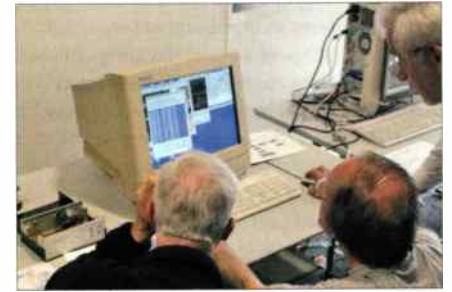
### *METOP-1* - New Launch Date

The **Russian Federal Space Agency** has announced that it will support the launch of the European meteorological satellite *METOP-A* (1). The satellite is scheduled to be launched by a Russian Soyuz rocket from Baikonur in April 2006. *METOP* was procured under an agreement between ESA (European Space Agency) and EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites), in which ESA is responsible for satellite development. The Soyuz launch vehicle was procured through a contract between EUMETSAT and the European-Russian joint venture, STARSEM. STARSEM provides state-of-the-art satellite preparation facilities at the Baikonur Cosmodrome in Kazakhstan.

*METOP-A* will be the first of the series of three *METOP* satellites that will be launched at four and a half year intervals to provide 14 years of operation. They constitute the space segment for the EUMETSAT Polar System (EPS), which, in conjunction with the USA POES satellites, provides global meteorological coverage from low Earth orbit. *METOP* will be the first European satellite dedicated to operational meteorology in low polar orbit, at a nominal altitude of 820km. This will complement the data currently being provided by the existing family of *METEOSAT* satellites that operate in geostationary orbits.

*METOP* satellites will carry several instruments for meteorology, climate monitoring and humanitarian missions. The payload is a mixture of instrumentation provided by NOAA/NASA, and new instruments developed in Europe to provide state of the art remote sensing. In combination, the payload will ensure enhanced accuracy for measuring temperature, humidity, the speed and direction of the wind above the ocean, and the distribution of ozone in the atmosphere.

*METOP* is equipped with a Low (LRPT) and an (h.r.p.t.) High Resolution Picture Transmission link, though neither are fully compatible with the TIROS (NOAA) satellites. Both data streams provide real-time data only, that is only the live measurement data from the area the satellite is currently scanning during fly-over can be acquired. HRPT will contain the complete instrument data; LRPT will provide selected data (HIRS/4, AMSU A1/A2, MHS, and SEM) and data from only three compressed channels of the Advanced Very High Resolution Radiometer (AVHRR) instrument. Those with NOAA h.r.p.t.



■ Fig 9: Rob Alblas (centre) explaining his software.

reception hardware should be aware that the METOP data is not an equivalent but is an advanced form called AHRPT.

## Melting ice

When the satellites rise between some of the trees in neighbours' gardens I manage to receive the h.r.p.t. transmissions while they are still over the north-east. Fig. 11 shows one of my favourite regions - the waters surrounding Norway where, on cloud-free days, the ice cover can be seen. On the original images one can zoom in to see individual ice sheets in upper Bothnia. By late April these are in seasonal retreat.

## Around the World

This month's image was originally received by GOES-12, the American geostationary WXSAT located over the east coast of the USA.

## WXSAT-L returns

Some editions ago I mentioned the return of the Internet's oldest WXSAT forum. The list was operated by Paul Ruscher. WXSAT-L is a community list for weather satellite professionals, amateurs, and hobbyists. It is designed to provide scientific, tracking, launch, and operations information for the WXSAT community at large, much as later



■ Fig 10: John Tellick talking with visitors to the GEO Shop stand.

Position	Satellite	Comments
-	FY-2D	and FY-2E are planned for launch in 2006 and 2009.
-	MSG-2	scheduled for launch on 23 August this year.
-	MTSAT-2	scheduled for launch later this year.
0°	METEOSAT-7	transmitting WEFAX and Primary Data until end of 2005. Easily received in Britain and Europe but probably no longer worth setting up new equipment (see METEOSAT-8).
10°E	METEOSAT-6	provides operational rapid scanning service (RSS).
63°E	METEOSAT-5	provides Indian Ocean Data Coverage service. The IODC service will continue via METEOSAT-7 when MSG-2 is successfully launched.
74°E	KALPANA-1	(formerly METSAT India). India's first exclusively meteorological satellite.
76°E	GOMS-N2	(ELECTRO-L Russia) to be positioned at after launch scheduled 2007.
83°E	INSAT-2E	India - last of the series with a met payload.
105°E	FY-2C	China.
123°E	FY-2B	Backup satellite for FY-2C.
140°E	GMS-5	Not imaging due to failure - see GOES-9.
140°E	MTSAT-1R	Set for to take over from GMS-5.
155°E	GOES-9	Pacific ocean - to cover for GMS (Japan).
3.4°W	METEOSAT-8	Transmitting the new digital image stream via EUMETCast relay from HotBird-6.
75°W	GOES-12	(GOES-East) operating over E coast USA.
105°W	GOES-11	Standby backup for both GOES WXSATs.
135°W	GOES-10	(GOES-west) operating over W coast USA.

Images from some of the new satellites should eventually be included in the METEOSAT-8 Foreign Satellite Data image group.



■ Fig 11: NOAA-16 1233 24 April h.r.p.t. image showing Norway.



■ Fig 12: GOES-12 1800 8 May via METEOSAT-8 © EUMETSAT 2005.

lists do now. It was suspended some time ago due to inappropriate postings. During one of my chats with Paul he told me that he planned to re-start the list this year - hence my early announcement some time back. Anyone wishing to re-subscribe should E-mail the address [wxsat-request@met.fsu.edu](mailto:wxsat-request@met.fsu.edu) plus, there is a website [www.met.fsu.edu/explores/wxsat/](http://www.met.fsu.edu/explores/wxsat/)

## Current & Future WXSATs

Weather satellites (WXSATs) are so important to the economies and safety of all nations that there is an ongoing programme of launches to ensure that failed satellites, or those with one or more onboard problems can be replaced in due course. Due to the success of EUMETCast, this principal will be applied rigorously to MSG-2 - so we can look forward to continuing transmissions even when the new direct downlinks are available! Table 1 provides a summary of currently active geostationary WXSATs, together with notes about near-term launches.

## Frequencies

a.p.t.

MHz	WXSAT
137.50	NOAA-12
137.50	NOAA-15
137.62	NOAA-17
137.9125	NOAA-18

During overlap periods with NOAA-15, NOAA-12's a.p.t. may be switched off.

h.r.p.t.

GHz	WXSAT	Notes
1.6980	NOAA-12	
1.6980	NOAA-16	
1.707	NOAA-14	Faulty - no image content
1.7025	NOAA-15	
1.707	NOAA-17	
1.698	NOAA-18	Should be transmitting on either or
1.707	NOAA-18	
1.7005	FENGYUN-1D	

WEFAX

METEOSAT-7 (geostationary) transmits WEFAX on 1.691 and 1.6945GHz, and Primary Data on 1.691GHz until the end of 2005. METEOSAT-8 HRIT, HRIT and other formats transmitted via HotBird-6 at 13°E on transponder 117 - 10.85344GHz as EUMETCast data.

# Propagation

Forecasts

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- E-mail [Jacques@pwpublishing.ltd.uk](mailto:Jacques@pwpublishing.ltd.uk)

## How to use the Propagation Charts

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

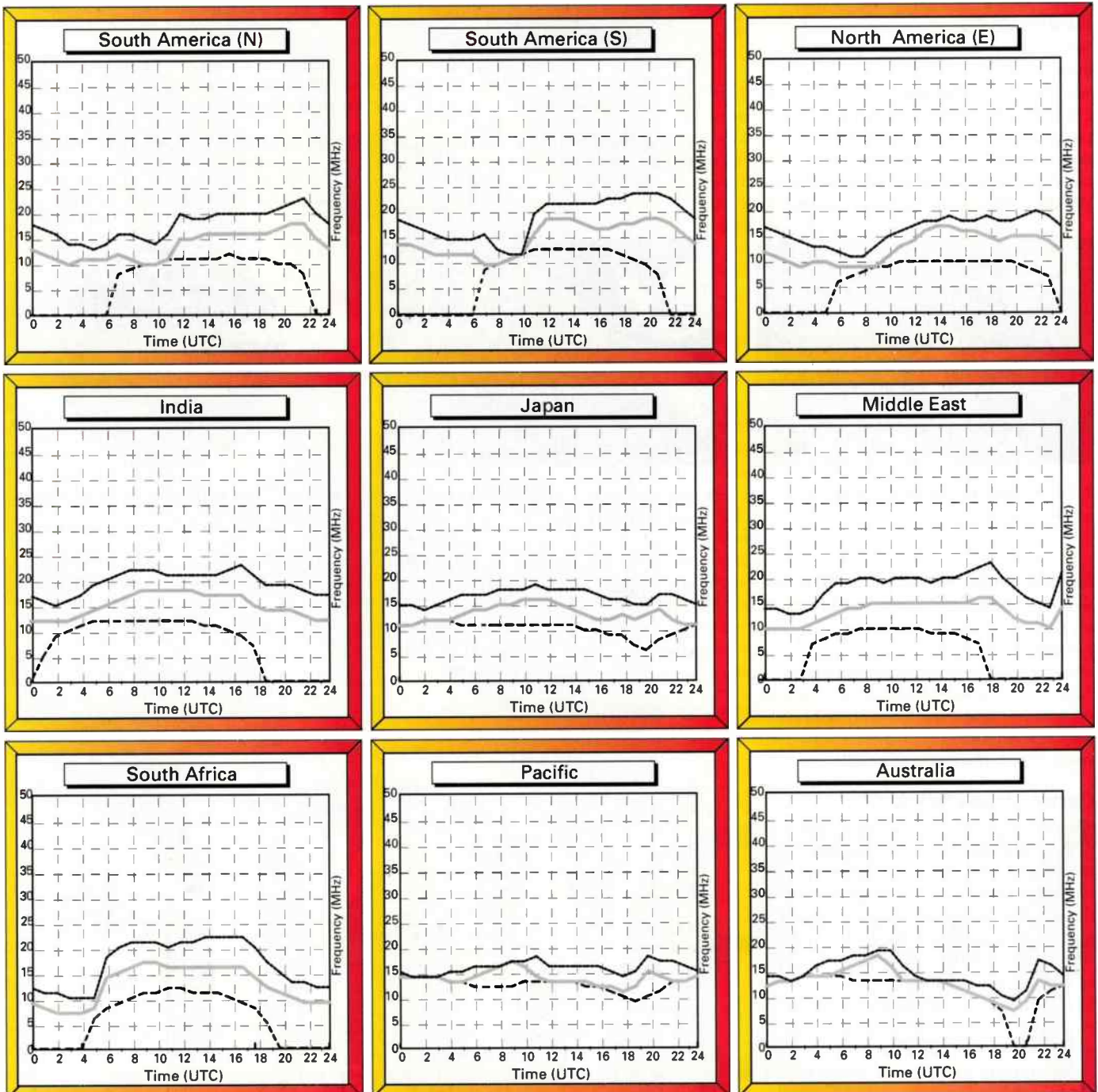
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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

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

Good luck and happy listening.

July 2005  
Circuits to London



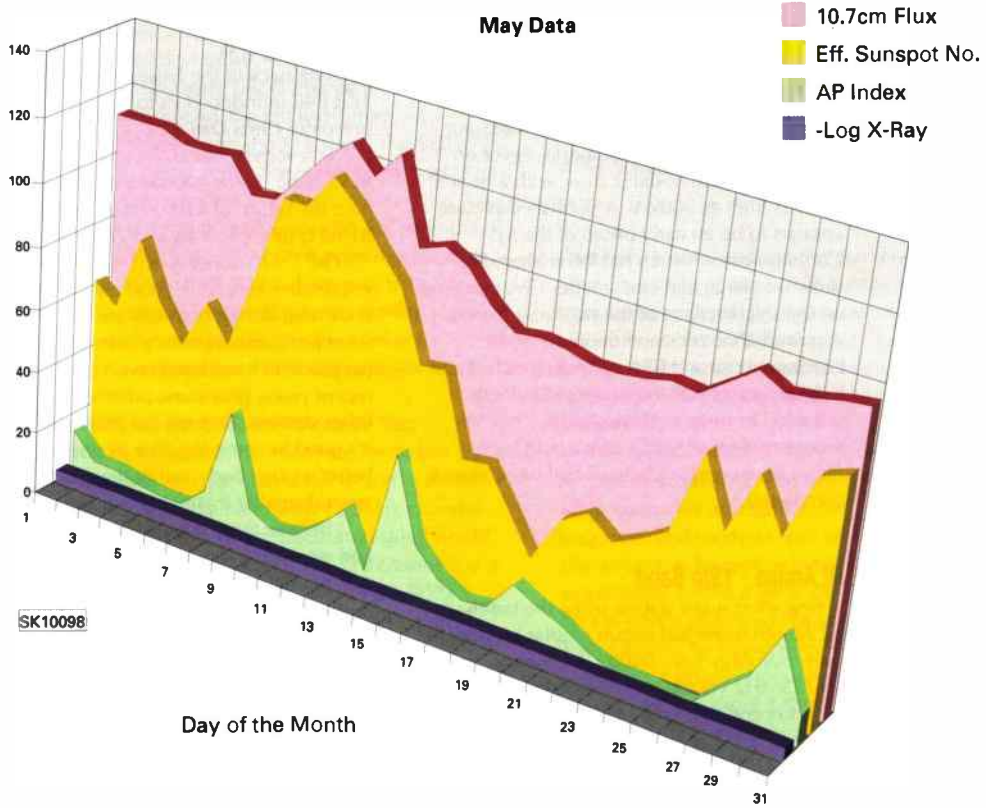
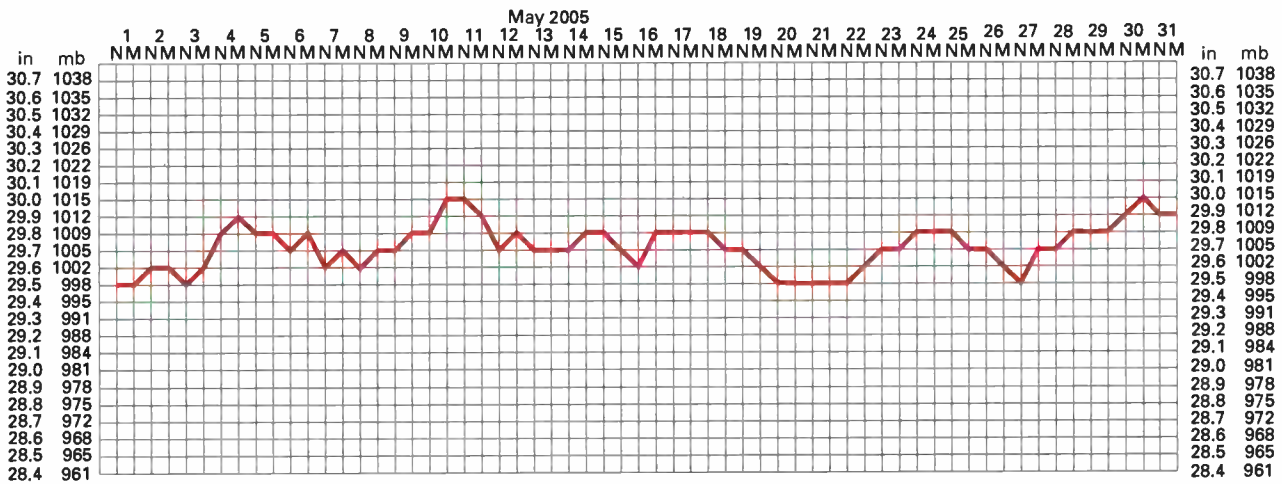
SK10097



# Propagation Extra

● **Kevin Nice** G3UNR, BRS95787,  
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Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, May 2005.



## guide to the chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity. The K and AP indices are measures of geomagnetic activity. The K index ranges from zero (very quiet) to nine (severely disturbed). K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions. The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

# Off<sup>the</sup> Record

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**H**ello and thanks to everyone who has been in touch with kind comments and information for inclusion. **Ivan** from Navan in Ireland has sent me a press cutting stating that the launch of Phantom FM in Dublin is being held up indefinitely. This is as a result of a legal challenge, which is being brought by Zed FM, one of the stations, which were not awarded the licence.

As a general point, it strikes me that anyone trying to do radio broadcasting needs to be extremely determined and resilient. Doing any kind of business is always tough, but in radio, with all the extra bureaucracy and legalities, mainly put there by state authorities who are scared of something, it can become a nightmare.

There is usually little or no money to be made in it either. Looking at these sorts of cases it strengthens the argument that regulation should be reduced to allow pretty much any station to have a go provided it avoids causing technical problems for others and beyond that just allow the market forces to determine who stays on and who goes off air.

## Inbox

An E-mail from **Sean** mentions that Britain Radio International (BRI) celebrates 25 years of broadcasting this June, and some special programmes will almost certainly be aired. BRI is a professional sounding station, fronted by presenter **Roger Davis** and can be heard via the 48m band transmission facilities of Jolly Roger Radio International, usually at least a couple of weekends per month.

Sean reports reception of Laser Hot Hits on the alternative frequency of 6.210MHz as clearer than the long-established 6.220MHz. The station has been heard to describe the more recent appearance of another European station, Mystery Radio on 6.220MHz, as 'Jamming'. It's hard to understand why any station would start up on this channel with Laser having been established on it for so long?

## MV Communicator Sold

Several reports from the usually reliable sources are saying that the former Laser ship has been bought by **Paul Rusling's** Isle of Man l.w. station and that plans are being made to use the ship for broadcasting, at least on a temporary basis until the offshore platform can be built. The hope is that the ship will be refurbished and installed with a 100kW transmitter and will allow the station to launch soon.

When the 500kW platform does take over, the ship will still be able to play an important role in the operations of the station in a number of ways. In technical terms, broadcasting on l.w. presents a challenge and it is not yet clear if the ship will be fitted with a conventional mast antenna or (as with the platform) a Crossed Field Antenna (CFA), which is said to be expensive. Other stories emerging seem to point to the latter as we will see.

## Strange Structures on Radio Ships

Back in early April, we had to be careful about believing stories about such things as revolutionary compact antenna designs, but it seems the developers of the Crossed Field Antenna are now offering a service to supply and install their patented invention on ships to be used as broadcasting stations. Advantages would include avoiding planning permission problems for taller mast structures and good signal propagation, resulting from the conductive salt-water earth connection. The company claim that latest developments to the antenna can even provide several dB of gain.

We are told that a ship is to be fitted out and will broadcast in Alexandria, Egypt on 162kHz l.w. and 558kHz m.w. with a quoted e.r.p. as high as 500kW. A published picture appears to be an early photo of the *MV Communicator*, which has been altered to show one large and one smaller CFA mounted on the ship in place of the two mast towers. I enquired about this and the reply from company boss and CFA co-inventor **Dr. Fathi Kabbary** states that the picture is indeed intended to show scale and be a representation of how a ship could look, rather than being a photo of real work already completed.

## Mi Amigo - 19m Band

A new short wave station using the familiar *Mi Amigo* name has begun regular broadcasts every Saturday from 0900 UK time on 15.725MHz via the transmitters of IRRS in Italy. Reception has been good in England. Power is understood to be 20kW.

The project is run by **Neil Gates**, whose name sounded familiar, so I wrote to ask him about himself and the station. According to his reply he is an avid reader of *SWM* and this

column, so "Hello Neil!" It seems he presented the last programme on Caroline from the North Sea and was on board the night the *Ross Revenge* went on to the Goodwins.

I asked about his use of the station name and he told me that he chose it because it's a name, which will be forever connected to free radio broadcasting and free radio listeners are his target audience. He goes on to say that he wants *Mi Amigo* to be an open forum for anyone who has anything to say musically or



verbally. Producers and presenters of programmes are invited to get in touch.

## Pipeline Radio

This former land based pirate gave up its naughty ways and went legitimate quite a while ago and has recently been pushing hard to expand its list of fine presenters and also to look for some higher profile transmission outlets. Station manager **Tom Mackenzie** told me that the station has financial backers in place and that we should expect to be hearing more from the station in the weeks and months to come. As of late April, Pipeline joined the list of stations, which can be heard from time-to-time via the 9.290MHz transmitter in Latvia.

## Recent Reports

Looking back to the Easter weekend, ENIGMA TKR 846 introduced us to the station's new presenter **Chris Day** who, along with Badger, brought some entertainment and jollity to the m.w. band. Some people were surprised to hear the return of Radio Free London (RFL) to 819kHz as well as 48 and 76m.

The 3.940 outlet was particularly impressive, receiving good reports over a wide area during both day and night. There were programmes from a number of the key people who have been involved with RFL in recent years, plus some other voices from other stations. Perhaps the philosophy is that it's good to come together as one bigger-and-better unified body, rather than to remain as several smaller fragments, who can say?

I believe there were a few raised eyebrows and reservations expressed about whether it was the right decision to resurrect the name. As someone who likes to think positively, I remind myself and others that hard work goes into putting out broadcasts and that is to be applauded.

Many have described RFL as a top-notch station over the years. Enthusiasts and fans of real radio listening will be at their happiest if they can hear the best possible sounds when they tune in with their real radio receivers, won't they?

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If any listeners understand spoken Arabic the bands are made for you at the moment. Bang on 14MHz at many times of the day stations can be heard talking in that language. Some are thought to be vessels smuggling in and out of Middle Eastern ports and others are involved in various wicked activities, the details of which would make your hair stand on end! I can only assume that intelligence agencies are monitoring this traffic. If not – why not!

When Iraq was under the boot of the Ba'ath Party, radio communications were strictly controlled, as they are under any totalitarian regime. Since the country has been liberated there are no regulations at all.

Whereas previously the airwaves in Iraq were all but silent, nowadays every frequency from d.c. to light seems to be in use there. The whole spectrum is totally packed. There is much to listen out for but, of course, most of it isn't in English.

It has always been the case that when a nation in that region is in crisis, that the occupants all end up keeping in touch with each other using American CB radios. This was certainly the case in Lebanon during their civil war when even the smartest home would have a CB hooked-up to an antenna on the roof and an old car battery.

## Extremely Low Frequency Signals

My mention, in April, of the HAARP project, prompted Mr. Coles from Leicestershire to write enclosing a photocopy from *Radio Communication* August 1979. *RadCom* quoted an extract from the newsletter of the Planetary Association for Clean Energy that informs us that in 1976 and 1977 the USSR (remember them?) were transmitting high power extremely low frequency signals.

These emissions were sometimes accompanied by "small radius displays similar to the aurora. In some parts of Britain the fluorescence was accompanied by a humming sound." The Association also quote other incidents where the fluorescence and an audible hum occurred and infer that these were caused by the e.l.f. transmissions from the Soviet Union.

It's not illogical for extremely low frequency emissions to create an audible frequency. Is this the noise that has been featured in many news broadcasts\* in the last

few years? Only certain individuals seem able to hear the noise.

One lady who lives 10km from my home is certain that it wakes her at 0400 every morning. Being rather good at sleeping I've not woken at that time to check the l.f. bands, but I may make a special effort to do so.

Many thanks to Mr. Coles for his letter and the photocopied pages from *RadCom*. Your filing system has mine beat by a long shot!

*\*Note: This sound is most probably due to nearby high power radar transmissions often referred to as PRF breakthrough. Ed.*

## Simple to Operate

Although the complexity of all radio systems has increased tremendously in recent years there is still a requirement for radio gear that can be quickly established and is simple to operate. So h.f. systems will continue to be manufactured and developed.

There are many aid agencies and Non Governmental Organisations (NGOs) who rely on h.f. radio for their communications needs, as well as peace-keeping forces.

Many of these user organisations have become concerned with the relative ease by



which monitors (like us) can eavesdrop on their radio systems. In the past listeners would utilise audio inversion scrambling like the excellent 'Invert' program that was featured in *SWM* some time ago to overhear transmissions that these organisations would use.

The NGOs and the like feel that are

obliged to use h.f. as satellite telephones do not always work and their battery charging requirements are sometimes less than robust. To put it simply they need a basic communications system and h.f. still fits the bill. In order to provide equipment for this ever increasing market several companies are building h.f. sets specifically for this, as well as for small unit military applications.

One such company is Q-MAC of Australia. They design and manufacture the HF-90 h.f. transceiver system. A basic 50W s.s.b. radio, it can be configured in a portable, mobile or base station mode with specific applications being catered for by the availability of a wide range of customising accessories. The radio supports voice telephony, data and frequency

hopping and operates in the 2-30MHz range with the makers emphasising their range of Near Vertical Incidence Skywave (NVIS) antenna products.

A few years ago some pundits were confidently predicting the demise of h.f. communications as more sophisticated technologies became available. It seems that the reverse is true as conflict increasingly destabilises what were previously reasonably safe nations, their infrastructures fracture and they begin the slide to third world status.

It's in these regions that radios such as the HF-90 are designed to operate in increasingly arduous and challenging conditions. The demand will be there for some time to come and so will listeners like us.

## Turbine Interference

Travelling throughout the UK it's hard not to notice the fresh forests of wind turbines that are sprouting on many previously open spaces. Talking to engineers from the power companies they are, to put it mildly, scathing about the usefulness of these machines.

From what I can see many of them appear stationary in all weathers and I'm told that those that do deign to spin only produce minute amounts of power. Apart from the obvious visual intrusion of wind farms their presence may also have a detrimental effect on users of the h.f. radio spectrum.

It seems that in some locations they are causing what can only be described as QRM (noise) on h.f. radio frequencies between 2.8 and 17MHz. The actual cause of the noise emanating from these things has yet to be determined but h.f. users are reporting the problem wherever wind farms are planted. At the moment there seems to be a lack of interest in the noise problem but with the increasing deployment of these windmills it looks as though the problem will spread as fast as the windmills.



# Satellite

TV News

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**M**id/late May had originally been the likely launch of *STS-114* but additional modifications to an external fuel tank has now pushed the *STS-114* launch to mid/late July. The re-commencement of Shuttle flights will mean work can go ahead on the *ISS - International Space Station* - the Shuttle is the only means of lifting heavy cargo into space. Trips up to the *ISS* have been made using Russian Soyuz capacity, mainly to ferry crews and the essential day to day living requirements. The latest crew change and trip back to Earth was carried on 24 April with live pictures down to Russia and fed to NASA-TV, which in turn was re-fed back into Europe and distributed over the familiar *UP4* slot @ 10°E - 10.972GHz-Vertical (Symbol Rate 4167+ FEC 5/6) and an additional frequency over 10°E - 11.081GHz-V (5632+3/4). Pictures showed the *ISS* crew leaving and entering the rather cramped Soyuz, the undocking and slow drift away from *ISS* and eventual blast to put the spacecraft into a return trajectory. Russian TV can be watched over *Atlantic Bird-1*, 12.5°E, 11.130GHz-H (3667+3/4). The programme is running 525-lines NTSC and displays [www.rusmirtv.com](http://www.rusmirtv.com) Programming carries the 'PYCCKNA MNP' (the 'N' in 'MNP' is backwards) with western style commercials, language is all Russian, suggesting that the NTSC channel is destined for an American cable TV service. It's a very strong signal across Western Europe.

I found UK election down-links from *Intelsat 801* - 31.5°E to *Eutelsat W2* - 16°E. The lower 11.000-11.200GHz slot on *Atlantic Bird-1 (AB-1)*, 12.5°E carried seven BBC links, mainly using MPEG 4:2:2. The BBC were also active on the low Ku vertical slot of *Eutelsat W2*, three feeds found were all sourced from Scotland, the low Ku horizontal slot included a Sky News feed from Hull West via 'BT TES\_34 EN' showing the count for the Labour candidate, John Prescott appeared to offer support. The upper Telecom band segment horizontal found another two Sky News feeds - the 12.500-12.565GHz-H range is the best spot to check out European wide satellite circuits. Apart from the German and Dutch versions of *Big Brother*, Russian and Middle Eastern feeds also are carried, the evening of 8 May and an Israeli report was transmitted from a balcony - 'ISR-008', 12.541GHz-H (5632+3/4). Another live report out of Israel appeared over 16°E 10 May, seemingly a ceremony related to VE Day, service id '2XG-EN2' gave no clues as to the occasion down-linking at 12.541GHz-H (5632+3/4).

**Gareth Foster** SE9, an established TV/FM and Sat DXer, notes that the analogue TV services of RAI-TV carried for years over the *Hot Bird* 13°E slot closed down early May. They are still available within the same slot in digital. Gareth recalls that when he started satellite reception in 1988, RAI-1 was one of the first TV channels received - RAI 2 and RAI 3 came on air later. Back then and now he uses a manually tuned (a rotary knob) analogue Zeta receiver, works as well today as in 1988.

'CBS NEWS LONDON' - or 'CBS NEWS BAGHDAD' often appears over 16°E running 625-lines PAL or 525-lines NTSC - often linking out of Baghdad into the CBS London Bureau en route for the New York CBS News Centre. May Day and the CBS reporter, detailed the 100 deaths over 2 days through car bombs and assassinations. The CBS reporter noted to his NY colleagues that the crew had several trips away from the hotel protection over the 28 day shift. CBS usually appears over 16°E as 'SERVICE 1' or sometimes a 6-fig. ID such as '514045' - a recent Baghdad report was linked over 12.518GHz-H (5632+3/4).

An outside broadcast down-linked 28 April live from a UK venue - the Cystic Fibrosis Trust presented *Breathing Life Awards 2005*. Many children and adults details of

their achievements. The transmission came "Live across the UK" and aired on 16°E, 11.162GHz-V in 16:9 format.

## Moroccan Desert

A few days earlier Rallye des Gazelles a 'car event' in the Moroccan desert with motors chasing off across the sand dunes, was carried at 1700 - an edited VTR payout of that day's best video clips over W2, 16°E, 12.533GHz-H, both the above used 5632+3/4. Still in the desert and another marathon event this time it's on foot. 'GCR/FLY' flyway terminal brought these hot pictures of sporting despair at 11.106GHz-H (6111+3/4) over Eutelsat's 36°E *SESAT* into **Roy Carman's** home in Dorking.

During 20 April 'VTM DSNG-6 ENG' transmitted a Dutch football match, this a wide screen 16:9 picture across the standard 4:3 screen (12.554GHz-H), mean while down at 12.533GHz-H we found Belgian's 'BEL-058' also running football but this was a 'squashed' widescreen offering within a 4:3 screen. No problems however, with Sky Sports who, on 17 April, appeared at the 'Rose Bowl' cricket venue near Southampton. Much travelled 'BT-TES 32' sat truck was linking play in the Essex v. Hampshire match from the ground which had ground to a halt - rain stopped play! The final report into Sky News was at 1900, TES-32 closed down the 11.128GHz-H link and went home.

Speedway in a Scandinavian forest, this a playback compilation of several heats and fed back to the Stockholm TV centre, the only identification on the 12.548GHz-H transmission was 'VV1'. All the thrills but very few spills. All the above carried over W2, 16°E using SR 5632 + FEC 3/4.

**Alan Richards** nr. Skegness, has just invested in a 'glass' satellite dish, "it's absolutely beautiful" he comments, well packed and premium hardware, apparently a popular dish in the South of France and is transparent. Being mainly used in the Mediterranean and has greater elevation adjustment than those intended for the UK market. Slight modification was necessary to make the dish 'look down' for the much lower elevation needs of the UK enthusiast tracking across the Clarke Belt. In use with an MTI 0.3dB noise LNB and Alan wondering over the efficiency of a transparent dish finds it's improved over that of a 750mm dish - the glass dish measures 860mm high by 800mm across. It doesn't bring in the *ARABSAT* programming though at 26°E however. Alan can 'see' 'PAS-9 @ 58°E and notes a BT bouquet - 11.477GHz-H (26463+3/4) - recently seen with 'WRC' rally cars on this 5-ch bouquet. Included across the bouquet was a camera from a drivers helmet-cam; a helicopter-cam, several shoulder cams from the pits and general views of the action, locals overheard in the pits with spoken accents suggesting the WRC rally came from New Zealand. At the end of the event cut to black and the usual 'BT TOWER' caption appeared with colour bars. And 'NBC New Jersey' has been seen recently running news content of the Middle East over *Telstar-12* 15°E, 11.518GHz-H (3744+3/4). Even with a smallish glass dish on a ground stand in a static home park you're still able to sat-zap across the Clarke Belt - the glass dish tends to 'merge' against the static home wall and lacks any visual intrusion.

One of the most important commercial events of the past weeks was the flight of the European made A360 Airbus. Several satellite trucks were at the airfield 27 April to witness the successful inaugural flight into the clear French skies. Both **Roy Carman** and **Rini de Weitzje** (Holland) obtained dramatic pictures of the day. Some four sat feeds were noted over W2, 16°E - 11.135, 11.149, 11.168 and 12.525GHz (all H, 5632+ 3/4) and an EBU feed over W3A, 7°E - 11.084GHz-H (13333+7/8) - this with an interesting service identification of 'TULU 1, 2, 3'.



Jerusalem Capital Studios, Jerusalem, via W3A, 7°E.



'CBS News LOND'[ON] from W2, 16°E.



BT on-air caption from *Eutelsat W1*, 10°E.



'VNN LIVE' - Virtual News Network disaster channel, AB-1, 12.5°E.



Desert marathon runners slog it out in the Saharan sun, via *SESAT* 36°E.



4 in 1 picture over AB-1 of news bureau details and C-Band frequency.



The giant A360 aircraft prepares for the inaugural flight, over W2, 16°E.



Turkish news agency pictures of large factory fire over *Eurasiasat* -1, 42°E.

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# Decode

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**T**his month I've had a few enquiries from listeners wanting to have a crack at monitoring the amateur GPRS system - I'll use this as a prompt to bring you up-to-date with Packet and the APRS system and show you how to use some of the current software packages.

## Background

Let's start with an introduction to amateur Packet radio. Data communications in amateur radio have moved forward at a significant pace over the last few years. When I started in amateur radio, RTTY was state-of-the-art for data communications and many amateurs were using thumping great CREED teleprinters. However, the launch of enthusiast home computers such as the Tandy TRS-80 Model I and the UK101 Superboard in the late 1970s transformed data communications.

Very soon, basic Morse and RTTY programs were being created and put together by enthusiasts and released as shareware via bulletin boards or through the radio press. Once RTTY moved away from the heavyweight Creed teleprinters and moved to the growing range of home computers, its popularity increased enormously. However, the systems had a number of built-in weaknesses that started a few bright minds seeking to use the new computer technology to find a better way to communicate.

## AMTOR Arrives

The result of all this work was **Peter Martinez's** excellent AMTOR (AMateur Teleprinter Over Radio) system. The significant feature of this system was the idea that the message was split into three character chunks using a special alphabet for the characters. At the end of each burst the receiving station would send an acknowledgement back to confirm that the last part of the message had been received intact. The message then progressed with the next three characters until the transmission was complete. If errors were detected, the receiving station could ask for the last set of characters to be sent again.

AMTOR was, and indeed still is, a very effective communication system and is ideally suited to the variable and often very difficult conditions found on the h.f. bands. The system is particularly well suited to very low power communications and I used to have regular AMTOR contact with South

America at dawn using just one watt of r.f. from my transmitter into a simple wire antenna!

Not surprisingly, the success of AMTOR sparked ideas in a number of people to see if the successful principles used in AMTOR could be used to develop a more powerful system that could handle the demand for data links that was being generated by the success of the home computer. The popular result of this effort was the Packet radio system that was first used by **Lyle Johnson** and **Den Connors** back in 1982.

The Packet system still uses the basic principle of breaking the message up into manageable chunks and checking for successful reception, but is very different in many other respects. The original systems were designed for use on the amateur v.h.f. bands where propagation conditions are much more predictable. As a result, Packet was designed with a standard operating speed of 1200baud or 9600baud, as against the 100baud used for AMTOR. The relatively high reliability of the v.h.f. links meant that AMTOR's system of chopping the message into three character blocks was somewhat over the top and was rather wasteful. So, the Packet system evolved with much longer character block lengths.

To ensure continued high reliability the Packet error correction system was enhanced through the use of a checksum to check the integrity of each data packet. Just to add even more flexibility each of these new data packets has an address field as well as an assortment of other control information. The end result is a sophisticated data transmission system where each chunk of information is safely wrapped-up with a unique address and quality check - very much like sending a packet through the post with recorded delivery - hence the name Packet radio.

Because each packet is self contained, the system can even cope with the packets arriving in a different order. This is an essential extra that allows great flexibility in the routing of data between any two points. If there is congestion on the network individual packets can be put in store for a short period till a gap appears and then forwarded - all this in the confidence that the message can be successfully reassembled when it gets to the distant end.

One other important feature of Packet that I've not yet mentioned is its ability to handle lots of stations all using the same frequency. Because Packet data comprises relatively

short transmissions it would be very wasteful to allocate each station its own frequency. However, there are a few logistical problems of putting stations on the same frequency, i.e. what to do about collisions as there are bound to be occasions when two or more stations want to transmit at the same time.

The solution to minimise the effect of collisions is pretty simple, but has several components. The first safeguard is a listening check, i.e. the Packet terminal monitors the channel and won't start the transmit process unless the frequency is clear. Assuming the transmission goes ahead, the next check is to wait for the receipt acknowledgement from the receiving station. If this doesn't come the transmitter waits a random time before re-transmitting. It's this random wait that forms the final element of the collision avoidance system. It might seem a bit crude, but it works well enough to be able to handle most amateur operator's traffic.

## Why APRS?

APRS, which is an acronym for Amateur (packet) Position Reporting System is a bolt-on to the Packet service and provides a host of new features that were previously not available. As you can see from the Packet radio story so far, it's a pretty sophisticated system that brings reliable data communications to the h.f. and v.h.f. users. So, why do we need APRS? One of the weaknesses of the basic Packet system is that it is really designed for one-to-one data transfers - and not for broadcasting to a group of receivers.

One of the drives for developing APRS was the need to be able to share information with groups of interested parties. A good example of this is DX spotting, where a group of enthusiasts are on the look-out for rare or very distant amateur radio stations. When such a station is spotted the group needs to be able to alert each other so that others in the group can make contact. Traditionally this was done using a voice net with an open channel where people would talk to each other.

However, such a voice net, usually on v.h.f., was somewhat limited so a better system was required. The APRS system provides the answer as any of the team could send a single message with details of the DX spot and the message would instantaneously be received by the rest of the group. This type of working with APRS is known as a DXCluster.

## Under the Bonnet

To make APRS work the system differs from Packet in three main areas:

■ The Main Web Page for *UiView* and associated programs.

- 1) Inclusion of maps and other data displays to organise data:
- 2) Uses a special One-to-Many protocol to update all users in real-time and:
- 3) Uses generic digi-peating so you don't need to know the network routing before you can use it.

Let's start with a look at the information that's available from within the APRS system:  
**Status:** This is a simple list of all the active stations along with a record of the last command that was issued.

**Position:** This is a really powerful extra and provides station location details - typically Lat and Lon from a GPS unit. However, this can also contain cruder positions such as grid square and can be supplemented with direction (DF) information or weather reports.

**Messages:** This is the main information field where broadcast messages are communicated.

**Bulletins:** Very similar to messages except they are normally used for high priority traffic.

**Stations Heard:** This is a logging system that shows the total number of packets per station, etc. It can be useful to show how active a particular APRS connection is.

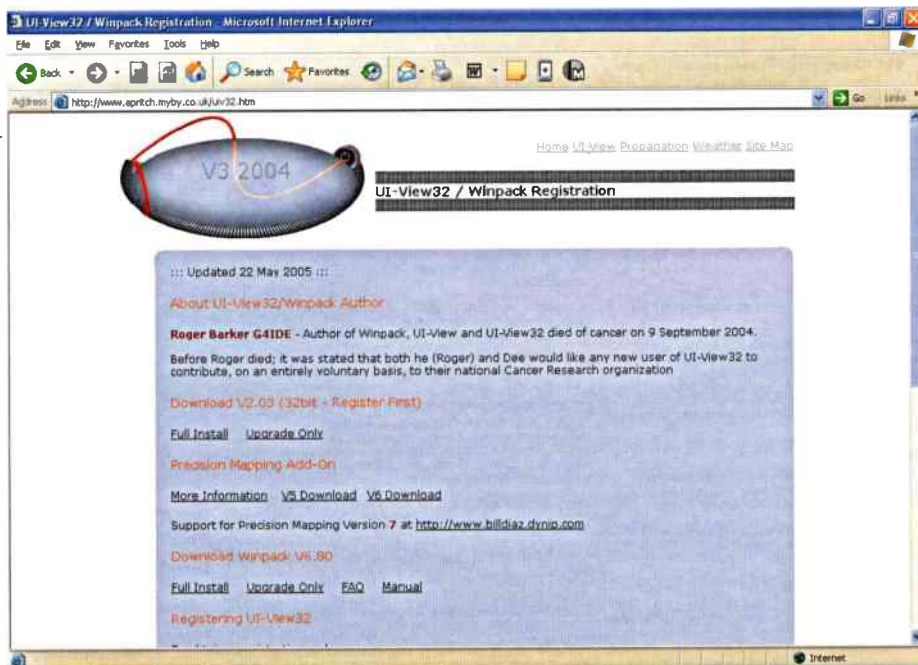
**Station Tracking:** Whilst the Position section provides the latest location the Tracking shows a history of movement so you can see direction and speed for mobile stations. In addition to the conventional v.h.f./u.h.f. and h.f. data links for APRS there is also a network of seven orbiting satellites that can be used to repeat APRS packets.

I suspect you can see that the APRS system is extremely powerful and has great potential. One of the key areas where all these features are invaluable is civil emergencies or large public events. If you were to use APRS to help control such an event, you could have full details of everyone's location along with on-the-spot reports in real-time. I'm sure you can see that this is so much more powerful than a conventional voice based system.

Another, maybe surprising, use of APRS is for direction finding. By combining signal strengths from a number of geographically displaced stations and reporting the results back to one point it's relatively simple to narrow down the location of any signal.

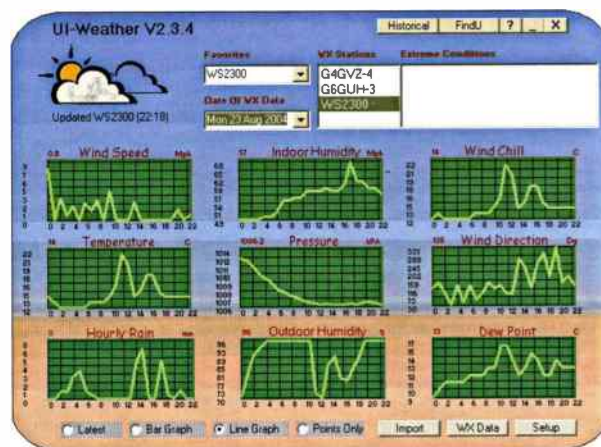
### What can you hear?

The most obvious difference between monitoring Packet and APRS is the facility to plot received station's position on a map. This really starts to bring your monitoring to life and you will soon start to see reception patterns emerging that will give you information about the performance of your antenna. The other point you'll note is that



many amateur stations will include a weather report with their position data. This is a great way to find out what the weather's doing around the country and can be used to build your own forecast. Another interesting data type is the DX-Cluster I mentioned earlier. If you tune into your local DX-Cluster you will get early sight of any particularly rare or distant stations. To find out where to tune you need to check the following website for details:

[www.armscroft.demon.co.uk/UKDXC/UKnet.html](http://www.armscroft.demon.co.uk/UKDXC/UKnet.html)



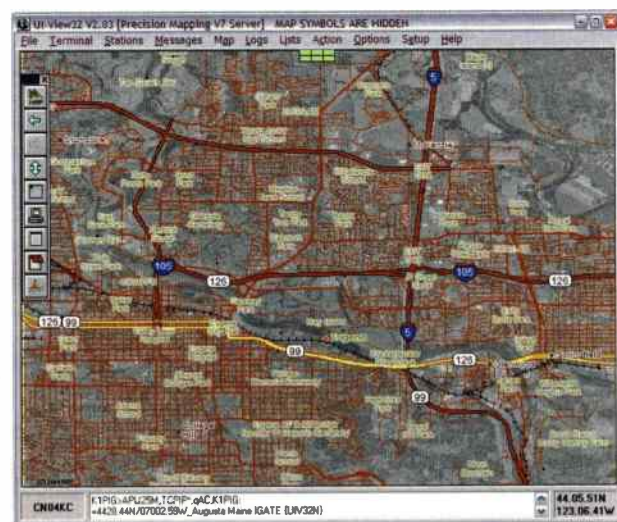
■ Example of APRS Weather display.

### What You Need

To get going on APRS you need two key software packages plus a v.h.f. and/or h.f. radio. As APRS is a Packet system you will need a Packet radio system for your computer. This can be in the form of a conventional hardware terminal node controller (TNC) or a software Packet engine. Two of the most popular pieces of software are *WinPak* and *UiView*, both developed by the late **Roger Barker**. Since Roger became a silent key last September, both packages have been made freely available. But the family have asked that users recognise his work by providing a donation to Cancer Research. The official site for registration is:

[www.apritch.myby.co.uk/uiv32.htm](http://www.apritch.myby.co.uk/uiv32.htm)

So, if you'd like to read through the above



■ Using *UiView*, by plotting stations over a detailed aerial photo.

once again, then get hold of the software, next time I'll take you through setting-up an APRS monitoring station.

# SWM UK Radio Club Listing

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

## NOTTINGHAMSHIRE

**ARC OF NOTTINGHAM, G3EWF.** Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

**DUKIERES ARS, G4XLT.** Meets at Ambleside Community Centre, Ambleside, New Oxton, Notts. Details from Colin Foster G7DXC.

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

**MANSFIELD ARS, G3QCQ.** Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from David Peat GORDP. Tel: (01623) 631931.

**NORTH NOTTS DATA GROUP, G0MNN.** Details from Tony Jenkins G8TFB.

**SIEMENS ARC, G8ZY, G8GQ.** Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

**SOUTH NOTTS ARC, G0OAU.** Meets at the Fairham Community College, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WUG. Tel: (01509) 672846.

**WORKSHOP ARS, G3RCV.** Meets at the Club House, 59-61 West Street, Workshop, Nottingham S80 1JP. Details from Terry Calvert G4GBS. Tel: (01302) 743130.

## SHROPSHIRE

**SALOP ARS, G3SRT.** Meets at the Tepestel Club, Railway Lane, Abbey Forge, 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) 255416.

## STAFFORDSHIRE

**BURTON-ON-TRENT & DARS, G3NFC.** Meets at the Stagehill Institute, Main Street, Stagehill, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HBV.

**CANNOCK CHASE ARS, G6SW.** Meets at the Four Crosses Inn, Wadding Street, Hatherton, Cannock. Details from Arnold Matthews G3FZW. Tel: (01543) 262495.

**CHAD RC, G4CAR.** Meets at the Swinfen Office Club, Swinfen, Lichfield, Staffs. Details from Bernard Jayne G88FL. Tel: (01543) 268569.

**LICHFIELD ARS, G3NMS.** Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smethers G3NLY. Tel: (01543) 672762.

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

## NEWCASTLE-U-LYME 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) 638901.

**SUTTON COLDFIELD RS, G3RSC.** Meets at the Rugby Club, Walmley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

## WARWICKSHIRE

**AVON VALLEY AREA, MORAD.** Details from Mr Peter Bradham G0WJU. Tel: (01905) 724531.

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

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

**STRATFORD-UPON-AVON & DRS, G0SOA.** 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, Binlrow West Road, Coventry. Details from John Beech G6SEQ. Tel: (01203) 673999.

**DUDLEY ARC, G4DAR.** Meets at the Community Centre, Sedgley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. Tel: (01384) 277925.

**HILLCROST ARS, G0SPM.** Meets at The College, Simms Lane, Netherdon, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457.

**KYNOCH RC & T.VS, G3HPH.** Meets at the Club Workshop, IJM Ltd., Sportsfield, Perry Bar, Birmingham. Details from Mr G. Nicholls. Tel: (01922) 635376.

**MIDLAND ARS, G3MAR.** Meets at Unit 22, 60 Regent Place, Birmingham (jewelry quarter). Details from John A. Crane G0LAI. Tel: 0121-628 7632.

**SANDWELL AMATEUR RADIO CLUB, G0CWC.** Meets at Sandwell ARC, Broadway, Oldbury, Walsley, West Midlands B68 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

**SIERRA HOTEL ARCS, G0OBS.** Details from Warwick M. Hall G4MWH.

**SOLIHULL ARS, G3GEI.** Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYY. Tel: 0121-783 2996.

**SOUTH BIRMINGHAM ARS, G3OHM.** Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRS Secretary.

**STOURBRIDGE & DRS, G6OI, G6SRS.** Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards.

**WEST BROMWICH CENTRAL RC, G4WBC.** Meets at The 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 G6RLJ.

**WILLENHALL & DARS, G4ETW.** Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

**WOLVERHAMPTON ARS, G8TA.** Meets at the Electricity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

**WORDSWLEY 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, G3HH.** Details from Mrs E.V. Harding 2E1AUQ.

**BRACKNELL AEC, G4BRA.** Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Elerton G3NCL.

**BURNHAM BEECHES RC, G3MWR.** Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G6EL. Tel: (01628) 625720.

**MAIDENHEAD & DARC, G3MOK.** Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

**NEWBURY & DARS, G5XV.** Meets at the Rugby Club, Monk's Lane, Newbury. Details from Max Maxwell G7DXC. Tel: (01635) 253233.

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

### BUCKINGHAMSHIRE

**AYLESBURY VALE RS, G4VRS.** Meets on the 2nd Wednesday of each month at the home of Roger Piper G3MEH in Weddington, near Tring, Hertfordshire HP23 6EN. Details from Roger Piper G3MEH. Tel: (01442) 826651, E-mail: roger\_g3meh@hotmail.com www.avs.mandarin-solutions.co.uk

**CHESSHAM & DARS, G3MDG, G1MDG.** Meets at the White Hill Centre, Chessham, Bucks. Details from Mr T.J. Threlwell G0VFW. Tel: (01442) 832169.

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

**MILTON KEYNES ARS, G3HIU.** Meets at Bletchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Bletchley, Milton Keynes. Details from Malcolm Bay M0MBO on (01525) 874075.

**MILTON KEYNES SCOUT ARS, G0SMK.** Meets at The Quarries, 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, Crofton. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 6948.

**BARKING R & ES, G3XBF.** Meets at the Parkside Community Centre. Details from Bill Chewter G0KQK. Tel: (01708) 474443.

**BROMLEY & DARS, RS8903.** Meets at the Victory Social Club, Kechil Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLX.

**CLIFTON ARS, G3GHN.** Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Veaney G7BK4.

**CRYSTAL PALACE & DRC, G3VCP.** Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G300U. Tel: (01717) 552170.

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

**ECHFIELD ARS, G3UES.** Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Ron Hewes G3TDR. Tel: (01784) 456513.

**EDGWARE & DRS, G3ASR.** Meets at the Watting Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Slater G0PQ8. Tel: 0208-953 2164.

**HAVERING & DARS, G4HRC.** Meets at the Fairkites Arts Centre, 51 Bilet Lane, Hornchurch, Essex.

**HS OF HARROW, G3EFX.** Meets at the Harrow Arts Centre, Riverside Road, Hatch End, Middlesex. Details from Mr C. Friel G4AUF. Tel: (01895) 621310.

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

**MITCHAM & DISTRICT ARS.** Meets at the ATC Hut, Commensale West, Mitcham, Surrey CR4 4HB. Details from Mr M. Knott G0WCR.

**SOUTHGATE RC, G3SFE.** 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 G4OHX. Tel: 0181-690 1274.

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

**WEST LONDON ARS, RS95599.** Details from Robin Clay G0VJI.

**WHITTON ARC, G0MNN.** Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Claton G0PFN. 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 G0PFC. 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.

**HODDERSDON RADIO CLUB, G0TSN.** Meets at the Rye Park Conservative Club, Rye Road, Hoddersdon, Herts. Details from Don Platt G3JNJ. Tel: 0208-292 3678.

**MIMRAM CONTEST GP, M0ABC.** Details from Alan Holdsworth G80U. Tel: (01707) 392950.

**RADIO SCOUTING TEAM, G82RST.** Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Livens G2CKB. Tel: (01992) 558493.

**STEVENAGE & DARS, G3SAD.** Meets at the Stevenage Day Centre, Chels Way, Stevenage, Herts SG2 0LT. Details from Don Bache M0XUP. E-mail: d.bache1@btinternet.com

**\*VERULM (ST. ALBANS) RADIO CLUB.** Meets at the RAFA, New Kent Road, off Marlborough Road, St. Albans, Herts. Details from Ralph G1BSZ. Tel: (01923) 265572.

**WELWYN & HATFIELD ARC, G3MGC.** Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (07973) 560649.

## SURREY

**BENTLEY ARC, G0VZS.** Details from Derek Gilbert G0NFA.

**CATERHAM RG, G0SCR.** Details from Mr P.N. Lewis G4AFL.

**COULSDON AMATEUR TRANS. SOC., G4FUR.** Meets at St. Swithuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Brnrs G0KZT. Tel: (01737) 552139.

**DORNING & DRS, G3CZU, G7DOR.** Details from John Greenwell G3AEZ. Tel: (01306) 631236.

**FARNBOROUGH & DRS, G4FRS.** Meets at The Community Centre, Meadon Avenue, Farnborough, Hants. Details from Mr Steve Austen-Jones MOCYF. Tel: (07759) 215842, E-mail: scja@btopenworld.com

**GUILDFORD & DRS, G6GS.** Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitbourn G0GSWE.

**KINGSTON & DARS, G3KIN.** Details from Mrs Mary Ashdown G0BVQ.

**REIGATE ATS, G5UK, G7RAT.** Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

**SUTTON & CHEAM RS, G2XP, G7SAC.** Meets at the Sutton United Football Club, Borough Sports Ground, Gender Green Lane, Sutton, Surrey. Details from John Putterock G0BVW. Tel: 0208-644 9945.

**THAMES VALLEY ARTS, G3TVS.** Meets at the Thames Ditton Library, Waits Road, Gages Hill, Thames Ditton, Surrey. Details from Cor. J. Pegler G3EHL. Tel: (01483) 284279.

**WIMBLEDON & DARS, G3WM.** Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Jim Bell. Tel: 0208-874 7456 or e-mail: james@bel0144.fsnet.co.uk

## SOUTH & SOUTH EAST

### EAST SUSSEX

**BRIGHTON RADIO CLUB, G4GQR.** Meets at Vallance Community Centre, Sackville Road, junction of Connaught Road, Hove. Details from Hon. Sec GORNS. Tel: (01273) 699104.

**CROMBOROUGH DARS, G0CWR.** Meets at the Plough & Horses, Washes Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

**EAST SUSSEX AMATEUR TV GROUP, RS178475 was GB3VX.** Details from Keith Ellis G8HGM. Tel: (01323) 720220.

**HASTINGS ELEC. & PC, G6HH, G1JHH, G6LL.** Meets at the William Parker School, Parkstone Road, Hastings, East Sussex. Details from Peter Firmin G0FUU, E-mail: peter.firmin@virgin.net or visit www.g4cus.freeweave.co.uk

**SOUTH-DOWN ARS, G3WQK.** Details from Jim Harris G4DRV. Tel: (01323) 728479.

**THE QRZ ARG OF SUSSEX, GB3VX.** Meets at the Coach Station, Warring Road, Eastbourne. Details from Stuart Constable M0CHW. Tel: (01435) 863020.

### HAMPSHIRE

**ANDOVER ARC, G0ARC.** Meets at the Village Hall, Widern, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

**BASINGSTOKE ARC, G3TCR, G0UYN.** Meets at the GEMS Social Club, Luster Road, Basingstoke, Hants. Details from Bob Brown M0CJL.

**FAREHAM & DARC, G3VEF.** Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397.

**HIGHFIELD PARK RC, G4WD.** Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heofield, Hants RG27 0LD. Tel: (07134) 225019.

**HORNDEN & DARC, G4FBS.** Meets at Loveclean Village Hall, Lovedean Lane, Lovedean, Hants. Details from Stuart Swain G0FYX. Tel: (01705) 472846.

**ITCHEM VALLEY ARC, G0MVR.** Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 613827.

**S0NY BROADCAST ARC, G4SZC.** Accredited C&G RAE centre. Meets at Sony Sports & Social Club, Priestley Road, Basingstoke. Details from Stephen Harding G4JGS. Tel: (01256) 55011.

**SOUTH HAMPSHIRE INT. TELE SOC., G3DIT.** Meets at G3JZV's QTH, space is limited. Details from Rev. T. Mortimer G3JIV. Tel: (02392) 649254.

**SUBMARINE ARC, G3BZU.** Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PPH. Tel: (01329) 232386.

**THREE COUNTRIES ARC, G4MWR.** Meets at the Bramshot Parish Inst. & Club, Headley Road, Liphook, Hants. Details from Damian Hamr G7RFV. Tel: (01428) 724456.

**WATERSIDE ARS, G4JYN.** Meets at the Applomere Scout HQ, Applomere, Hythe, Southampton. Details from Tony Horton G0UGK. Tel: (01703) 841794.

### ISLE OF WIGHT

**BRICKFIELDS ARS, G0BAR.** Meets at Brickfields Horse Centre, Newnham Road, Binstead, Isle of Wight. Details from Mr Pebody.

**ISLE OF WIGHT RS, G3SKY.** Meets at The Old Cafe, Whitecalf Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZFQ. 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, G5LD.** Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

**VALE OF WHITE HORSE ARS, G5RP, G4VWH, G6VWH.** Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

**CRAWLEY ARC, G3WSS.** Meets at the Tiglate Forest Rec. Centre, Hut 1A, Tiglate Forest, Crawley, West Sussex. Details from Keith Farrow G8KZC. E-mail: keith.farrow@btinternet.com

**HORSHAM ARC, G4HRS.** Meets at the Guide Hall, Denne Road, Horsham, West Sussex. Details from Alistair Watt G3ZBU. Tel: (01403) 253432.

**MID SUSSEX ARS, G3ZMS.** Meets at Marie Place, Laylands Road, Burgess Hill, West Sussex. Details from Mr C. Childs 2E1DCP. Tel: (01444) 244689.

**T.S. VINDICATRIX ASN, G0WVB.** Details from Don Still G000C.

**WORTHING & DARC, G3WOR.** Meets at the Lancing Parish Hall, South Street, Lancing, West Sussex.

**WORTHING & DISTRICT VIDEO RG, GB3VR.** Details from the Treasurer. Tel: (01903) 211919 (w).

## WILTSHIRE

**CHIPPENHAM & DARS, G3VRE.** Meets at the Sea Cadet HQ, Chippenham. Details from Jon Ainge G4LZG. Tel: (01249) 462610.

**SWINDON & DARC, G3FEC.** Meets at the Eastcott Community Centre, Savenake St, Swindon. Details from Den Forest M0ACM.

**TROWBRIDGE & DARC, G2BQY.** Meets at the Southwick Village Hall, Southwick, Trowbridge, Wilts. Details from Ian Carter G0GIT. Tel: (01225) 864698.

## SOUTH WEST & CHANNEL ISLANDS

### AVON

**BRISTOL ARC, G3TAD.** Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Benrey G7BYN.

**GORDANO ARG, G6GGR.** Meets at The Ship, Redcliffe Bay, Portswear, Avon. Details from Mr R.T. White G6SPC. Tel: (01275) 874001.

**NORTH BRISTOL ARC, G4GCT.** Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 790448.

**SEVERNIDE TV GROUP, G6ZZZ.** Meets at NBARC, Filton, Bristol. Details from Paul Stevenson G8YMM. Tel: 0117-965 5386.

**SHIREHAMPTON ARC, G4G4H.** 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, G4MWW.** Meets at the Whitchurch Folk House, East Dundry Road, Bristol. Details from Ian C.B. Baker. Tel: (01275) 834282.

**THORNBURY & SOUTH GLOS ARC, G4ABC.** Meets at the United Reform Church Hall, Rook 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 G3YOL. Tel: (01934) 843144.

## CORNWALL & SULLY IS

**CORNISH RAC, G4CRC.** Meets at the Perran-ar-Worthe Village Hall, Perranwell, Nr Truro, Cornwall. Details from Mrs Cheryl Hammett 2E1ADQ. Tel: (01726) 882758.

**NEWQUAY & DARS, G4ADV.** Meets at the Treviglas School, Newquay. Details from Mrs Maggie Reed G0KEM. Tel: (01726) 882752.

**POLDHU ARC, G6ZGM.** Meets at the Club House, Poldhu Cove, Mullion, Cornwall TR12 7JB. Details from Mrs Carolyn Rule M0ADA. Tel: (01326) 240144.

**SALTASH & DARC, G4GQX, G8SAL.** Meets at the Toc H Hall, Warfonton Road, Saltash, Cornwall. Details from Brian Gjes. Tel: (01752) 844321.</



# Amateur

Bands

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

If you're the holder of an M3 licence, read on! It seems that the boom in the number of amateur licence holders generated by the introduction of the Foundation licence has slowed recently to the point where the overall number of licensed amateurs is more or less static. This stalling of growth has inevitably brought out the prophets of doom to wring their hands in dismay and forecast the terminal decline of the hobby.

Personally, I don't think the end is anywhere near, and there's always scope for improvement in any situation. It's interesting to see that the rate of take-up of the licences hasn't changed that much. The Foundation licence is way ahead of the Intermediate and Full licences, which both have take-up rates that remain very low. This suggests that new Foundation licence holders are disinclined to progress to the Intermediate and Full licence levels. Or does it suggest that M3s are becoming disillusioned after only a brief time in the hobby and moving to pastures new?

While I firmly believe that the Foundation licence is a good thing, for many reasons, I continue to think that the attractions of the Intermediate licence are outweighed for many by the effort required to obtain it. The somewhat cumbersome 2E0 prefix doesn't help its cause either, but I could be wrong.

## The Answer is?

There's only one way to find out, and that's to ask? So that is what I'm doing. If you're an M3 I'd like your views on moving onto the Intermediate and Full licences.

Are you fully content to stay as an M3? Has having an M3 licence given you all that you expected from amateur radio? Do you intend to move beyond the M3? If not, why not? Is it difficult to find somewhere to take the Intermediate exam? Do you like your M3 callsign too much and don't want to lose it, which applies in my wife's case, as she has her father's initials as her call?

Perhaps it's simple inertia, or do you think the gains from becoming an Intermediate licence holder are outweighed by the effort needed to obtain it? Whatever your views, please let me know.

All replies, however brief, will be very welcome. It's not a test! There are no wrong answers! Just let me know what you think.

## Free Callsign CD!

As an incentive the names of everyone who lets me know their views will go in a hat and the first half a dozen pulled out will receive

the new *PW* Callsign Directory CD covering UK & ROI as a thank you. This is the most up-to-date callsign database available on CD, which uses new software that enables it to run straight from the CD without the need to install any memory hungry applications on your computer.

There are also PDF images on the CD of the very first 1932 issue of *Practical Wireless* and the now out of print antenna compendium, *More Out of Thin Air*, plus power supply designs. Do let me know your views, as the more people that respond, the more useful the information obtained.



So, send your thoughts to me and encourage any other M3s you know to do the same. I really do want to know what you think. Thanks, in anticipation. My contact details are at the top of this page.

## Islands On The Air

It's the Islands on the Air (IOTA) weekend at the end of July and, as ever, DXpeditions have been organised to visit various islands around the globe.

Closer to home there's a group of operators from the Cray Valley Radio Society that will be at St. Mary's, Scilly Isles operating as **M8C**. For a few days before the contest listen out for them operating as **M3CVN**, **G0VJG**, **G4BUO**, **G7GLW**, **2E0ATY** and **G0FDZ** using *owncall/P*.

Also on the Islands will be **M1KTA** operating as **G2XV/P**. Activity will be on s.s.b. with some slow c.w. thrown in when possible.

Sheffield Amateur Radio Club will have operators on the Isle of Arran using the call **MM3M**. [www.sheffield-live.co.uk](http://www.sheffield-live.co.uk) is the place to look for more information.

The Scarlett Point Radio Group will operate special station **GB5MOB** from The

Old Nunnery, Isle of Man. The activity will be part of the celebrations for the Isle of Man's 175th Maritime Anniversary Year. For more information on this event, including real time Internet video and audio streaming of all stations and operators, visit [www.scarlettpoint.com](http://www.scarlettpoint.com).

Jim, operating as **MM0Q**, will be at Tanera Mor, Summer Isles.

Across the channel a team from France and Belgium will operate from the Iles d'Ouessant (the Western Isles) as **TM4Z**. The islands, which have maritime and bird reserves, are just beyond Finistère. They were first named the Western Isles around BC 330 by Pytheas, a Phoenician navigator, sailing up the Atlantic coast in search of tin. The name has stuck - and in English has become corrupted to 'Ushant'.

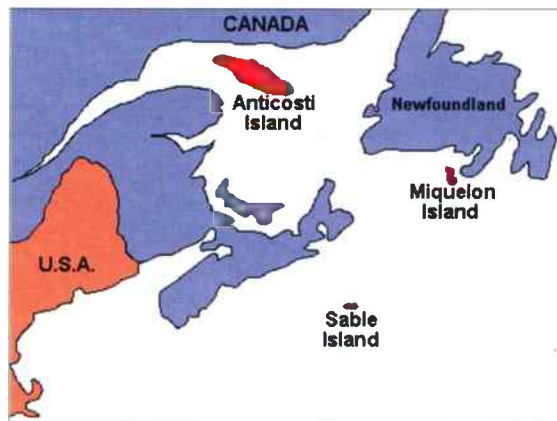
Way across the Atlantic several operations are taking place on islands near the USA/Canada border. **VE2QRA**, will be active from Anticosti Island, internationally known for the outstanding quality of its deer hunt, at the lighthouse of Pointe-Carleton. He's there on holiday, so it's not certain if he's entering IOTA, but if he comes up on the air at that time, he won't get any choice!

**CY0AA** is the call that will be used by three US amateurs during their operation from Sable Island scheduled to take place from 27 July to the 3 August. **K9OT** and **KB9LIE** will be active as *FP/owncalls* from Miquelon Island during the contest.

Other IOTA activity will be The South Texas DX and Contest Club operating as **K5M** from Mustang Island. Canary Islands DX Society will be active as **3V8SM** from the club



Canadian Coast Guard, Quebec Region



station on Djerba Island. **DH6GD/P** will operate from Fehman Island. **HA8KW** will operate as **J48KW** from Zakynthos Island using low power c.w. only.

Some Kuwaiti operators plan to be active as **9K2F** from the country's Faylakah Island. A group of three Danish amateurs will be active as **OZ8MW/P** from Anholt Island. France's Brehat Island will be activated by three Belgian amateurs. The probable callsign is **TM0EME**.

For IOTA s.s.b. activity begin by monitoring 14.260 and, if open, 21.260 and 28.460MHz.

# International Radio Clubs



## AMSAT-UK (G0AUK)

Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: g3wgm@amsat.org or visit [www.uk.amsat.org](http://www.uk.amsat.org)

## British Amateur Radio Teledata Group (BARTG - G4ATG, GB2ATG)

Contact Membership Secretary Andrew Thomas G8GNI, M5AEX, Dome School House, 103 High Street, Stony Stratford, Buckinghamshire MK11 1AT, E-mail: members@bartg.demon.co.uk or visit [www.bartg.demon.co.uk](http://www.bartg.demon.co.uk)

## British Amateur Television Club (BATC - RS38114)

Enquiries to Dave Lawton G0ANO, 'Grenehurst', Pinewood Road, High Wycombe, Bucks HP12 4DD. Tel: (01494) 528899. E-mail: memsec@batc.org.uk or visit [www.batc.org.uk](http://www.batc.org.uk)

## British DX Club (BDXC-UK)

Enquiries to Club Secretary Colin Wright, 126 Bargery Road, London SE6 2LR. E-mail: secretary@bdxc.org.uk or visit [www.bdxc.org.uk](http://www.bdxc.org.uk)

## Danish Shortwave Club

Information from Treasurer Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark or visit [www.dswci.org](http://www.dswci.org)

## Group for Earth Observation

Information pack from GEO Info S, 34 Ellerton Road, Surbiton, Surrey KT6 7TX or via [info@geo-web.org.uk](mailto:info@geo-web.org.uk) or visit the GEO website at [www.geo-web.org.uk](http://www.geo-web.org.uk)



## International 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](http://www.iswl.org.uk)

## Military Wireless Amateur Radio Society (G0PTZ)

Further details from John Taylor-Cram, 7



Hart Plain Avenue, Cowplaw, Waterlooville, Hampshire PO8 8RP. Tel: 0239-225 0463.

## Radio Amateurs Invalid and Blind Club

## (RAIBC - G4IBC, G8OIBC, GB1IBC)

Enquiries to Honorary Treasurer/Membership Secretary Mrs Shelagh Chambers, 78 Durley Avenue, Pinner, Middlesex HA5 1JH. Tel: 0208-868 2516.

## Radio Amateur Old Timers' Association

Enquiries to Membership Secretary Ted Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich NR9 5SH. Tel: (01603) 872309, E-mail: edit@raota.fsnet.co.uk or visit [www.raota.org](http://www.raota.org)

## Remote Imaging Group (RS88803)

Further details from the Membership Secretary John Din, 59 Woodend Road, Coalpit Heath, Bristol BS36 2LH. FAX: (01454) 887880. E-mail: membership@rig.org.uk



## Royal Air Force Amateur Radio Society (RAFARS - G8FC, G8RAF)

Details from the Administrator, HQ RAFARS, RAF Cosford, Wolverhampton WV7 3EX. Tel: (01902) 372722, E-mail: administrator@rafars.org

## Royal Navy Amateur Radio Society (RNARS - GB3RN, G3CRS, G1BZU)

Enquiries to Secretary Philip Manning G1LKJ/M3LKJ, 1 Waverley Gardens, Ash Vale, Surrey GU12 5JP. Tel: (01252) 334929, E-mail: g1lkj@amsat.org or visit [www.rnars.org.uk](http://www.rnars.org.uk)

## Royal Signals Amateur Radio Society (RSARS - G4RS)

More information from General Secretary, HQ RSARS, Cole Block, Blandford Camp, Dorset DT1 8RH. Tel: (01258) 482814, E-mail: gensec@rsars.org.uk or visit [www.rsars.org.uk](http://www.rsars.org.uk)

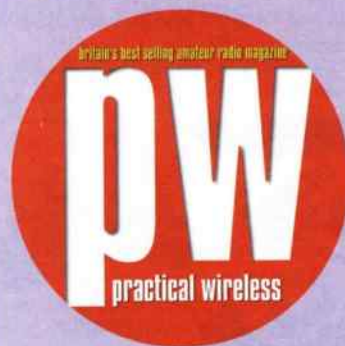
## The Medium Wave Circle

Details from c/o C. Rooms, 59 Moat Lane, Luton LU3 1UU. E-mail: contact@mwcircle.org

## World Association of Christian Radio Amateurs & Listeners M1CRA

Details from Membership Secretary Derek Chivers G3XNX, 51 Alma Road, Brixham, South Devon TQ5 8QR. Tel: (01803) 854504 or visit [www.wacral.org](http://www.wacral.org)

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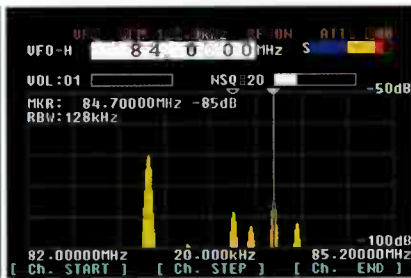
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