

# short wave magazine

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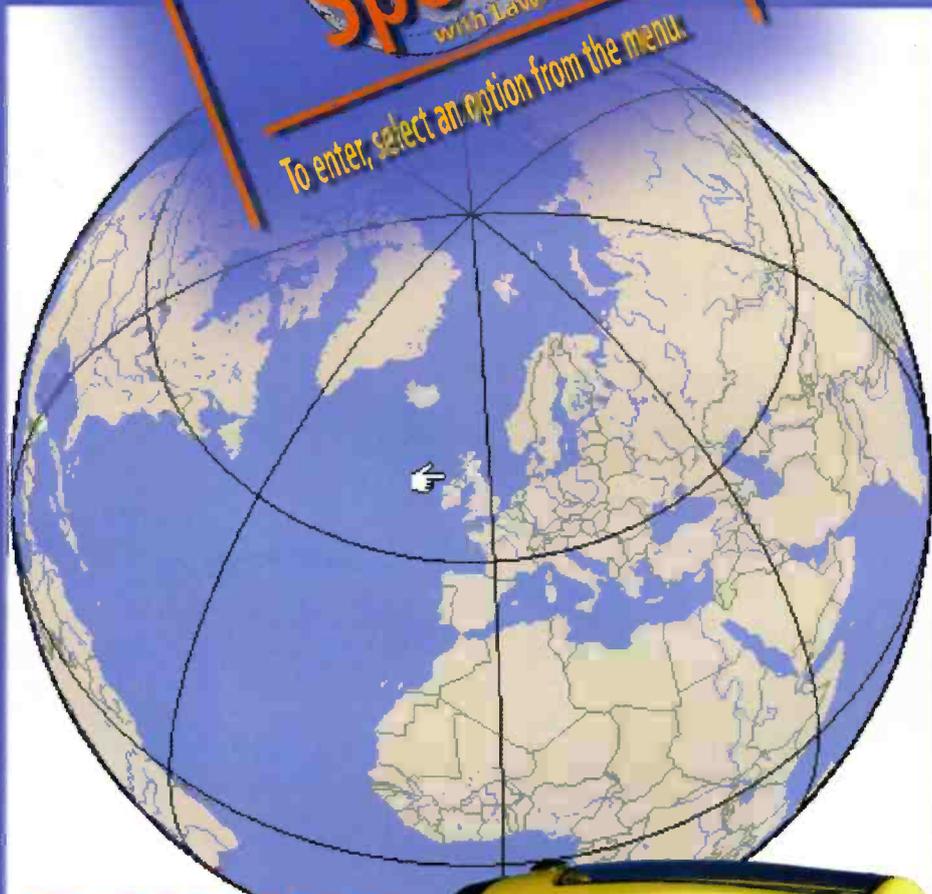
# AOR's AR8600

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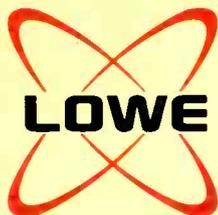
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Next issue on sale November 23



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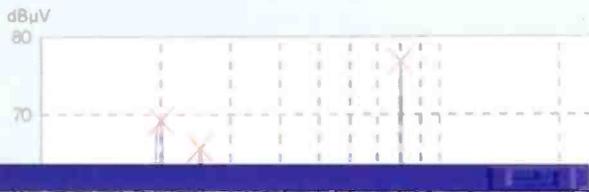
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Don't be left in the dark, check out page 42 for our special offer - it's not just a torch!

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- 👉 JW on the Racal RA17
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### Components For SWM Projects

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

**KANGA PRODUCTS, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

### 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 £2.99 each and photocopies are £2.99 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

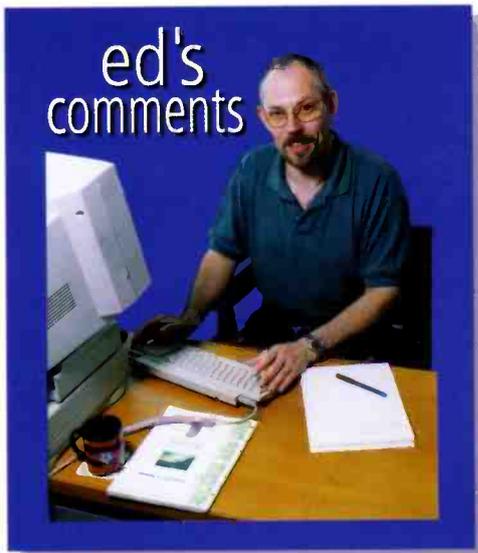
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### Technical Help

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.



**A**s I write this month's Ed's Comments, I'm suffering from a distinct lack of sleep due to the past weekend's

flurry of activities as a marshal/spectator on the Welsh Hill Rally, based at Bwlth Wells, Powys. I enjoyed immensely the rain, mud and off-roading. The three day event was a perfect example of how radio is used to achieve smooth efficient and safe running of such an event.

Anyone with a radio capable of receiving 86.4375MHz could have monitored the activities in the forests and military roads of the area. I'd be interested to hear from any readers who caught any of the action between 6 and 8 October.

## WorldSpace Competition

Due to the very high level of interest generated by our WorldSpace radio feature in the October issue of *SWM*, Simply Radios, the UK stockists of WorldSpace receivers - see page 6 - have offered four portable satellite radios for *SWM* readers to win in our competition that will feature in next month's issue - make sure you get the chance to enter by reserving your copy now.

## Satisfied Customer

If you have a problem getting hold of out-of-date material, don't forget that a letter to our QSL page could be the way to find what you're looking for. Our most recent success is John M1CW0 who found the DOS based software for a second-hand ERA Reader decoder. Glad we could help John.

## No Batteries Required

Further to Joe Pritchard's article on a 'Kitchen Cupboard Crystal Set' in the October 2000 issue of

*SWM*, I had an E-mail from Dr. Philip C. Miller Tate of Kingston University who had the following to say, "...there are a group of people, mainly, but not exclusively, based in the USA but linked by the Internet (myself included) who are keen on pursuing the design and construction of crystal set receivers that are capable of high performance and DX reception. They have organised two annual crystal set DX contests so far, with a good response and astonishing results. Mike Tuggle, the current champion, lives in Hawaii and logged 98 stations during the last contest, mostly 4000km away on the West Coast of the USA. I personally logged over 30 stations, including Norway, Spain, Rome and Hungary with what I now recognise to be a wholly inferior design of set, coming last in the contest, but being awarded the title of 'European Grand Champion' - yes, you guessed it, I was the only contestant this side of the Atlantic! It's all good fun.

On the serious side, the enthusiasts have been building crystal sets with outstanding performance, designing the highest Q tuned circuits (500+, Litz wire and self-supporting coils), finding the best detector diodes (including research work on galena), identifying the best headphone types, and modelling circuits with SPICE in order to improve impedance matching for minimum losses. Most of their results have been publicly disseminated through the 'Yahoo' discussion group at <http://clubs.yahoo.com/clubs/thecrystalsetradioclub> and, to a lesser

extent, through the 'Crystal Set Society' discussion group which is open to all-comers.

The main point of this letter is to bring the activities of the enthusiasts to your attention, and to enquire as to whether you would be interested in an article describing the main principles of modern DX crystal set design? I'm not talking about kid's sets or vintage renovation here; this, I

promise you, is ground-breaking and thought-provoking stuff. Please have a trawl through some of the material at the above site (not all of it is cutting edge, there's a lot of chat) and see what you think". Well it could be interesting couldn't it. If you have an opinion either way please drop me a line, paper or electronic. Please include the subject 'Crystal Set'.

## Reader RX Survey

Rex Gilroy from St. Albans says "I hope I am not too late with details of my gear for your survey". Well Rex, due to the belated and now large response from all of your letters and E-mails, I've decided to hang on until next month to include the results of the survey. Unless the post bags keep rolling in that is.

## Free Next Month

Before I sign off, I must tell you about the bonus with next month's *SWM* - a free Nevada Communications catalogue. Don't miss it.

73

*Kevin*



**Dear Sir**

Yesterday, a very sad thing happened to me. "What was that?!", I hear everybody clamouring to find out, (not!). Well, I'll tell you. I had to spend some **money**.

"So what!" you are all asking. We enthusiasts in the scanning, utilities, s.w.l. and other versions of our radio-related hobby all have to spend money in the pursuit of our pastime, sometimes vast amounts of it.

Briefly, my complaint is this. Back in October 1991, I bought a Fairmate HP-2000 wide-band scanning receiver from G4TJB of Weston-Super-Mare for the then princely sum of £259 including VAT. This radio came complete with four Nickel-cadmium batteries and would you believe it, they have only lasted nine, yes that's right, nine years, before I actually had to go out and buy some new ones, because they were only lasting three hours before needing a recharge.

All I can say is, I'm glad my R-5000, Bearcat 9000 and PCR1000 are all mains operated, for I don't think I could stand this constant expense. (What a lot of 1000s there are about, I never noticed that before). Seriously though, this must be pretty good for this type of power source, the NiCads being Sanyo Cadnica N-600AA 1.2V 600mAh and not a trace of leakage or blemish anywhere.

Surely, this must be a record for this type of component! Unless of course, as Esther says, 'you know different!'

**Kelvin Wheeler**  
**Torfaen**

**Dear Sir**

It has been almost 20 years since I purchased a radio from South Midlands Ltd. It was one of those radios which was modified to operate in the amateur bands - a CBM272. Upon receiving the radio, we put in a tone burst for a 10m repeater on Mount Constitution on Orcas Island, Washington. I used the radio for a few years and then put it on the shelf

I have used the radio from time to time. However, I brought it out to use it and found that the tone burst doesn't work. The wire that goes to the mic. has fallen off the mic. connection. Would it be possible to obtain a schematic of this radio or assistance as to where to attach the wire which goes to the mic.? Over the years I have

lost the manual which had the modified frequencies chart. I am also getting old and forgetful at 59 years.

Thank you for your help.

**Ryan LePage KD7RO**  
**Medford Oregon**

*Can anyone help Ryan? Please write c/o SWM Editorial Offices, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW - Ed.*

**Dear Sir**

With reference to the letter from Lionel P. Clyne, Kent, *SWM* October 2000, on checking 6.175MHz I found the station to be Radio Japan in Japanese to Europe 1700 to 1900UTC from there UK relay with IDs every hour on the hour. This station also has the same transmission to the Middle East from their Sri Lanka relay on 11.880MHz. The other frequency to Europe according to the web site at - <http://www.nhk.or.jp/rjnet/> - is 15.115MHz - 1700 to 1800UTC.

**Richard J.C. Reynolds**  
**Surrey**

**Dear Sir**

I've just received the October issue of *SWM*, and seen the letter from Lionel P. Clyne regarding the mystery transmission on 6.175MHz. It seems much more likely that what he's hearing is NHK. relayed from the Merlin site at Skelton, using a 250kW TX and a bearing of 140°. The programme would be in Japanese, and is on from 1700 to 1900UTC. The only puzzle is why he's only started hearing it in the last two weeks - it's been there since at least the end of March!

**Richard Davis**  
**Schedule Manager**  
**Merlin Communications International Limited**  
**London**

**Dear Sir**

I have stumbled back into listening - as a child we always had an old radio set, with short wave, in the bedroom. I've also done it humbly by waiting for every Tandy sale (alas no more around here now they've been taken over). So my main receiver is a Realistic DX-394 usually used when

insomnia means I get up at 0500 and work. It is connected via a Howes CTU9 (the first thing I've built in many a year) to two dipoles in the loft of indeterminate length, made from 10mm earth wire, one facing NW and the other SE.

I also have a Realistic PRO-2045 scanner, mainly tuned to nearby Cambridge airport and Lakenheath control but I do get more adventurous at times. This is connected to a Tandy Discone (with one of the lower rods missing - it's a long way up the ladder and I wobble more at my age! which it shares with my ordinary Pioneer stereo (that'll upset the purists!)).

With regard to *SWM* creating a need for me, it is exemplified by my Icom IC-R2. Now, don't get me wrong, this is an amazing piece of equipment even if I do have to consult the handbook every time I use it and it eats batteries.

However, its only use in anger was whilst waiting at Luton airport for my wife who had been delayed nine hours by EasyJet losing a bit off their plane. I tuned into the tower and could then check properly when it landed which did not correspond with the displays and announcements.

Again the purists will cringe when I say I use it for Radio 4 sometimes, and when working on the PC in the early morning, using a DOS program which prevents me from using the TV card, to listen to BBC 1 *Breakfast News* - who needs to watch it. I have downloaded *Hamcomm* and have a Pervisell comparator interface, but I have yet to decode anything in Morse except 'E'.

I'll also come clean. I do have a hand-held CB (Realistic again) because I thought I'd like to transmit legally without needing Morse. Except for being able to point out to truckers that they have almost killed me, it gets little use as the people I hear with CBs are not the type of people I want to communicate with - my knowledge of Soaps, football and 'page 3' of the *Sun* being minimal - what a snob.

**John Loader**  
**Fordham, Ely**

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.

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**Dear Sir**

Boat anchors, bl\*\*dy boat anchors mate, four pages of dribbling nostalgia, three and a half wasted pages. Please let us have no more of this, or, at least very small doses. I refer to John Wilson's article on the RCA AR88 in the July 2000 issue of this publication.

Any human endeavour must attract young enthusiasts to its ranks or perish. Perhaps you've forgotten that most teenage tyros have a low tolerance level for nostalgia expressed by those over nineteen.

For heaven's sake, the AR88 is **sixty years old**, yes that's the early half of the last century, such articles as this would have them reaching for the latest computer magazine. I'm also sixty years old and if I didn't have a standing order for *SWM* with newsagent, I'd have put it back on the shelf myself.

As most receivers these days are of the 'black box' variety, could we please have more practical articles on simple ancillary equipment designed to support their performance such as aerials,

tuners, preselectors power supplies and the like.

**M.R. McLellan**  
**NSW Australia**

*I understand your point of view, particularly related to the encouragement of 'new blood' into the hobby and more importantly from my perspective to the magazine. However, I disagree that the visitation to the AR88 by John is not relevant to today's listening community, be they young or old. The point is, that this fine example of a radio still holds its own amongst the shiny full featured receivers of*

*today. In many cases it is not only a better performer but is much more pleasant to drive. I suspect that you read the July feature, no further that the title and missed the point and the findings contained within the body of the text. Whilst we strive to attract a wide audience to SWM, I can categorically say that the genre of article about which you complain is here to stay. Your point about ancillaries and accessories is noted - thanks. - Ed.*

**TOP QSL**

# Communiqué

## WorldSpace At Reading

A group of broadcast band DXers, with support from three main UK DX clubs, have been meeting at Reading for about 25 years now, with an average attendance of between 15 and 20. **Bob Stewart DSO**, Senior Vice President of WorldSpace Europe and Middle East, will be the guest speaker at the next meeting of the **Reading International Radio Group**. Bob will be speaking and giving a visual presentation about the concept and development of WorldSpace as well as showing the portable receivers now available to receive the broadcasts.



The meeting, open to anyone interested, will be on **Saturday November 4th** from **1430-1630** in the **Abbey Room, Reading Central Library, Kings Road**. For further information contact **Mike Barraclough** on **(01462) 643899**, E-mail: **mikewb@dircon.co.uk**

## SWM Causes Prices To Tumble!

Last month we featured an article by Hugh Cocks on WorldSpace Radio. Since then we have had an E-mail from Nick Jones, Sales Manager of **Simply Radios** who informs us that they have stocked the Hitachi and Sanyo models for over three months. The Hitachi model, says Nick, is available to order on-line at **www.simplyradios.com** and both are available to order by 'phone on **0208-668 0908**. The Hitachi KH-WS1 was priced at £239.99 and the Sanyo DSB-WS1000 used to be priced at £279.99 - prices include P&P to all UK mainland addresses.

During the gestation of this issue, the impact of our WorldSpace feature in October SWM has had obvious repercussions. We were informed a short while after the above information was passed to the SWM Newsdesk that the price of both Hitachi and Sanyo WorldSpace receivers has been **slashed to £99.99 inc. free delivery**.



## Final Bristol Rally

Due to falling trader support and diminishing attendances, the Bristol Rally, which was held back on the 3rd September 2000, was the last. The Rally had been held on the first Sunday in September for the past 15 years, but recently it has needed the support of computer traders to maintain its viability.

Closure of a number of radio traders plus others who have moved away from Amateur Radio equipment has made it impossible to continue as a credible radio rally. The **South Bristol Amateur Radio Club** would like to thank all their regular traders and visitors for their loyal support over the years, and their efforts will now be focused on helping the RSGB (Bristol) Group at the Longleat Rally.

## Credit Cards Accepted

### QuartSLab Marketing Ltd.

who up till now have only accepted payments by cheque and postal orders from non-account customers, are pleased to announce that due to frequent requests, especially from overseas customers to pay by credit card, this facility is now available.

QuartSLab Marketing Ltd. can be reached at **PO Box 19, Erith, Kent DA8 1LH, Tel: (01322) 330830, FAX: (01322) 334904** or E-mail: **sales@quartslab.demon.co.uk**



## GlobeCast Chosen

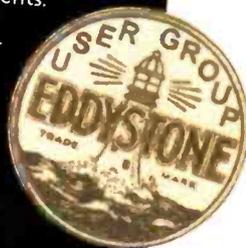
**World Radio Network (WRN)** has chosen **GlobeCast**, the broadcast services unit of France Telecom, to provide satellite

transmission services for its unique new digital radio multiplex on the *Eutelsat Hot Bird 5* satellite, which will offer broadcasters a potential audience

## Eddystone Thrives

The **Eddystone User Group** has now passed its tenth anniversary and continues to thrive. Membership is over 300 and growing! Benefits of being a member include a bi-monthly newsletter of hints, tips, features and technical advice and membership adverts, together with access to a large collection of Eddystone documents. New members will receive the most recent (or next published) newsletter and a renewal notice a year later.

The Eddystone User Group is a non-profit making society of Collectors and Users of these superb radios, which had been made in England since 1923. If you would like to find out more, contact **Graeme Wormald G3GGL, 15 Sabrina Drive, Bewdley, Worcestershire DY12 2RJ**.



of 75 million homes across Europe, North Africa and the Middle East.

This new DVB channel, branded dRadio, will eventually carry up to 40 national and international radio stations broadcasting a wide range of news, current affairs, magazine, commercial, classical and specialist music programming in digital quality, unencrypted audio, all easily accessible to listeners via satellite dish and digital receiver. The launch of dRadio, less than five years before the analogue switch-off, due in 2005, is set to shake up the European broadcasting scene with its promise of a low-cost digital satellite channel on *Hotbird 5*.

WRN will use dRadio as the main distribution platform for all its European networks, including WRN1 Europe, EuroMax Deutsch, EuroMix Multi-lingual and the EuroMax Francais network. A number of major international and European national broadcasts have already expressed a strong interest in dRadio.

Sarah Williams, Chief Executive of GlobeCast Northern Europe of GlobeCast said, "Digital radio distribution offers new and exciting business models for audio broadcasters. We are pleased to be chosen by WRN as their satellite provider and look forward to playing a part in bringing an expanded portfolio of audio entertainment to consumers throughout Europe, North Africa and the middle East".

## Catalogue On Web

**AOR (UK) Ltd.** have recently informed us that they have now uploaded a new General Catalogue onto the AOR (UK) web site. The Catalogue is presented as a 12 page Acrobat PDF format file and "covers all

## Mini VCOs

**BFI OPTILAS** has recently announced a new range of surface mount Voltage Controlled Oscillators (v.c.o.s) manufactured by MaCom, an AMP company. Designed for use in wireless base station applications, the MLO family of electrically shielded oscillators are miniature devices that offer high linear tuning and low phase noise that is stable across the frequency band. The v.c.o.s are 100% tried and tested using automated computer-controlled test stations. Industry-standard surface mount packaging simplifies circuit design across radio boards.

All devices within this family are fundamental single-ended oscillators aimed at the market for cellular, portable communication systems and WLL infrastructure. Used in low noise PLL synthesisers in base stations and repeaters, the v.c.o. is designed for use in cost sensitive, wireless and telemetry applications. The devices have been optimised, by careful selection of the

bipolar transistor and varactor diode, for low phase noise and high linearity tuning characteristics.

The low phase noise meets the requirements of digital systems for low adjacent channel interference and BER enabling higher capacity networks. Standard +5V operation interfaces directly with the output for standard +5V p.l.l. circuits and with standard +5V power supplies, saving on component count and cost.

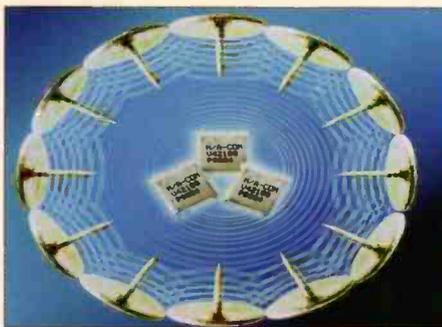
M/A-COMs VCOs are Electrically Shielded to reduce the effect of stray r.f.i. on board while offering High Linearity Tuning which enables low tuning/modulation sensitivity for f.m. and p.m. systems. These miniature devices offer a designer increased packaging density, while the 0.5in LSM1 footprint is

**BFI OPTILAS offers electrically shielded miniature VCOs.**

common to all designs and meets with the accepted industry standard.

Devices are designed to operate over the temperature range of -20°C to +70°C after exposure to the shock, vibration, thermal shock and moisture conditions typically encountered in base station and subscriber terminal environments.

Any enquiries should be addressed to: **BFI OPTILAS Literature Centre, 8 The Oaks Business Village, Revenge Road, Lordswood, Chatham, Kent ME5 8LF.**



major items in fair detail". The file size is around 1.3Mb with picture quality reduced to keep transfer times to a minimum - all text is perfectly

legible! The PDF catalogue can be downloaded from <http://www.aoruk.com/pdf/aor-cat.pdf>

## New Starter Kit

Embedded applications based on the PCI bus are expected to expand significantly. In order to support the development of embedded systems and applications during the hardware and software design phase, **EPSON** provide starter kits for its System Level Products.

The latest addition to this family of extremely successful complete hardware development kits is the Cardsystem-PCI. It follows the same philosophy as starter kits for the Card-PC, but is based around the newly introduced product Card-PCI/GX.

The new Cardsystem-PCI cuts your design time by providing a ready-to-run system consisting of a motherboard, a Card-PCI/GX with 32MB at 200MHz using the Geode GXLV processor from

National Semiconductor, a Compact Flash Card with Windows CE demo image plus runtime licence, software, documentation and cables. Using this new kit cuts the design time dramatically.

The Cardsystem-PCI is a single board computer based on the EPSON Card-PCI/GX. The main board makes a broad range of interfaces available to the user. After unwrapping and connecting the power supply, the system is ready to run. For initial testing and exploring the system a 16MB Compact Flash card including a demo image of Windows CE is included.

The hardware development kit is a useful tool

for hardware integration and the test and development of the application software. In order to support the hardware integration, EPSON provides software tools for the adaptation of the EPSON modified Award BIOS.

Find out more, including news of a software development kit for Windows CE from EPSON themselves - E-mail: [info@epson-electronics.de](mailto:info@epson-electronics.de)

## Club Corner

The **Wakefield & District Radio Society** meet on Tuesdays at 2000 at the Ossett Community Centre, Prospect Road, Ossett, W. Yorkshire. Further details about the society's activities can be obtained from **John G7JTH** on (01924) 251822 or visit their web site at <http://www.sandalmagna.demon.co.uk/wdrs>

Members of the **Bangor & District Amateur Radio Society** meet on the 1st Wednesday of every month in the Clandeboye Lodge Hotel, Bangor, at 2000. Wednesday 1st November 2000 is their Annual Surplus Sale. This excellent event is always a popular way to make some space in your shack! Visitors and new members are (as always) most welcome. More information from **Mike G14XF** on 0284-277 2383 or visit the club's web site at <http://welcome.to/bdars>

Meetings take place at the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants, for the **Horndean & District Amateur Radio Club**, starting at 1930. Visitors are always most welcome. More details from **Stuart Swain G0FYX**, Club Secretary, on 0239-247 2846 or E-mail Stuart at: [g0fyx@msn.com](mailto:g0fyx@msn.com)

The **Weston-Super-Mare Radio Society** meet at the Woodspring, High Street, Worle, normally on the 1st and 3rd Monday of each month. Visitors and prospective members with an interest in amateur radio are always welcome. Further information about club activities from **Graham Pinder G8WAR** on (01934) 415700.

# rallies

## Attention Please!

**Would you like to have your Rally publicised? If so, all you have to do is put together as much information as possible about the Rally, i.e. date, location, times, who to contact, etc. and send it to the Editorial Offices.**

**October 29:** The Galashiels & District Amateur Radio Society are holding their Annual Radio & Computer Rally at The Volunteer Hall, St. Johns Street, Galashiels, Scottish Borders, from 1100-1600. There will be traders, Bring & Buy and refreshments, etc. More details from **Jim GM7LUN** on (01896) 850245 or E-mail: [jimk@gm7lun.freeserve.co.uk](mailto:jimk@gm7lun.freeserve.co.uk)

**November 4/5:** The 14th North Wales Radio & Electronics Show will be held at the North Wales Conference Centre, Llandudno. The show opens at 1000 both days and the entrance fee is £2 for adults and under 14s free when accompanied by an adult. There will be a club room and an extensive Bring & Buy. **M. Mee GW7NFY** on (01745) 591704 (combined telephone and FAX number).

**November 12:** The Tenth Great Northern Hamfest takes place at the Metrodome Leisure Complex, Queens Road, Barnsley, South Yorkshire. Doors open at 1000. For further information please contact the Hamfest Manager, **Ernie Bailey G4LUE**, 8 Hild Ave, Cudworth, Barnsley, Yorkshire S72 8RN or telephone on (01226) 716339 or (07787) 546515 (mobile).

**November 25:** The Rochdale & District Amateur Radio Society are holding their traditional radio rally at St. Vincent de Paul Catholic Church Hall, Caldershaw Road, off the A680 Edenfield Road, approx two miles west of Rochdale. Follow the orange arrows from M62 J20. Doors open 1030 (1015 for disabled visitors). Entrance fee is just £1 and there will be refreshments/rest area. **John G7OAI**, evenings, on (01706) 376204.

**November 25/26:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. There will be trade stands, talk-in on 2m and 70cm, Bring & Buy, special interest groups, free parking, disabled facilities, camp site, family attractions, licensed bar, catering and Morse tests. Doors open on Saturday at 1015 till 1700 and on the Sunday from 1000 till 1600. Further information on (01923) 893929.

**November 26:** The Bishop Auckland Radio Amateurs Club (BARAC) Rally will take place at Spenny Moor Leisure Centre. This venue is ideally suited for both trader and disabled visitors as it boasts good parking and access to large ground floor hall. There will be the usual radio, computer, electronics and Bring & Buy stalls, as well as catering and bar facilities. Morse tests are available on demand. There will be lots to do for all the family within the Leisure Centre for members of the family not interested in radio. Doors open 1100 (1030 for disabled visitors). Admission is £1, under 14s free of charge. Talk-in on S22. **Mark G0GFG** on (01388) 745353 or **G7OCK** on (01388) 762678.

Send your news to Zoë Shortland at the Editorial Offices

■ **Gerry L. Dexter, c/o SWM EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW.**

■ **E-MAIL: gdexter@pwpublishing.ltd.uk**

# Bandscan America

These days, DXers around the world are eagerly hunting signals in areas not normally used by international short wave broadcasters. Several US navy communications stations have begun carrying programming from the US Armed Forces Network (AFN). These services, formerly carried by satellite, are intended for naval personnel stationed on ships and bases around the world.

As most everyone surely knows, two such stations - in Puerto Rico and near Key West, Florida - have been carrying the AFN service for a couple of years now. But this past summer several others suddenly became operative and, at the time of writing, at least two more sites - in Washington state and Iceland - are expected to become active.

Here is the current line-up as we have them at the moment:

MHz	Station	MHz	Station
4.319	Diego Garcia	10.320	Pearl Harbor, Hawaii
4.933	Sigonella, Sicily	10.320	Keflavik, Iceland
5.765	Barrigada, Guam	10.940	Sigonella, Sicily
6.350	Keflavik, Iceland	12.579	Diego Garcia
6.350	Pearl Harbor, Hawaii	12.689	Key West, FL
6.4585	Roosevelt Roads, Puerto Rico	13.362	Barrigada, Guam

The list above is likely not the final version as some of the sites have not been confirmed and, as mentioned above, we're also expecting at least two more stations to be added to the list. Most of the frequencies are used on either a 'day' or 'night' basis, apparently according to local time.

There are several different program 'streams' so what you hear on one station probably won't be the same as what the next one may be carrying. All broadcasts are in upper sideband. Reception reports can be sent to: **Naval Media Centre, NDW Anacostia Annex, 2713 Mitscher Road, S. W., Washington, D.C. 20373-5819.** I'd suggest asking that the site(s) you are reporting be specified on the QSL. You can also send a report via E-mail to [qsl@mediacen.navy.mil](mailto:qsl@mediacen.navy.mil)

Brazil still has a healthy list of active short wave broadcasters and, over time, most if not all of them can be heard. Among those logged in North America recently are:

MHz	Station
2.380	Radio Educadora de Limeira
2.490	Radio Oito de Setembro, Descalvado
3.245	Radio Transamerica Light, Varginha
4.755	Radio Educacao Rural, Campo Grande
4.825	Radio Cancao Nova, Cachoeira Paulista
4.865	Radio Alvorada, Londrina
4.885	Radiodifusora Acreana, Rio Branco
4.905	(Nova) Radio Relogio, Rio de Janeiro
4.915	Radio Anhanguera, Goiania
4.935	Radio Capixaba, Vitoria
4.945	Radiodifusora, Pocos de Caldas
4.955	Radio Clube Rondonopolis
4.985	Radio Brazil Central, Goiania
5.013	Radio Copacabana, Rio de Janeiro (reactivated)
5.015	Radio Pioneira, Teresina
5.970	Radio Itatiaia, Belo Horizonte
5.980	Radio Guarua, Florianopolis
6.105	Radio Cultura Filadelfia, Faz de Iguacu
6.120	Radio Globo, Sao Paulo
6.135	Radio Aparecida, Aparecida
9.565	Radio Tupi, Sao Paulo
9.615	Radio Cultura, Sao Paulo
9.630	Radio Aparecida, Aparecida
9.645	Radio Bandeirantes, Sao Paulo
9.665	Radio Marumby, Florianopolis
9.695	Radio Rio Mar, Manaus
11.735	Radio Nova Visao, Sao Paulo

Some of the frequencies may be slightly variable. Many of these receptions are during the first hours of the station's broadcast day, i.e. 0900 and on, a near impossible time in Europe. But checking during the evening hours and later should produce results.



## Station News

It looks like private Canadian station CHNX-6130 in Halifax, Nova Scotia, may be a goner. The station is silent at the time of writing, in need of some parts and equipment repairs. And the owners of the m.w. station which it relays are apparently not very interested in whether the short wave is active or not, especially if it requires an expenditure of money to get it up and running again!

Radio HERT, 4.960, in Puerto Lempira, Honduras, is active again on this frequency. It IDs as 'Radio Buenas Nuevas'. Check around midnight UTC.

However, watch out for Radio Villa in the Dominican Republic, which was also recently reactivated and also uses 4.960, give or take a decimal place or two. Also check 4.930 for Radio Barahona, another Dominican Republic station that seems to operate on a rather inconsistent basis.

Moving further south, here are some Ecuadorian stations that have been noted recently:

MHz	Station
3.280	La Voz del Napo, Tena
4.770	Radio Centinela del Sur, Loja
4.801	Radio Oriental, Tena (nominal 4.780, variable)
4.815	Radio El Buen Pastor, Saraguro
4.840	Radio Interoceanica, Santa Rosa de Quijos
4.919	Radio Quito, Quiot
4.950	Radio Baha', Otavalo
5.040	La Voz del Upano, Macas

All of the above frequencies should be considered slightly variable. Of all of the Ecuadorian short wave stations Radio El Buen Pastor and Radio Interoceanica are probably the most difficult to hear in North America.

LRA36 - Radio Nacional Arcangel San Gabriel, in the Argentine Antarctic has had its schedule cut to just three hours per day, 1800-2100, and only Mondays through Fridays at that! There are no weekend broadcasts at present.

Argentine medium wave and f.m. stations continue to be relayed on short wave, albeit on a very much sporadic basis and at no scheduled times. 8.098 lower sideband has recently carried La Red, B.A. (Buenos Aires) and Mil Ciento Diez (a.m. - 1110). 13.3635 has been noted carrying Radio Continental. 15.820 has had Radio Diez and Mega 98 f.m. 20.276 has aired Radio Rivadavia. You have to keep checking the appropriate frequencies on a regular basis.

Argentina isn't the only South American country relaying broadcast stations over a utility transmitter on a new and then basis. CBV, the Chilean utility station at Valparaiso, has been noted carrying a 'futbol' match between Chile and Bolivia from Radio Portales in Santiago on 8.759 at around 2130.

If one were determined enough it might be possible to find a source for the schedules of such games and then consulted a good utility frequency directory the chances of hearing these rare relay events might be taken out of the realm of pure chance.

Radiodifusora Nacional Colombia has appeared on 9.635, in addition to its 4.955 spot, and is sometimes heard quite well during the North American evenings. If you don't find them, try 9.655 or 9.685, two frequencies they tried briefly before settling (?) choosing 9.635. Somewhat surprisingly, the 9.635 broadcasts are different from what you'll hear on 4.955.

New from Peru is Radio Univision 2000 on variable 5.855, in Soritor, San Martin department. Another is Radio Andina, 6.673, Huancabamba, which is fairly widely heard during the evening hours. This one has no connection with the Radio Andina in Huancayo, long an occupant of 4.996, at least that we know of. Also new is Radio San Antonio, 3.375, in Callalli, Arequipa.

In Chile there is an amateur radio group that does a bit of broadcasting every couple of weeks. Radio Club de Chile is active on 7.120 lower sideband. According to their every 15 day formula, future broadcast dates should be November 12 and 26, December 10 and 24, January 7 and 21. Their transmissions start at 1600, not at all a good time for reception in North America. Reports can be sent to **RCC, Departamento de Radioescucha, Box 13.630, Santiago 21, Chile.**

Nicaraguan Radio Miskut, 5.770, has returned to the air (again). It's heard occasionally to sign off at 0000. Radio Miskut began life as a clandestine broadcasting in opposition to the Sandinista regime during the civil war there.

Alaska's KNLS (World Christian Broadcasting) station is going to add a second 100kW transmitter and additional antennas at their Anchor Point transmitting site. Once in operation this will allow a doubling of their on-air hours. One transmitter will continue to focus primarily on Russia and the other will broadcast mainly in Chinese.

That's all from this side of the pond for now. We'll have another Bandscan America for you in three months. Until then, good listening!



Greetings from Nova Scotia

Canada's Ocean Playground

**It looks as though we've heard the last from an old friend - CHNX in Halifax, Nova Scotia.**

**Towers for several broadcasting bands occupy the transmitter site at Radio Bandeirantes, one of many Brazilian stations active on short wave.**

■ BRIAN ODDY G3FEX, THREE CORNERS, MERRYFIELD WAY, STORRINGTON, WEST SUSSEX RH20 4NS

# LM&S

Frequent disturbances to reception in the short wave broadcast bands may occur in the months ahead so a few words about them may be appropriate here. The Sun is said to be 'quiet' during periods of low level solar activity and 'active' when an eruption or 'solar flare' takes place on the surface.

Solar flares occur without warning and vary in magnitude and effect. Frequently they are located close to a major sunspot and emit intense bursts of electromagnetic radiation, consisting of X-rays, ultra-violet, visible light and radio waves, which reach the Earth in 8.3 minutes. The ultra-violet and X-ray radiation may increase the ionisation of the D-layer of the ionosphere to the point where all radio waves are absorbed before they can reach the reflecting F-layers. The result is a 'sudden ionospheric disturbance' (s.i.d.), which might last a few minutes, but could be as long as an hour.

Fast moving streams of charged particles are also emitted by a flare and any that travel towards the Earth will arrive here about two days after a s.i.d. has occurred. They may cause another form of radio blackout known as an 'ionospheric storm', which can last anything from a few hours to several days!

There are two types of ionospheric storm - 'isolated' and 'recurrent'. The isolated type often occur during the peak years of a sunspot cycle and may well arise just now. Fast moving particles from other sources on the Sun's surface may result in the recurrent type of storm, which reappear about every 27 days, being the approximate rotation period of the Sun as seen from Earth. They usually occur a few years after a sunspot maximum and initially their effects may last a few days but they gradually diminish. So if reception suddenly deteriorates don't jump to the conclusion that your receiver has developed a fault!

**WARNING:** Any attempt to look at the Sun through binoculars or a telescope can result in permanent blindness.

## Long Wave Reports

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

Good conditions were observed early in the evening on some days in August. The Radiotelevisione Italiana (RAI) 10kW outlet at Caltanissetta, Italy, on **189kHz** was heard for the first time by **Simon Hockenhill** (E.Bristol) at 2020UTC on the 8th. He says "Apart from the obvious Italian language, I identified this by tuning another radio to **846** and **900kHz** in the medium wave band and to 6.060MHz in the 49m band".

At 2115 on the 25th **Sheila Hughes** (Morden) heard faintly under DLF Donebach, Germany (500kW) on **153kHz**, ballad type songs or a light opera and a man talking which she presumed was broadcast by Societatea Romana De Radiodifuziune via Bod (1200kW), which shares that frequency. At best the transmission rated 22212 and faded to 12211.

Over in Co.Down, **Eddie McKeown** (Newry) received exceptionally well on one occasion a broadcast from Rikisutvarpid (RUV) in Reykjavik via their 300kW outlet at Gufuskalar, W.Iceland, on **189kHz**. He logged it as 35233 at 0030UTC.

Music, then a time signal followed by the news in Italian broadcast by RAI via Caltanissetta, Italy, on **189kHz** were picked up between 1955 and 2010 on the 30th by **Fred Pallant** in Storrington. The transmission rated 13242. He also noticed that some N.African stations were audible co-channel with European ones.

## Medium Wave Reports

Although the hours of darkness are now increasing there were no reports of m.w. transatlantic reception during August. However, the listeners who searched the band after dark for the sky waves from m.w. stations in the Middle East, N.Africa, Europe and Scandinavia were fairly successful and they compiled some interesting logs - see chart.

Some listeners enjoyed searching the band during daylight for the ground waves from distant local radio stations. Over on the Isle of Wight **George Millmore** (Wootton) found that those from R.Kiran, the new station serving the Nottingham area on **1413kHz** (see 'LM&S' October *SWM*), were completely blocked by Premier R, which has outlets at Heathrow and Dartford on that frequency.

## Short Wave Reports

Many listeners have been hoping that more use will be made of the **25MHz (11m)** band during the coming months but so far there is no indication that will happen. In fact Radio For Peace International (RFPI), Costa Rica has now vacated **25.930** and moved to **21.815** in the 16m band and Radio France International (RFI) is now the sole occupant. Throughout the summer RFI has broadcast daily to listeners in E/C.Africa on **25.820** (Fr 0900-1300). The reception of them must have been

exceptionally good most days because potent signals have been reaching the UK in the 10m amateur band from stations in that area. It is most disappointing that no reception reports have arrived here for 'LM&S' to confirm this.

Unfortunately reception of the broadcasts from RFI is unreliable in the UK because it is dependent upon back scatter and other modes. Some of the SINPO rating noted in the reports during August were 34433 at 0900 by **Vic Prier** in Colyton; 32223 at 1030 by **Bernard Curtis** in Stalbridge; 55444 at 1104 in Newry; 25533 at 1126 by **David Edwardson** in Wallsend; 25343 at 1213 by **Fred Wilmshurst** in Northampton; 25522 at 1215 in E.Bristol.

The high level of activity in the **21MHz (13m)** band has continued and good reception from many areas has been reported by listeners in the UK. During the morning R.Thailand, Udun Thani **21.795** (Eng to Eur 0530-0600) was rated 44434 at 0530 in Morden; HCJB Quito, Ecuador **21.455** (Eng [u.s.b. + p.c.]) 34333 at 0702 by **David Hall** in Morpeth; R.Australia via Shepparton **21.725** (Eng to Pacific areas 0200-0900) 44434 at 0710 by **Stan Evans** in Herstmonceux; R.Denmark via R.Norway Int **21.755** (Da to E.Asia 0930-1000) 44333 at 0930 by **Thomas Williams** in Truro; BBC via Seychelles **21.470** (Eng to Africa 0900-1300) 32333 at 1030 by **Gerald Guest** in Dudley; R.Pakistan **21.460** (Ur to Eur 0800?-1100, Eng 1100-1105) 35553 at 1103 in Wallsend.

After mid-day, R.Australia via Shepparton on **21.820** (Eng to Asia 0900-1400) was rated 35343 at 1304 in Northampton; UAER, Dubai **21.605** (Eng to Eur 1330-1350) SIO 433 at 1330 by **Tom Smyth** in Co.Fermanagh; R.Ext.Espana via Noblejas **21.570** (Sp to S.America 1000?-1700) 45544 at 1355 in E.Bristol; BBC via Cyprus **21.470** (Eng to Africa 1300-1700) 55555 at 1446 by **Tom Winzor** in Plymouth; WYFR Okeechobee, USA **21.455** (Eng to Eur 1600-2100?) 34423 at 1700 in Colyton; R.Denmark via R.Norway **21.730** (Dan to Africa 1730-1800) 34333 at 1735 by **Robert Hughes** in Liverpool; R.Nederlands via Bonaire, Ned.Antilles **21.590** (Eng to C/W.Africa 1830-2025) 44444 at 1833 by **Martin Venner** in St.Austell; R.For Peace Int (RFPI), Costa Rica **21.815** (Eng [u.s.b.] to N.America 1200?-?) 22222 at 1935 in Stalbridge; HCJB Quito, Ecuador **21.470** (Various) 32333 at 2056 by **Peter Pollard** in Rugby.

In the **18MHz (15m)** band R.Denmark via R.Norway **18.910** (Da to Australia 0930-1000) was rated 45433 at 0945 in Northampton; R.Sweden **18.960** (Eng to N.America 1230-1300?) 34333 at 1253 by **Vera Brindley** in Woodhall Spa; R.Sweden **18.960** (Eng, Sw to N.America 1330-1430) SIO 555 at 1330 in Co.Fermanagh; Christian Science BC via WSHB Cypress Creek **18.910** (Eng, Fr to E/C.Africa 1800?-?) 33122 at 2100 in Rugby; WYFR via Okeechobee, USA **18.980** (Eng to Africa, Eur 1600-2200) 34444 at 2120 in Morden.

Good reception over long distances has been evident in the **17MHz (16m)** band. During the early morning R.New Zealand's transmission to Pacific areas from Rangitaki, N.Island on **17.675** (Eng ?-0705) was rated 34522 at 0633 in E.Bristol & 43433 at 0700 in Herstmonceux. R.Australia via Shepparton on **17.750** (Eng to Asia 0000-0500, 0600-1100) was noted as 35543 at 0704 in Wallsend, SIO 333 at 0754 by **Francis Hearne** in N.Bristol & 43443 at 0943 in Plymouth.

Also mentioned in the reports were R.Austria Int via ? **17.870** (Eng to M.East 0730-0800), rated 44444 at 0730 in Morden; Israel R, Jerusalem **17.545** (Heb [Home Svce relay] to Eur, N.America 0600-?) 54554 at 0900 by **Bill Griffith** in W.London; R.Jordan via Al Karanah **17.680** (Eng to N.America 1000-1200) 45444 at 1042 in Northampton; R.Bulgaria, Sofia **17.500** (Eng to Eur 1100-1200) SIO 555 at 1100 in Co.Fermanagh; Israel R, Jerusalem **17.535** (Eng to Eur, N.America 1300-1330) 33333 at 1310 in Truro;

R.Romania Int **17.770** (Eng to W.Eur, N.America 1300-1356) 54444 at 1314 by **Tony Hall** in Freshwater Bay, IoW; R.Romania Int **17.790** (Eng to Asia, Australia 1300-1356) 33333 at 1320 in Woodhall Spa.

Later, Qatar BS, Doha **17.895** (Ar to Eur 1700-2130) was 54454 at 1750 in Liverpool; Channel Africa via Meyerton **17.870** (Eng to W.Africa 1800-1830) 44444 at 1810 in St.Austell; Swiss R.Int via Julich, Germany **17.580** (It, Ar, Eng, Ger, Fr to Africa 1830-2130) 45444 at 1830 in Colyton; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) 32233 at 1900 by **Clare Pinder** in Appleby; BBC via Ascension



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

Listeners -  
(A) Simon Hockenhill, E.Bristol.  
(B) Sheila Hughes, Morden.  
(C) Eddie McKeown, Newry.  
(D) George Millmore, Wootton, IoW.  
(E) Fred Pallant, Storrington.  
(F) Tom Smyth, Co.Fermanagh.  
(G) Fred Wilmshurst, Northampton.

## Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	E*
153	Donebach DLF	Germany	500	B,C*,D,E*,F*,G
153	Bod	Romania	1200	B*
162	Allouis	France	2000	B,C*,D,E*,F*,G
171	Nador Medi-1	Morocco	2000	A*,E*
171	B'shakovo etc	Russia	1200	C*,G*
177	Oranienburg	Germany	500	A*,B*,C*,D,E*,F*,G
183	Saarlouis	Germany	2000	B,C*,D,E*,F*,G
189	Gufuskalar	W.Iceland	150	C*
189	Caltanissetta	Italy	10	A*,E*
198	Droitwich BBC	UK	500	B,C*,D,F*,G
207	Munich DLF	Germany	500	C*,D,E*,F*,G
207	Azilah	Morocco	800	A*,E*
216	Roumoules RMC	S.France	1400	B,C*,D,E*,F*,G
225	Polskie R-1	Poland	?	A*,B*,C*,E*,G
234	Beidweiler	Luxembourg	2000	B,C*,D,E*,G
243	Kalundborg	Denmark	300	A,B,C*,D,E*,G
252	Atlantic 252	Eire	500	C*,D,E*,F*,G
261	Burg(R.Ropa)	Germany	85	A*,C*,D,E*,G
270	Topolna	Czech Rep	1500	A*,B*,C*,D,E*
279	Sasnovy	Belarus	500	A*,B*,C*,E*

**£99.95**

**LOG PERIODIC MLP32**  
 Freq. Range 100-1300MHz  
 Length 1420mm Wide Band 16 Element directional beam which gives a maximum of 11-13Db Gain Forward and 15Db Gain Front to Back Ratio. Complete with mounting hardware. (The Ultimate Receiving Antenna - a must for the Dedicated Listener.)

**£49.95**

**ROTATOR AR-300XL**  
 \* Rotation Torque-222Kg  
 \* Vertical Load-45Kg  
 \* Mast Size - 28-44mm  
 \* Control Box-230v AC  
 \* Cable-3 core  
 \* Direct Compass Bearings (Ideal for Light to Medium Beams, i.e. LOG PERIODIC above.)

**£6.00**

**6" STAND OFF BRACKET**  
 Complete with U Bolts

**£9.00**

**9" STAND OFF BRACKET**  
 Complete with U Bolts

**MD37 SKY WIRE (LONG WIRE BALUN KIT)**  
 25 METRES OF ENAMELLED WIRE & INSULATOR

FOR USE ON WITH RECEIVER 0 - 40 Mhz. ALL MODE NO ATU REQUIRED 2 "S" POINTS GREATER SIGNAL THAT OTHER BALUNS. MATCHES ANY LONG WIRE TO 50 OHMS

**£9.00**

**IMPROVED RECEPTION**

**£29.95**

**5' SWAGED POLES**  
 Heavy Duty Ali (1.2mm wall)  
 SINGLE 1 1/4 ..... £6.00  
 SET OF FOUR 1 1/4 . £19.95  
 SINGLE 1 1/2 ..... £9.00  
 SET OF FOUR 1 1/2 . £29.95

**CONNECTORS**

PL259/9..... 0.75 each  
 PL259/6..... 0.75 each  
 PL259/7 for mini 8 1.00 each  
 BNC (Screw Type) 8 1.00 each  
 BNC (Solder Type) 8 1.00 each  
 N TYPE for N58 .....2.50 each  
 N TYPE for RF213 ..2.50 each  
 SO239 to BNC .....1.50 each  
 PL259 to BNC .....2.00 each  
 N TYPE to SO239 ..3.00 each

**CABLE**

RG213 MILITARY 0.85 per mtr.  
 MINI RF8 ..... 0.85 per mtr.  
 RG58 STANDARD 0.35 per mtr.  
 RG58 MILITARY 0.60 per mtr.

**WEATHER SATELLITE ANTENNA**

**TURNSTILE 137**  
 Freq. 137.5 Mhz  
 Length 1000mm

This Antenna is designed for external use to receive weather satellite signals.

Complete with mounting hardware.

**£39.95**

**£29.95**

**SUPER SCAN STICK**  
 Freq. Range 0-2000MHz  
 Length 1000mm

It will receive all frequencies at all levels unlike a mono band antenna. It has 4 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals. (Ideal for the New Beginner and the Experienced Listener alike.)

**£29.95**

**SUPER SCAN AIR BASE (Airband)**  
 (Stainless Steel)  
 Freq. Range Receive 117-140MHz  
 Transmit 117-140MHz  
 Length 825mm  
 Connector-N TYPE

This is a transmitting & receiving antenna designed for the aircraft frequency range. (For the control tower & aircraft listener.)

**£39.95**

**SUPER SCAN STICK II**  
 Freq. Range 0-2000 MHz.  
 Length 1500mm.

This is designed for external use. It will receive all frequencies. at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. (For the expert who wants that extra sensitivity)

**£49.95**

**MULTI SCAN STICK II**  
 Freq. Range Receive (0-2000MHz) Transmit (144-146 MHz)  
 Gain 4.00Dbd (420-430 MHz) Gain 6.00Dbd Length 1500mm

Same as Super Scan Stick but with extra gain, makes it an even better antenna for the amateur and expert alike. (Ideal for the Ham Radio user)

**£39.95**

**MULTISCAN STICK**  
 Freq. Range Receive - 0-2000 MHz.  
 Transmit 144 - 146 Mhz  
 gain 2.5 DBd  
 420 - 430 Mhz  
 gain 4.5 DBd  
 Length 1000 mm.

Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike. Comes complete with mounting hardware and brackets. (Ideal for the amateurs ham radio - user).

**£89.95**

**IVX 2000**  
 Freq. Range Receive - 0-2000 MHz.  
 Transmit 50 - 52 Mhz  
 gain 2.00Dbd  
 144 - 146 Mhz  
 gain 4.00 DBh  
 420 - 430 Mhz  
 gain 6.00 DBd  
 Length 2.5 m.

For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. (THE BEST)

**FULL RANGE OF SCANNERS AVAILABLE. PLEASE PHONE FOR PRICE.**

**£29.95**

**SWP 2000 FREQ. 25 - 2000 Mhz. Length 515mm.**

Multiband good sensitivity for its small size. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. (Good for the car user who doesn't want an external antenna.)

**£39.95**

**SWP HF30**  
 Freq. Range 0.05-30MHz Length 770mm

Although small, surprisingly sensitive for the H.F. user. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. (Good for the car user who doesn't want an external antenna.)

**£49.95**

**ROYAL DISCONE 2000**  
 (Stainless Steel)  
 Freq. Range Receive 25-2000MHz  
 Transmit 50-52MHz  
 144-146MHz 430-440MHz 900-986MHz  
 1240-1325MHz  
 Length 1540mm  
 Connector-N TYPE The Ultimate Discone Design. 4.5DB GAIN OVER STANDARD DISCONE! Highly sensitive, with an amazing range of transmitting frequencies, comes complete with mounting hardware & brackets (The Best There is).

**£49.95**

**HF DISCONE**  
 Freq. Range 0.05-2000MHz  
 Length 1840mm

Internal or External use (A Tri-Plane Antenna). Same as the Super Discone but with enhanced HF capabilities, comes complete with mounting hardware and brackets. (Ideal for the Short Wave H.F. Listener.)

**£34.95**

**TRI SCAN III**  
 Freq. Range 25-2000MHz Length 720mm

Desk Top Antenna for indoor use with triple vertical loaded coils. The tri-pod legs are helically wound so as to give it its own unique ground plane. Complete with 5mts of low loss coax and BNC plug. (Ideal for Desk Top Use.)

**£39.95**

**SUPER DISCONE**  
 Freq. Range 25-2000MHz  
 Length 1380mm

Internal or External use (A Tri-Plane Antenna). The angle of the ground planes are specially designed to give maximum receiving performance within the discone design. The Super Discone gives up to 3Db Gain over a standard conventional discone. Comes complete with mounting hardware and brackets. (Ideal for the Experienced Enthusiast.)

**£19.95**

**MRW-40 (Rubber Duck)**  
 Dedicated for Civil & Military Airband VHF/UHF RX & TX Capabilities  
 Length 215mm. PP £2.00

**£49.95**

**MRP-2000 (Preamplifier)**  
 Freq Range 25-2000 Mhz 9-15v input (Battery not included) 14 db Gain. Complete with lead and BNC connectors.

**£19.95**

**MRW-100 (Super Gainer) (Rubber Duck)** Wideband extra sensitive Dedicated VHF/UHF all mode Length 400mm. PP £2.00

**MRP-125 (Preamplifier)**  
 Freq Range 118-137 Mhz 9-15v input (Battery not included) 14 db Gain Complete with lead and BNC connectors.

**£19.50**

**UK SCANNING DIRECTORY**  
 7th edition

**£19.95**

**G. SCAN II**  
 Freq. Range 25-2000 MHz. Length 620 mm.

Magnetic mount Mobile Scanner Antenna. 2 vertical loaded coils for good sensitivity complete with magnetic mount and 4mts of coax, terminated with BNC plug. (Good for when you are driving about)

**£44.95**

**CIVIL AND MILITARY RECEIVING ANT**

AR30 (Length 1000mm GAIN 3.6 & 6.5) Price £39.95  
 AR50 (Length 1500mm GAIN 5.0 & 7.5) Price £64.95

## Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
3.230	SABC Meyerton	S. Africa	2010	E
3.255	BBC via Meyerton	S. Africa	2009	E,I
3.270	Namibian BC, Windhoek	Namibia	2008	D,E
3.316	SLBS Goderich	Sierra Leone	2000	E
3.320	SABC (RSG) Meyerton	S. Africa	2008	D,E
3.335	CBS Taipei	Taiwan	2020	E,I
3.365	GBC R-2	Ghana	2006	D,E,I
3.380	NBC Blantyre	Malawi	2007	E
3.915	BBC via Kranji	Singapore	2100	B,C,I,J
3.955	R. Taipei via Skelton	England	1800	C,E,G,H,K,L
3.970	R. Korea via Skelton	England	2100	B,F,G,J
3.975	R. Budapest	Hungary	2130	D,G,I,J
3.975	R. Taiwan via Skelton	England	2344	D
3.985	Nexus, Milan	Italy	2016	I
3.995	DW via Julich	Germany	2145	C,D
4.760	ELWA Monrovia	Liberia	2120	I
4.770	FRON Kaduna	Nigeria	2012	C,D,E,I
4.783	RTM Bamako	Mali	2353	D
4.800	LNBS Maseru	Lesotho	1852	D
4.815	R.diff TV Burkina	Duagadougou	2014	D,E,I
4.820	R. Botswana, Gaborone	Botswana	0310	A
4.825	R. Cancao Nova	Brazil	0315	A
4.835	R. Tezulutlan, Coban	Guatemala	0330	A
4.835	RTM Bamako	Mali	2010	B,C,E,I
4.845	DRTM Nouakchott	Mauritania	2012	D,E
4.850	R. Yaounde	Cameroon	2132	I
4.860	AIR Delhi	India	1915	C,D,E
4.885	KBC East Sce Nairobi	Kenya	1825	D,E
4.890	RFI Paris	via Gabon	0400	A
4.890	R. Port Moresby	Pap. N. Guinea	2011	E
4.915	Armonias del Caqueta	Colombia	0006	D
4.915	GBC-1, Accra	Ghana	2047	B,C,E
4.915	KBC Cent Sce Nairobi	Kenya	1825	E

Freq (MHz)	Station	Country	UTC	DXer
4.915	R. Cora de Peru, Lima	Peru	0324	A
4.935	KBC Gen Sce Nairobi	Kenya	1910	E
4.950	VOA via Sao Tome	Sao Tome	1928	D,E,G,I
4.960	VDA via Sao Tome	Sao Tome	0330	A
4.965	Christian Voice	Zambia	1920	EJ
4.975	R. Uganda, Kampala	Uganda	1921	D,E,I
4.980	Ecoss del Torbes	Venezuela	0009	D
4.985	R. Brazil Central	Brazil	0013	D
5.009	R. TV Malagasy	Madagascar	1826	E
5.020	La V du Sahel, Niamey	Niger	1921	C,E,I
5.025	R. Parakou	Benin	0018	D
5.025	R. Uganda, Kampala	Uganda	1827	E
5.030	AWR Latin America	Costa Rica	0020	A,D
5.030	RTM Kuching	Sarawak	2009	E
5.047	R. Togo, Lome	Togo	1922	D,E
5.050	R. Tanzania	Tanzania	1828	E,I
5.060	Sist d'Em Progreso	Ecuador	0022	Q

### DXers:-

- (A) David Hall, Morpeth.  
 (B) Simon Hockenhill, E. Bristol.  
 (C) Sheila Hughes, Morden.  
 (D) Rhoderick Illman, Dxted.  
 (E) Fred Pallant, Storrington.  
 (F) Clare Pinder, Glasgow.  
 (G) Clare Pinder, while in Appleby.  
 (H) Peter Pollard, Rugby.  
 (I) Vic Prier, Colyton.  
 (J) Tom Smyth, Co.Fermanagh.  
 (K) Martin Vennet, St. Austell.  
 (L) Tom Winzor, Plymouth.

Is **17.830** (Eng to Africa 0800-2100) 44444 at 1950 in Morpeth; R. Netherlands via Bonaire, Ned. Antilles **17.605** (Eng to Africa 1830-2025) 34343 at 2004 in Newry; WHRI via Maine, USA **17.650** (Eng to Eur, M. East, Africa 1600-2200) 44444 at 2008 in Rugby; VOA via Philippines **17.820** (Eng to E. Asia 2100-0030) 33323 at 2205 in Stalbridge.

Despite the increased activity in the 13m and 16m bands many broadcasters still rely on the propagation conditions prevailing in the **15MHz (19m)** band to reach listeners in selected areas. R. Australia has been heard in the UK on three frequencies from Shepparton: **15.240** (Eng to Pacific areas 0100-0900), rated 42443 at 0530 in Morden & 43334 at 0815 in Stalbridge; **15.415** (Eng to Asia 0100-0400, 0600-0900) 24542 at 0645 in Wallsend; **15.515** (Eng to Pacific, N. America 0200-0900) 32332 at 0625 in Morpeth.

During the morning HCJB Quito, Ecuador **15.160** (Eng to Eur? 0600-0800) was a potent 54444 at 0719 in Plymouth; R. Austria Int via Moosbrunn **15.410** (Eng to Eur, N. Africa, M. East 0730-0800) 43433 at 0750 in Herstmonceux; R. For Peace Int, Costa Rica **15.050** (Eng to N. America?) 33333 at 0815 in Truro; V of Armenia, Yerevan **15.270** (Various to Eur, M. East [Eng 0840-0900] Sun) 32222 at 0850 in Colyton; Swiss R. Int via Julich, Germany **15.315** (Eng, Ger, Fr, It to SW. Eur 1000-1230) 33333 at 1000 in Woodhall Spa; WEWN via Vandiver, USA **15.745** (Eng to Eur 1000-2200) 44444 at 1100 in Dudley; R. Bulgaria **15.700** (Eng to W. Eur 1100-1200) 44333 at 1115 in St. Austell.

After mid-day Israel R, Jerusalem **15.650** (Eng to Eur? 1400-1430) was 55555 at 1400 in Appleby; R. Oman via Thumrait **15.140** (Eng to M. East) SIO 322 at 1430 in Co.Fermanagh; All India R. via Bangalore **15.200** (Eng to W. Africa 1745-1945) 35333 at 1812 in E. Bristol; Africa No.1, Gabon **15.475** (Fr to W. Africa 1600-1900) 34433 at 1849 in Storrington; V of Indonesia, Jakarta **15.150** (Eng to Eur, Africa 2000-2100) 34343 at 2011 in Newry; RCI via Sackville **15.325** (Eng to Eur, N&W. Africa 2000-2300) 54444 at 2037 in Freshwater Bay, IoW; KTBN Salt Lake City, USA **15.590** (Eng to N. America 1600-0000) 33333 at 2045 in Liverpool; R. Korea **15.575** (Fr, Eng to Eur 2000-2130) 33343 at 2045 in Liverpool; VOA via Greenville, USA **15.580** (Eng to Africa 1800-2200) 24212 at 2140 in Newry; R. Taipei Int via WYFR **15.600** (Eng to Eur 2000-2300) 55544 at 2215 in Northampton.

In the **13MHz (22m)** band Swiss R. Int via Sottens **13.685** (Eng, It, Ger, Fr to Australia 0830-1030) rated 44444 at 0840 in Herstmonceux; R. Australia via Shepparton **13.605** (Eng to Pacific 0800-1200) 22222 at 0930 in Truro; Croatian R, Zagreb **13.830** (Cr to Pacific?) 25443 at 0945 in E. Bristol; R. Oman via Thumrait? **13.640** (Ar to M. East) 24232 at 1026 by Rhoderick Illman in Oxted; R. Prague, Czech Rep. **13.580** (Eng to Eur, Asia 1300-1330) 54444 at 1315 in Plymouth; Croatian R, Zagreb **13.830** (Eng to Eur, N. America 1800-1810) 44344 at 1805 in Liverpool; UAER, Dubai **13.675** (Eng to Eur 1600-1640, Ar to Eur 1640-2100) 42333 at 1810 in Colyton; R. Netherlands via Flevo **13.700** (Eng to Africa 1830-2025) 44444 at 1845 in Freshwater Bay,

IoW; V of Vietnam, Hanoi **13.740** (Eng, Fr to Eur 1800-2000) 32223 at 1940 in Stalbridge; Vatican R, Italy **13.765** (Eng to Africa 2000-2030) 43444 at 2015 in Rugby; R. Damascus, Syria **13.610** (Eng to Eur 2005-2105; Eng to America, Pacific 2105-2205) 34433 at 2016 in Newry; RCI via Sackville, Canada **13.650** (Eng to Eur 2000-2200) 32322 at 2036 in St. Austell; R. Havana Cuba **13.750** (Eng to Eur 2030-2130 [best on u.s.b.]) 32222 at 2110 in Morden; VOIRI Tehran **13.745** (Eng to Asia, Australia 2130-2230) SIO 222 at 2130 in Co.Fermanagh; RCI via Skelton, UK **13.670** (Fr, Eng to Eur, Africa 1800-2200) 44333 at 2150 in Northampton.

Some improvement in the reception of R. New Zealand's broadcasts in the **11MHz (25m)** band has been reported by listeners in the UK. Their early morning transmission to Pacific areas on **11.720** (Eng 0705-1005) was rated 43333 at 0710 in Herstmonceux & 44333 at 0755 in Appleby.

Also mentioned in the reports were World Harvest R. (VHRI) via Maine, USA **11.565** (Eng to Africa 0700-0800), rated 44444 at 0758 in Truro; R. Korea Int via Sackville? **11.715** (Eng to E. USA 1030-1100) 44344 at 1052 in Oxted; R. Macedonia via Thessaloniki, Greece **11.595** (Gr) 22222 at 1305 in W. London; R. Jordan via Al Karanah **11.690** (Eng to W. Eur, E. USA 1100-1730) 54444 at 1416 in Plymouth; R. Australia via Shepparton **11.660** (Various to Asia 1430-1700) 43333 at 1515 in Morpeth.

Later, R. Kuwait via Kabd **11.990** (Eng to Eur, N. America 1800-2100) was 44444 at 1833 in St. Austell; AIR via Bangalore **11.620** (Eng, Hin to Eur 1745-2230) 43434 at 1847 in Colyton; R. Bulgaria **11.700** (Eng to Eur 1900-2000) 43344 at 1900 in Dudley; V of Mediterranean, Malta via Russia? **12.060** (Eng to Eur, N. Africa 1900-2000) 45444 at 1935 in E. Bristol; China R. Int via ? **11.790** (Eng to Eur 2000-2100) 24222 at 2011 in Newry; RAI Int, Rome **11.880** (Eng to E. Africa? 2025?-2045?) 33333 at 2030 in Stalbridge; R. Romania Int **11.940** (Eng to W. Eur 2100-2200) SIO 222 at 2123 in N. Bristol; BBC via Ascension Is **12.095** (Eng to S. America 2100-0300) 43443 at 2208 in Northampton; WWCR Nashville, USA **12.160** (Eng to N. America, Eur 1200-0000) 44444 at 2250 in Morden; R. Prague, Czech Rep **11.615** (Eng to N. America 0000-0027) SIO 222 at 0000 in Co.Fermanagh.

R. Australia has been reaching the UK very well in the **9MHz (31m)** band. Although intended for listeners in Asia their transmission from Shepparton on **9.500** (Eng 1430-2130) was a potent 55435 at 2030 in Stalbridge. However,

### Listeners:-

- (A) Francis Hearne, N. Bristol.  
 (B) Simon Hockenhill, E. Bristol.  
 (C) Sheila Hughes, Morden.  
 (D) Brian Keyte, Bookham.  
 (E) Eddie McKeown, Newry.  
 (F) George Millmore, Wootton, IoW.  
 (G) Clare Pinder, Glasgow.  
 (H) Harry Richards, Barton-upon-Humber.  
 (I) Tom Smyth, Co.Fermanagh.  
 (J) Fred Wilmschurst, Northampton.

## Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	B,D,F,H,J
585	R. Solway	B	2.00	E,H
603	Capital G, Lit't'bme	I	0.10	D,F,H,J
630	R. Bedfordshire(3CR)	B	2.00	B,D,F,H,J
630	R. Cornwall	B	0.20	F
657	R. Clwyd	B	2.00	D,F,H,J
657	R. Cornwall	B	0.50	F
666	Cl. Gold 666, Exeter	I	0.34	A,B,C,D,E,J
666	R. York	B	0.80	C,D,H
729	BBC Essex	B	0.20	C*,D,F,H,J
738	Hereford/Worcester	B	0.037	A,B,D,F,H,J
756	R. Cumbria	B	1.00	E,G,H
756	The Magic 756, Powys	I	0.63	D,F,H,J
765	BBC Essex	B	0.50	C,D,F,H,J
774	R. Kent	B	0.70	D,F,J
774	R. Leeds	B	0.50	H
774	Cl. Gold 774, Gigs	I	0.14	A,D,F,J
792	Cl. Gold 792, Bedford	I	0.27	C,D,H,J
801	R. Devon	B	2.00	A,B,D,F
828	Cl. Gold 828, Luton	I	0.20	A,D,J
828	Magic 828, Leeds	I	0.12	H
828	2CR Cl. G. Boum'enth	I	0.27	F
837	R. Cumbria/Furness	B	1.50	E,H
837	Asian Netwk Leics	B	0.45	B,D,F,H,J
855	R. Devon	B	1.00	D,F
855	R. Lancashire	B	1.50	E,H
855	R. Norfolk, Postwick	B	1.50	D,H,J*
855	Sunshine 855, Ludlow	I	0.15	B,D,J
873	R. Norfolk, W. Lynn	B	0.30	D,F,J
936	Brunel CG, W. Wilts	I	0.18	D,F,I*,J
936	Fresh AM, Hawes	I	1.00	D,H
945	Cl. Gold GEM, Derby	I	0.20	D,H,J
945	Capital G, Bexhill	I	0.75	D,F
954	Cl. Gold 954, Torquay	I	0.32	D,F
954	Cl. Gold 954, H'ford	I	0.16	B,D,H,J
963	Asian Sd, E. Lancs	I	0.80	H
963	Liberty R, Hackney	I	1.00	D,F,H,J
972	Liberty R, Southall	I	1.00	D,F,H,J
990	R. Devon, E. Devon	B	1.00	B,D,F
990	Magic AM, Doncaster	I	0.25	D,H
990	C. G. Wolverhampton	I	0.09	D,J
999	C. Gold GEM Nott'ham	I	0.25	D,H,J
999	Magic 9-99 P'stn	I	0.80	E
999	R. Solent	B	1.00	B,D,F
1017	Cl. G. WAABC, Shr'shire	I	0.70	D,H,J
1026	R. Cambridgeshire	B	0.50	C*,D,H,J
1026	Downtown R, Belfast	I	1.70	F,I
1026	R. Jersey	B	1.00	B,D
1035	RTL C'try(Ritz)1035	I	1.00	D,F,J
1035	R. Sheffield	B	1.00	H
1035	West Sound AM, Ayr	I	0.32	E
1116	R. Derby	B	1.20	D,H,I,J
1116	R. Guernsey	B	0.50	D,F
1116	Valley R, Ebbw Vale	I	0.50	B
1152	LBC 1152 AM	I	23.50	D,F,J
1152	Pic'ly 1152, Manchr	I	1.50	E
1152	Cl. G, Birmingham	I	3.00	B,J
1161	R. Bedfordshire(3CR)	B	0.10	D,I*,J
1161	Magic 1161, Goxhill	I	0.35	H
1161	Southern Counties R	B	1.00	D,F
1170	Magic 1170, Stockton	I	0.32	H
1170	Capital G, Ports'm'th	I	0.50	D,F
1170	1170AM, High Wycombe	I	0.25	D,J
1242	Capital G, Maidstone	I	0.32	D,F
1251	C. G. Amberbury StEd	I	0.76	D,J
1260	Brunel CG, Bristol	I	1.60	F
1260	SabrasSnd, Leicester	I	0.29	J
1260	R. York	B	0.50	H
1296	Radio XL, Birmingham	I	5.00	D,E,F,H,I*,J
1305	Magic AM, Barnsley	I	0.15	H
1305	Premier via	I	0.50	D,E,F,J
1305	Touch AM, Newport	I	0.20	F
1323	Capital G, Southwick	I	0.50	D,F,J
1332	Premier, Battersea	I	1.00	D
1332	Cl. Gold 1332, Ptbo	I	0.60	D,H,J
1332	Wiltshire Sound	B	0.30	F
1359	Breeze, Chelmsford	I	0.28	D
1359	Cl. Gold 1359, C'try	I	0.27	D
1368	R. Lincolnshire	B	2.00	H
1368	Southern Counties R	B	0.50	D
1377	Asian Sd, Rochdale	I	0.10	D*,H
1413	R. Gloucester, Boton	B	0.50	H*
1413	Premier via ?	I	0.50	C,D,F
1413	Premier, Dartford	I	0.50	H*
1431	Breeze, Southend	I	0.35	C,D
1431	Cl. Gold, Reading	I	0.14	C,D,E,F
1449	R. Peterboro/Cambis	B	0.15	C*,D,H
1458	R. Cumbria	B	0.50	E,H
1458	Sunrise, London	I	50.00	C,D,E,J
1458	Asian Netwk Langley	B	5.00	J
1485	Cl. Gold, Newbury	I	1.00	B,C,D,J
1485	R. Humberside (Hull)	B	1.00	H
1485	R. Merseyside	B	1.20	E,F
1485	Southern Counties R	B	1.00	C,D,F
1503	R. Stoke-on-Trent	B	1.00	D,E,F,H,I,J
1521	Breeze, Reigate	I	0.64	D,F,J
1530	R. Essex, Southend	B	0.15	C,D,F
1530	Cl. Gold W. Yorks	I	0.74	H
1530	Cl. Gold Worcester	I	0.52	F,J
1548	R. Bristol	B	5.00	F
1548	Capital G, London	I	97.50	D,F
1548	Forth AM, Edinburgh	I	2.20	H
1557	R. Lancashire	B	0.25	H
1557	Cl. Gold B7, N. hant	I	0.76	J
1557	Capital G, So'ton	I	0.50	D,F
1566	CountySnd, Guildford	I	0.50	B*,C,D,E,F
1584	London Turkish R	I	0.20	C,D,F
1584	R. Nottingham	B	1.00	D,H,J
1584	R. Shropshire	B	0.50	D
1602	R. Kent	B	0.25	D,F

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

their early morning transmission to Pacific areas from Shepparton on **9.710** (Eng 0800-0900) is much weaker, rating only 22222 at 0815 in Truro.

Also received during the morning were R.Canada Int via Skelton, UK **9.595** (Eng, Fr to M.East 0500-0600), rated 44444 at 0520 in Morpeth; TWR Monte Carlo, Monaco **9.870** (Eng to Eur 0655-0820) 55444 at 0710 in Northampton; AWR via Forli **9.610** (Eng to Eur? 0930-1000) 44333 at 0930 in Morden; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 53443 at 0945 in Plymouth; R.Nederlands via Wertachtal **9.860** (Eng to Eur 1030-1225) 55555 at 1040 in Herstmonceux; R.Prague, Czech Rep. **9.880** (Eng to Eur 1030-1057) 44433 at 1057 in Oxted.

After mid-day R.Macedonia via Thessaloniki, Greece **9.935** (Gr) was 44444 at 1300 in W.London; V of Turkey, Ankara **9.460** (Tur to Eur, N.America 0800-2200) 33343 at 1335 in Liverpool; R.Pyongyang, Korea **9.335** (Sp, Eng to Eur 1800-2000) 42332 at 1837 in Colyton; V of Armenia via Kamo **9.965** (Eng to Eur 1955-2015) 34443 at 1955 in Newry; Africa No.1, Gabon **9.580** (Fr to C.Africa 0500-2200) 42242 at 2006 in Storrington; R.Ext.España (REE), Spain **9.840** (Eng 2100-2200 Sat/Sun) 33333 at 2100 in Appleby; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 54444 at 2140 in Freshwater Bay, IoW.

In the **7MHz (41m)** band good reception of World Harvest Radio (WHRI) via Maine, USA on **7.580** (Eng to N.America) was noted at midnight in Morpeth. Their transmission was a potent 44444. Some of the broadcasts to Europe in this band come from R.Japan via Woofferton, UK **7.230** (Eng, Jap 0500-0700), rated 55555 at 0655 in Herstmonceux; R.Polonia (Polish R), Warsaw **7.270** (Eng 1200-1300) 44333 at 1225 in Morden; R.Polonia (Polish R), Warsaw **7.285** (Eng 1400?-1430?) 33333 at 1420 in Stalbridge; R.Norway Int **7.485** (Norw 1800-1830) 54555 at 1800 in Liverpool; R.Denmark via R.Norway **7.485** (Dan 1830-1855) 44544 at 1840 in Colyton; V of Russia **7.300** (Eng [WS]) 25422 at 1825 in E.Bristol; V of Russia **7.380**

(Various) 54444 at 1858 in Freshwater Bay, IoW; R.Minsk, Belarus **7.210** (Eng 1930?-2000) 45444 at 1935 in Newry; RAI Rome **7.290** (Eng 1935-1955) 44444 at 1935 in Appleby; DW via Sines? **7.130** (Eng 2000-2045) 44444 at 2007 in St.Austell; R.Canada Int via Woofferton, UK **7.235** (Eng 2100-2200) SIO 444 at 2109 in N.Bristol; R.Macedonia via Thessaloniki, Greece **7.430** (Gr 1600?-2300?) 44434 at 2134 in Oxted; V of Turkey **7.190** (Eng 2200-2245?) 54544 at 2225 in Northampton; R.Minsk, Belarus **7.210** (Eng 0200-0230) SIO 544 at 0200 in Co.Fermanagh.

Many more broadcasts to Europe may be received in the **6MHz (49m)** band. Those mentioned in the reports came from R.Nederlands via Julich, Germany **6.045** (Eng 1030-1225), rated 44333 at 1143 in Oxted; Deutsch Welle (DW) via Julich? **6.140** (Eng Service) SIO 222 at 1500 in Co.Fermanagh; R.Prague, Czech Rep. **5.930** (Eng 1700-1727) 54444 at 1707 in Plymouth; R.Sweden via Horby **6.065** (Eng 1730-1800) 54444 at 1740 in Morden; R.Slovakia Int **5.920** (Eng 1830-1900) 43333 at 1633 in Colyton; Swiss R.Int via Julich, Germany **6.110** (Ger, It, Fr, Eng 1730-1930) 54554 at 1920 in Herstmonceux; Sri Lanka BC via Skelton, UK **6.010** (Eng to Eur 1900-2000 Sun) 44444 at 1930 in St.Austell; R.Finland, Helsinki **6.110** (Eng 1930-1945) 43334 at 1940 in Stalbridge; R.Canada Int via Skelton, UK **5.995** (Fr, Eng 1900-2200) 54454 at 2010 in Liverpool; R.Ukraine Int, Kiev **5.905** (Eng 2100-2200) 44333 at 2100 in Appleby; R.Japan via Skelton, UK **6.115** (Eng 2100-2200) 43343 at 2122 in Newry; R.Austria Int, via Moosbrunn **6.155** (Various) SIO 333 at 2139 in N.Bristol.

Also noted were some to other areas: VOA via Sao Tome **6.035** (Eng to W.Africa 2000-2300), rated 43334 at 2000 in Dudley; BBC via Antigua, W.Indies **5.975** (Eng to C/N.America 2100-0800) 45444 at 2228 in Northampton; BBC via Sackville, Canada **6.175** (Eng to USA 2200-0500) 35433 at 2228 in E.Bristol; R.Habana, Cuba **6.000** (Eng to N.America 0100-0500) 33333 at 0430 in Morpeth.

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

Listeners:-

- (A) Simon Hockenhill, E.Bristol.  
(B) Sheila Hughes, Morden.  
(C) Brian Keyte, Gt.Bootham.  
(D) Eddie McKeown, Newry.  
(E) George Millmore, Wootton IoW.  
(F) Clare Pinder, while in Appleby.  
(G) Tom Smyth, Co.Fermanagh.  
(H) Fred Wilmshurst, Northampton.

## Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600/300	E*
531	Berg	Germany	20	D*,E
531	RNE5 via ?	Spain	?	E
531	Beromunster	Switzerland	500	D*,E*,G*,H*
540	Wavre	Belgium	150/50	D*,H
540	Sidi Bennour	Morocco	600	D*,E*
549	Les Trembles	Algeria	600	A*,B*,D*,E*
549	Thurnau (DLF)	Germany	200	B*,D*,E,H
558	Espoo	Finland	50	D*
558	RNE5 via ?	Spain	?	E*
567	Tullamore(RTE1)	Ire	500	A,C,D*,E,G,H
567	RNE5 via ?	Spain	?	E*
576	Muhlackert(SDR)	Germany	500	D*,E,H*
576	Riga	Latvia	500	E*
585	Paris(FIP)	France	8	E
585	Madrid(RNE1)	Spain	200	A*,D*,E*
585	Dumfries(BBCScott)	UK	2	D*
594	Frankfurt(HR)	Germany	1000/400	D*,E*
594	Oujda-1	Morocco	100	E*
594	Muge	Portugal	100	D*,E*
603	Lyon	France	300	E*
603	Bucharest	Romania	50	E*
603	Sevilla(RNE5)	Spain	50	E*
603	Newcastle(BBC)	UK	2	C,D*
612	Athlone(RTE2)	Ire	100	A,C,D*,E,G,H
612	RNE1 via ?	Spain	10	E*
621	Wavre	Belgium	80	E,H
621	Barcelona(OCR)	Spain	50	D*
630	Vigra	Norway	100	D*
630	Tunis-Djedeida	Tunisia	600	D*,E*
639	Praha(Liblice)	Czech	1500	D*,E*
639	RNE1 via ?	Spain	?	A*,E*
648	Orfordness(BBC)	UK	500	B,C,E,G,H
657	Madrid(RNE5)	Spain	20	E*
657	Vneham(BBCWales)	UK	2	C,D*,G,H
666	Messkirch(Rohrd(SWF))	Germany	150	D*,H*
666	Lisboa	Portugal	135	D*,E*
675	R10 FM	Holland	120	A,D*,E,H
684	Sevilla(RNE1)	Spain	500	A*,D*,E*
684	Avala(Beograd-1)	Yugoslavia	2000	E*
693	Droitwich(BBC)	UK	150	E,H
693	Enniskillen(BBC)	UK	1	G
702	Flensburg(NDR)	Germany	5	D*,E*
711	Rennes 1	France	300	A,D*,E,H
711	Murcia(COPE)	Spain	5	E*
720	Lisnagarvey(BBC4)	N.Ireland	10	G
720	Norte	Portugal	100	D*
720	Lots Rd,Ldn(BBC4)	UK	0.5	C,E
729	Cork(RTE1)	Ire	10	C,D*,E
729	RNE1 via ?	Spain	?	D*,E*
738	Paris	France	4	E
738	Barcelona(RNE1)	Spain	500	D*,E*
747	Flevo(Hiltv2)	Holland	400	A,D*,E,H
756	Braunschweig(DLF)	Germany	800/200	D*,E*
756	Bitbaol(EI)	Spain	5	E*
756	Redruth(BBC)	UK	2	C,D*,E,G
765	Sottens	Switzerland	500	D*,E*
774	Enniskillen(BBC)	N.Ireland	1	D*,G
774	RNE1 via ?	Spain	?	D*,E*,H*
783	Leipzig(MDR)	Germany	100	D*,E*

Freq (kHz)	Station	Country	Power (kW)	Listener
792	Lingen(NDR)	Germany	5	D*
792	Sevilla(SER)	Spain	20	E*
792	Londonderry(BBC)	UK	1	G
801	Munchen-Ismaning	Germany	300	D*,E*
801	RNE1 via ?	Spain	?	E*
810	Volgograd	Russia	150	E*,H*
810	Madrid(SER)	Spain	20	D*,E*
810	Westerglen(BBCScott)	UK	100	C,D*,G,H*
819	Batra	Egypt	450	E*
819	Toulouse	France	50	A*,D*
837	Nancy	France	200	D*,G*
837	COPE via ?	Spain	?	D*,E*
846	Rome	Italy	1200	A*,D*,E*,H*
855	RNE1 via ?	Spain	?	A*,D*,E*,H*
864	Paris	France	300	D*,E,G*
873	Frankfurt(AFN)	Germany	150	C,D*,E*
873	Zaragoza(SER)	Spain	20	D*,E*
873	Enniskillen(R.U.I)	UK	1	D*,G
882	COPE via ?	Spain	?	D*
882	Washford(BBCWales)	UK	100	C,D*,E,G,H
891	Algiers	Algeria	600/300	E*
900	Brno(CRo2)	Czech Rep.	25	D*,E*
900	Milan	Italy	600	A*,Q*
909	Lisnagarvey(BBC5)	N.Ireland	10	G
909	B'mans Pk(BBC5)	UK	140	E*,H
918	Domzale	Slovenia	600/100	D*,E*,F*
927	Wolvertem	Belgium	300	D*,E,H
936	Bremen	Germany	100	D*,E*
936	Venezia	Italy	20	E*
945	Toulouse	France	300	D*
954	Brno (CRo2)	Czech Rep.	200	D*,E*
954	Madrid(CI)	Spain	20	A*,E*
963	Pori	Finland	600	A*,D*,E*,F*
963	Tir Chonail	Ire	10	G*
972	Hamburg(NDR)	Germany	300	D*,E*
972	RNE1 via ?	Spain	?	E*
981	Alger	Algeria	600/300	B*,E*
990	Berlin	Germany	300	D*,E*
990	Tywyn(BBC)	UK	1	D*,G
999	Schwerin (RIAS)	Germany	20	D*
999	Madrid(COPE)	Spain	50	D*
1008	Flevo(Hiltv-5)	Holland	400	D*,E,H
1017	Rheinsender(SWF)	Germany	600	D*,E*
1035	Lisbon(Prog3)	Portugal	120	D*
1044	Dresden(MDR)	Germany	20	D*,E*
1044	S. Sebastian(SER)	Spain	10	D*,E*
1053	Talk Sport via ?	UK	?	D*,E,H
1062	Kalundborg	Denmark	250	D*,E*
1062	R. Uno via ?	Italy	?	D*,E*
1071	Riga	Latvia	50	E*
1071	Bitbaol(EI)	Spain	5	D*
1071	Talk Sport via ?	UK	?	D*,E*
1080	SER via ?	Spain	?	D*,E*
1089	Talk Sport via ?	UK	?	D*,E,G,H
1098	Nitra(Jarok)	Slovakia	1500	D*,E*
1107	AFN via ?	Germany	10	D*
1107	RNE5 via ?	Spain	?	D*
1107	Talk Sport via ?	UK	?	D*,E,G
1116	Bari	Italy	150	D*
1125	La Louviere	Belgium	20	D*,E*
1134	Zadar(Croatian R)	Croatia	600/1200	A*,D*,E*,H*
1134	COPE via ?	Spain	2	D*
1143	AFN via ?	Germany	1	D*

Freq (kHz)	Station	Country	Power (kW)	Listener
1143	Stuttgart(AFN)	Germany	10	E*
1143	COPE via ?	Spain	2	D*
1179	Solvesborg	Sweden	600	A*,D*,E*,H*
1188	Kuurne	Belgium	5	D*,E*
1188	Szolnok	Hungary	135	E*
1197	Munich(VOA)	Germany	300	D*
1197	Virgin via ?	UK	?	D*,E,G,H
1206	Bordeaux	France	100	A
1215	Virgin via ?	UK	?	D*,E,G,H
1224	Lelystad	Holland	50	D*,E*
1233	Nitra	Slovakia	40	D*
1233	Virgin via ?	UK	?	D*,H
1242	Virgin via ?	UK	?	D*
1251	Huisberg	Netherlands	10	D*,E*
1260	SER via ?	Spain	?	D*,E*
1269	Neumunster(DLF)	Germany	600	D*,E*,H*
1278	Dublin(Cork(RTE2))	Ire	10	C,D*,E*,G,H
1287	RFE via ?	Czech Rep.	?	D*,E*
1296	Valencia(COPE)	Spain	10	E*
1296	Orfordness(BBC)	UK	500	C*
1305	RNE5 via ?	Spain	?	D*,E*
1314	Kvitsoy	Norway	1200	A*,D*,E,H*
1323	W'brunn (V.Russia)	Germany	1000/150	D*,H*
1332	Rome	Italy	300	E*
1341	Lisnagarvey(BBC)	N.Ireland	100	C,E*,G,H*
1350	Cesvaine/Kuldiga	Latvia	50	D*,E*
1359	Madrid(RNE-FS)	Spain	600	E*
1368	Foxdale(Manx R)	Is of Man	20	C*,D*,E*,F,G*
1377	Lille	France	300	D*,E,H
1386	Bolshakovo	Russia	2500	B*,D*,E*
1395	Filake	Albania	1000	D*
1395	Lopic	Netherlands	120/40	E,H
1404	Brest	France	20	B*,D*,E*,H*
1413	RNE5 via ?	Spain	?	D*,E*
1422	Heusweiler(DLF)	Germany	1200/600	D*,E*,H*
1440	Marnach(RTL)	Luxembourg	1200	B*,D*,E*,H*
1440	Dammam	Saudi Arabia	1600	A*,B*,D*
1449	Redmoos(BBC)	UK	2	A*,B*,C,D*,E*,G*
1458	Filake	Albania	500	E*
1467	Monte Carlo(TWR)	Monaco	1000/400	B*,D*,E*
1476	Wien-Bisamberg	Austria	600	A*,D*,E*
1485	SER via ?	Spain	?	B*
1494	Clermont-Ferrand	France	20	B,D*,H*
1494	St.Petersburg	Russia	1200	D*,E*
1512	Wolvertem	Belgium	300	D*,E*,F*,H*
1521	Kosice(Cizaitce)	Slovakia	600	D*,E*,H*
1521	Duba	Saudi Arabia	2000	A*
1530	Vatican R	Italy	150/450	C,D*,E*,H*
1530	Penheira(VOA)	Sao Tome	100	G*
1539	Mainflingen(ERF)	Germany	350(700)	D*,E*,G*,H*
1575	Genova	Italy	50	A*,E*,H*
1575	SER via ?	Spain	5	D*,E*,H*
1584	SER via ?	Spain	2	E*
1593	Holzkirchen(VOA)	Germany	150	D*,E*
1602	SER via ?	Spain	?	E*,H*
1602	Vitoria(EI)	Spain	10	D*,E*,H*
1611	Vatican R	Italy	15	C,D*

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

# aor AR8600



Faris Raouf, recovering from his recent move to wild and wet North Wales, gets his hands on the very latest from AOR. Here he uses the therapy of radio to relax and discover.

## Transportable Wide-band Receiver

**B**efore I say anything else, I want to point out that the AR8600 is **not** just a repackaged AR8200. Admittedly there are more similarities than differences between the two - they share the same frequency coverage, the same basic specs, the same display and almost the same button arrangements, for example. But the AR8600 is obviously not a hand-held portable receiver, instead being more at home in your shack or in your car. It is still portable, though, or more accurately what AOR refer to as 'transportable' - an internal NiCad battery pack can optionally be fitted into the case of the receiver, allowing you to use it anywhere you want to. A more important difference between the AR8600 and the AR8200, is the fact that the new model's front-end has been very much re-designed. The end result, according to AOR, is much better performance in general, and adjacent channel rejection in particular. I'll let you know if I agree with this once I've taken you through a more in-depth tour of the radio, highlighting some other differences between the AR8600 and the AR8200 along the way.

### What's In The Box?

I always like to start my reviews with a list of what you'll actually get in the box if you decide to actually buy the product I'm writing about, and I normally do this by simply listing what I can see in front of me. In this case that would be impossible, though, as AOR

sent me a huge number of optional items to play with along with all the standard ones. But as I understand it, of the huge pile of toys I see in front of me, what you would actually get as standard is the radio itself, which is extremely well-built and should last a lifetime, a telescopic whip antenna with a flexible base joint, a medium wave bar antenna, a user manual, and a mains power supply unit. As for the options, well, these are actually pretty similar to those available for the AR8200, and I'll mention some of them as I go on to describe the specifics of the AR8600.

### The Tour

We'll start our tour around the back of the AR8600, and quite frankly there's an awful lot to say here.

For a start, there's the usual 12V power input, along with two BNC sockets. The first BNC is the main antenna connection, while the second is a 10.7MHz i.f. output. This latter socket won't be of much interest to many users, but it is invaluable if you want to attach something like AOR's SDU5500 spectrum display unit, or certain types of sophisticated data decoders, to this radio.

Next you'll find a strange rectangular connector, located towards the top of the rear panel. This is where the AR8600's medium wave bar antenna attaches. Small and easily lost, this antenna is very similar to the one supplied with the AR8200, and is actually quite effective.

# aor AR8600



Close to the bar antenna connector are a standard 9-pin RS-232 port, an external speaker output, and a proprietary connector labelled 'ACC'. The RS-232 port allows full computer control of the AR8600 via software available absolutely free from AOR's Internet web site. Indeed, the same software used to control the AR8200 is used to control the AR8600. Having said that, there are a couple of minor incompatibilities between the current version of the software and the AR8600, but AOR tell me this will be sorted out soon. (AOR tell me that the software that Faris was supplied with for the review is that intended for the AR8200, a new version that will operate with the AR8600 and the AR8200 will be available by the time you read this - Ed.)

The external speaker output, which is on a 3.5mm socket, needs no additional comment. The 'ACC' connector, however, does. Basically, it provides access to a number of interesting things, primarily an unfiltered audio output - in other words a discriminator/detector output - yahoo! The 'ACC' connector also provides a tape motor relay interface, high and low level audio outputs, a low current 12V output and a ground.

If what I've described so far doesn't excite you, what comes next will...

## Option Slots

The lower section of the AR8600's rear panel has a set of five small slots in it. These are designed to accommodate the same optional slot cards available for the AR8200, of which there are five in total; a Voice Inverter card, a CTCSS squelch and search card, a tone eliminator card, a solid-state audio recorder card, and an external memory card. However, unlike the AR8200, which only has one card slot, since there are five slots on the AR8600 and five

cards in total, you can actually fit all of the available cards simultaneously into this radio rather than just one at a time. The bad news is that only two cards can be active at any one time, and not any two at that - the cards are split into two groups, with the tone eliminator, CTCSS and voice inverter cards falling into group one, and the solid-state audio recorder and extended memory card falling into group two, and you can only select one card from each group for use at any one time. Oh well, nothing's perfect.

## Where The Action Is

Having dealt with the rear panel, it's finally time to look at the front panel. On the left hand side you'll find individual rotary squelch and volume controls, with the volume control doubling as a master power switch.

Just underneath these is a 3.5mm headphone socket.

Moving to the right hand side of the front panel you'll find a set of four cursor keys and a larger rotary knob. The primary purpose of the cursor keys is to selecting options when adjusting the AR8600, and the primary function of the knob is to adjust frequency settings. However, the knob can also be used to adjust settings, and the cursor keys can also be used to adjust frequency.

All the real action lies in the middle area of the front panel, of course. Here you'll find the radio's l.c.d., which as I said before is identical to that of the AR8200. Therefore, the top third boasts a total of 20 textual or iconic function and status indicators that appear or disappear as necessary, while the rest consists of a 30 x 70 pixel dot matrix display.

Under normal circumstances, the dot matrix area displays a very clear seven segment S-meter at the bottom, radio mode, receive mode, and step setting at the top, and AOR's trademark dual-v.f.o. frequency readout in the middle. When editing any of the radio's functions, settings or memories, the dot matrix area changes appropriately, for example showing you the alphanumeric name you've given a memory location along with the bank and location name and the frequency itself.

To the left of the display you'll see just three buttons, 'STBY', 'K.L.' and 'MONI'. 'MONI' (Monitor) normally just opens up the squelch completely, or automatically tunes to the second frequency in a duplex transmission if you've enabled this option elsewhere. 'K.L.' (Key Lock) locks the keyboard to prevent accidental changes from being made. 'STBY' (Standby) is actually the button that AOR recommend you use to switch the radio on and off in general use rather than the master power switch. Hmm!

To the right of the display you'll find the AR8600's numeric keypad, plus '.' (decimal Short Wave Magazine, November 2000

point) and 'ENT' (Enter) keys. Each and every one of these buttons, even the 'ENT' key, has a second function (which allows such things as the step size or receive mode to be adjusted), identified with an additional label just above the key itself. These are accessed by simply pressing and releasing the 'FUNC' key, which is located in an additional row of buttons at the bottom of the front panel, then pressing the key below the label for the function you want. Pressing 'FUNC' then the '2' key allows you to adjust the frequency step, for example. Many of the buttons have tertiary functions too. These are normally labelled in orange below the keys and are accessed by pressing and holding the 'FUNC' button for a short time, releasing it, then pressing the required key.

As I mentioned a moment ago, the 'FUNC' key is in a row of keys at the bottom of the front panel. Other buttons located here include one to swap between the two v.f.o. frequencies (2VFO), one to activate the AR8600's bandscope function (BAND) and ones to activate the radio's search (SRCH) and scan (SCAN) facilities. Most of these buttons have secondary and tertiary functions just like the numeric keypad ones, but annoyingly not all of these are labelled.

## Features And Facilities

This is a review, not a user manual, so I'm not going to explain exactly which keys you need to press in order to activate each function I mention. I will break this rule a few times for the purposes of illustration, however. Be assured, though, that access to all the AR8600's functions are arranged in a quite logical manner.

So, let's start with the basics. To tune to a particular frequency, you just enter it in MHz using the numeric pad, entering the decimal point as required. You can then use the large knob or the cursor keys to move up and down frequency according to the step size you've set using the 'FUNC' '2' (STEP) key sequence. Pre-programmed step sizes of 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 6.25, 8.33, 9.0, 10.0, 12.5, 20.0, 25.0, 30.0, 50.0 and 100kHz are available, and if necessary you can also enter a user-defined step size.

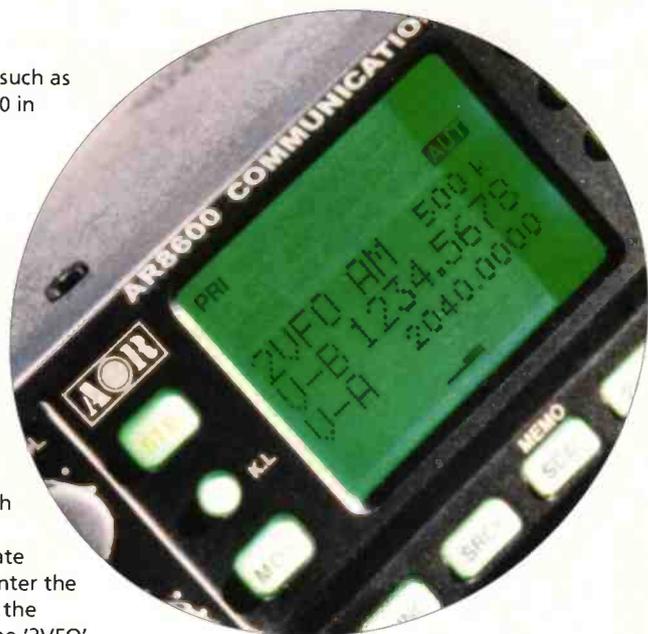
Receive mode is set using the key sequence 'FUNC' '3' (MODE), with options of w.b.f.m., n.b.f.m., s.f.m., w.a.m., a.m., n.a.m., u.s.b., l.s.b., c.w. and AUTO. Most of these are self explanatory, but two need further explanation. s.m. is basically just f.m. with a particularly narrow filter, but can be useful to home in on a particular signal in a busy band. The AUTO receive mode activates the AR8600's built-in band plan and causing its mode and step setting to be adjusted automatically for you. If configured elsewhere, it will also make fine adjustments to a receive frequency and step size based on information in the radio's band plan. For example, if you select 917MHz as your receive frequency (one of the starting points for analogue cellular telephone systems and a frequency I simply use as an example - do not tune in here yourself as it is highly illegal), the AR8600 will automatically adjust the receive frequency to 917.0125, which it will then increment in 25kHz steps. This is necessary in order to match the true band plan that is used in this frequency range. A similar facility allows you to do other things that would be impossible on less

sophisticated radios, such as tune from, say, 148.10 in 20kHz steps. All very clever stuff!

## Finding Frequencies

If you don't know an exact frequency for a transmission you are searching for, or just want to see what's out there, you can use the AR8600's v.f.o. search mode to search between any two frequencies. To activate this mode, you just enter the starting frequency in the current v.f.o., press the '2VFO' button to switch to the second v.f.o., and enter the ending frequency. Pressing and holding the '2VFO' button then causes the AR8600 to continuously search for transmissions between these two frequencies.

The AR8600 also has 40 programmable search pair banks. These allow you to program and store 40 start and end frequencies between which the radio will search at the push of the 'SRCH' button. The search pair banks are labelled simply 'a' to 't'



# Very usefully, you can program up to nine, individually selectable, scan link configurations into the AR8600

for banks '1' to '20' and 'A' to 'T' for banks 21 to 40, but you can quite easily add an alphanumeric title (e.g. 'VHF' to each bank to make it easier to identify later.

Very usefully, you can program up to nine, individually selectable, scan link configurations into



# aor AR8600



the AR8600. These allow you to link any or all of the 40 search pairs, which would then be searched through one after the other. It is also possible to have the AR8600 automatically store active frequencies it finds while searching into memory for you, to ignore non-voice transmissions, and to treat transmissions it comes across as 'active' only as long as they are above a certain signal level.

## Manual Storage

Assuming you don't want to use the AR8600's automatic frequency store feature, once you've found a frequency of interest you will undoubtedly want to store it manually in one of the radio's 1000 main user memory locations. This can be done with a push of a button or two, and you can add a 12 character alphanumeric description to each one for subsequent easy identification. The step,

mode and a number of other things to do with the current way you've configured the radio are also stored along with the frequency.

The AR8600's memory locations

are split into banks labelled 'a' to 'j' and 'A' to 'J', in a similar way to the search banks. Bank 'J', incidentally, is the bank into which the AR8600's automatic store facility always writes any active frequency it finds. By default, each of the 20 banks has 50 channels for you to store your frequencies in. You can actually alter the number of channels in each bank if you want, but only up to a point; upper and lower case banks of the same letter (e.g. D and d) are linked, and must always have a total of 100 memory locations between them. What's more, the maximum and minimum number of memory locations in any one bank is 90 and 10 respectively.

Having stored some frequencies, the next thing you'll probably want to do is scan through them. This is achieved by simply pressing the SCAN button. Selecting which bank you want to scan through is done by pressing the numeric key representing the correct bank (one press of the '1' button would scan bank 'a', and a second press would scan bank 'A', for example), or by pressing the left or right cursor keys to step up or down through all available banks.

To scan through more than one bank at once, you need to activate the AR8600's scan link facility. This is similar to the search link facility, and again you can set up nine individually selectable sets of links. It is also possible to select one or more individual channels within one or more banks, and to scan through only these selected channels. And, if required, you can tell the AR8600 not to scan through any memory locations unless they match the mode you specify (e.g. f.m.), to ignore any transmissions that are not voice transmissions, and to ignore any transmissions below a certain received signal level. Best of all, though, if you have stored a frequency and can't remember which bank it was in, you can even have the AR8600 search through all the alpha tags you've stored along with your frequencies and look for a particular string, for instance, 'MARINE'.

## Additional Features

The AR8600 has quite a few other interesting features worth mentioning, such as a built-in attenuator, a noise limiter, an AFC circuit, ten additional 'quick memory' locations, and a sophisticated memory channel/frequency pass facility. These are relatively self-explanatory, and quite frankly I don't have room to give you any more details on them. I can't finish my tour of the AR8600 without telling you about the AR8600's band scope, though. When activated, this gives you a graphical representation of the activity around the currently selected frequency, and allows you to quickly tune in to any area of interest. Like most other radio's band scope facilities, unfortunately, when the band scope is active you can't hear what's happening on any frequency unless you suspend the scope function first.

**SWM**



## In Use

I mentioned at the start of this review that the AR8600 has a redesigned r.f. circuitry. Amongst other things, this features a preselected front-end utilising varicap tuning across the range 75 to 470MHz. This receiver also utilises a temperature compensated crystal oscillator to ensure high stability. I noticed very minimum number of internal spurious. What this translates to in practice, is that the AR8600 is much more selective than an AR8200 (and most other mobile and portable receivers for that matter), and does not suffer from as much strong signal break-through, nor from as many birdies. Indeed, at my new offices, which are admittedly out in the wilds of North Wales, I encountered no break-through at all, and came across impressively few birdies. The same cannot be said of my Mark 1 AR8200 when used right next to the AR8600. What's more, I found the AR8600 much more sensitive than the AR8200 on just about every band I tried. In fact it worked a treat with just the telescopic antenna supplied as standard. I also found the AR8600 much easier to program and use than my AR8200, mainly thanks to it being fitted with individual cursor keys instead of that highly annoying four-way rocker switch.

I do have a few complaints though. For a start, I found the buttons just a tad on the small side for my liking. AOR's decision to use such small buttons is perfectly understandable, though, as if they were any bigger the radio as a whole would have to be bigger, which would have an impact on its portability. I was also annoyed about the fact that, just like the AR8200, the AR8600 pauses for up to five seconds when you change banks across one that has no frequencies stored in it. AOR suggest you make sure each and every bank has a frequency stored in it in order to prevent this happening, and this certainly does work. But it is a big disappointment on a radio of this sophistication.

Overall though, I was very impressed by the AR8600. A firm price had not been set at the time of writing, but all expectations are that it will be around £799, which isn't too bad at all considering what this radio offers. It is therefore well worth investigating further if you are in the market for a very sophisticated and sensitive radio you can use at home or in the car, or even away from any power source at all.

Thanks to **AOR (UK) Ltd., 4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA**, Tel: **(01773) 880788**, web: **www.aoruk.com** for supplying me with one of the very first AR8600s in the UK, and effectively making Christmas come early to the Raouf household this year!

# Whips, Loops & A Bit Of Feedback

About a hundred pounds or thousands of pounds? You choose!

This month something a bit different, JW compares an active loop antenna costing around one hundred pounds to multi-thousand pound alternatives from Rohde & Schwarz. See which one you'd choose.

It's funny how several unconnected things come together and focus your mind on a subject you hadn't before considered. In my case, the unconnected subjects were DefStan 59-41, BS EN 60945, the Lowe HF-350 and Wellbrook loop antennas. To explain: DefStan 59-41 is an MOD EMC test standard which calls for (amongst many other things) measurement of E-field radiated emissions below 30MHz, by use of an active rod antenna. BS EN 60945 is the European Harmonised test standard for marine equipment, also calling for radiated emission measurement below 30MHz but using a screened loop antenna measuring the H-field component of the emissions from equipment. The Lowe HF-350 and Wellbrook antenna came together at the time of my review of the receiver, when I commented on the rather neat idea of Palstar in providing a switched d.c. feed to the centre of the coaxial antenna connector so that the user could feed an active antenna system. The receiver handbook mentions only the Lowe AA-150 (manufactured by RF Systems and badged for Lowe) as being a suitable antenna, but I had been evaluating the Wellbrook ALA-1530 loop at the EMC Centre with a view to using it as a low cost alternative to a Rohde & Schwarz loop antenna which I normally use. The low cost comes from the fact that the Wellbrook loop can be had for about £120 whilst the Rohde & Schwarz loop costs just over £3500. You can understand my interest.

The ALA 1530 is made up of three parts, the one metre diameter loop with an impedance matching network and amplifier in its base, a mains power supply which delivers 12V d.c., and an interface box which feeds the d.c. up the coaxial cable to the active bit of the antenna but prevents it from feeding back to the receiver, and also an r.f. network which allows the incoming signals from the antenna to be passed to the receiver without being shunted to ground by the low impedance of the d.c. supply. The d.c. supply can of course come from any source, such as a battery, so the ALA 1530 is equally at home when used as a portable device. If you have a receiver such as the Lowe HF-350 in

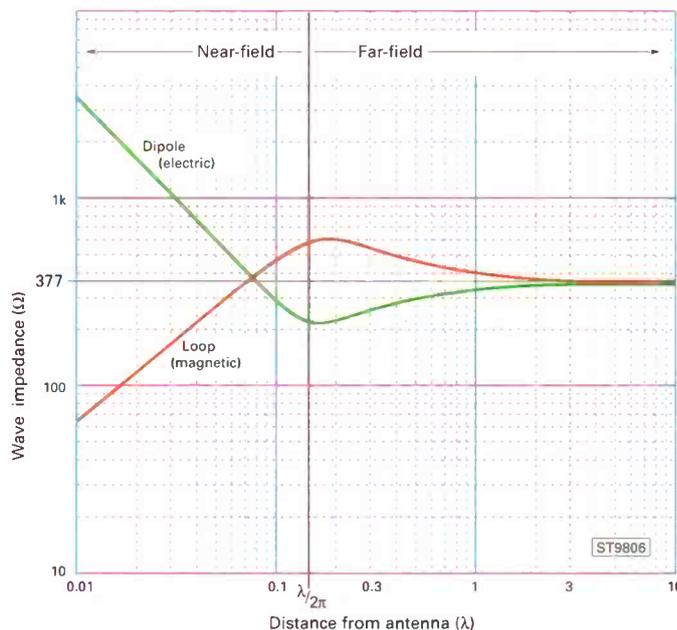
which the designer has provided a 12V d.c. feed via the receiver antenna socket, then it's even easier.

## Couldn't Resist It

So, having the ALA 1530 available I couldn't resist trying it out on the HF-350 to see how it performed. The handbook for the receiver says that the active antenna power feed is limited by an electronic fuse, and I checked that the trip limit on the review receiver operated at 140 to 150mA, which meant that the Wellbrook would operate comfortably without tripping the supply and indeed it did operate faultlessly. I used the ALA 1530 for several days on the HF-350 and it produced terrific results; so much so that I took a closer look at the relative performance of active loops and active whips and thought that the readers of *Short Wave Magazine* would appreciate an article on my findings.

First of all a bit of background. As short wave listeners, we are accustomed to having our receivers and antennas operating in what is known as the far field of any transmitting source. This is the region where a transmitted signal (or emission in EMC terms) is made up of an electric (or E) field, and a

**Fig. 1: Wave impedance, high for E-field and low for the H-field. The commonly accepted impedance plots for the near to far field transition.**



"if you consider that most sources of electrical noise such as the dreaded PC radiate their noise from the mains wiring, and that in the near field the E field dominates, it is indisputably true that an antenna which responds to the E field and which is in this cloud of radiated noise will transfer the noise to your receiver and effectively blanket any wanted signals which are arriving from the far field."

magnetic (or H) field which exist together to make up the electromagnetic wave. However, in the near field which, is commonly taken to be within a distance of  $\lambda/2\pi$  or roughly one sixth of a wavelength from the source, the relationship between the E-field and the H-field is difficult to determine, and the wave impedance becomes high for the E-field and low for the H-field. The commonly accepted impedance plots for the near to far field transition are shown in Fig.1

and without pursuing this much further let's think about the near field distances for the frequencies in which we might be interested as listeners. If you are listening to Rugby on 60kHz, the near field exists up to about 800m from the source, whereas at 3MHz the near field exists up to about 17m from the source, and at 6MHz up to about 8.5m. What has this got to do with the listening hobby? Well, if you consider that most sources of electrical noise such as the dreaded PC radiate their noise from the mains wiring, and that in the near field the E field dominates, it is indisputably true that an antenna which responds to the E field and which is in this cloud of radiated noise will transfer the noise to your receiver and effectively blanket any wanted signals which are arriving from the far field, in other words just those signals you want to hear and can't because of the electrical din created by your house wiring and all the devices connected to it. Haven't you ever noticed that the low frequency DXers in the USA have regular summer visits to long sandy beaches with no local inhabitants, and set up their Beverage antennas connected to receivers running from battery power? Why is that? Answers on a postcard please.

For my first tests I had at my disposal (who's a lucky chap?) a Rohde & Schwarz HFH2-Z6 active whip E field antenna and a matching HFH2-Z2 active screened H field loop antenna, together with the Wellbrook ALA 1530 active (unscreened) loop. I set each antenna in turn on a one metre tripod located just outside the EMC test centre and connected by a 10m cable to a Rohde & Schwarz ESHS-10 test receiver. I took a spectrum sweep of the frequencies from 150kHz to 30MHz and the results from the Rohde & Schwarz antennas are shown in Fig. 2 and Fig. 3. The active whip (Fig. 2) shows signal levels approaching 80dB microvolts in the medium wave band, and apparent peaks of signals at around 2.5 and 15MHz. The screened loop (Fig. 3) has a much flatter response, with signal levels being down on the whip, which can be explained by the fact that

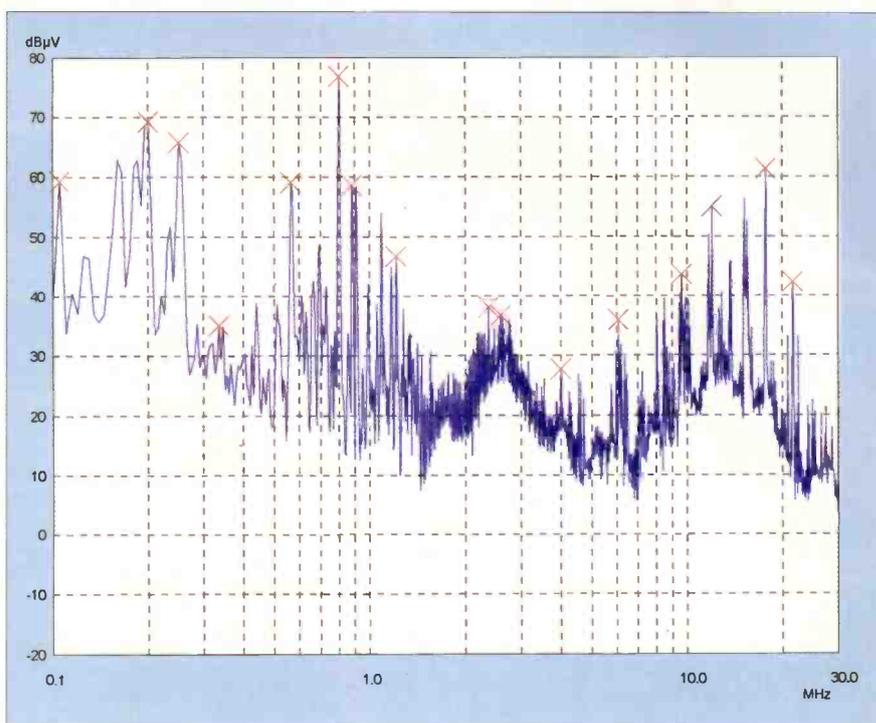


Fig. 2: The Rohde & Schwarz active whip spectrum sweep 150kHz to 30MHz.

the loop has an antenna factor of 20 whilst the whip's antenna factor is 8. (That's EMC talk which tells us that the whip has more built in gain than the loop.) Now for the £100 loop from Wellbrook using exactly the same set-up as for the £3500 antennas from Rohde & Schwarz. The results are shown in Fig. 4 and it doesn't take sharp eyesight to see that not only are low frequency signals well up to those shown by the active whip, but the noise peak at 2.5MHz from the whip is no longer present and real signals can be seen, and the signal levels between 5 and 22MHz are as high as those using the whip but there is no background noise peak at 15MHz, simply more real signals appearing out of the noise floor and then disappearing again in between each peak.

What does this all mean? I took another sweep over the range 1 to 5MHz using the Rohde & Schwarz active whip and repeated the same sweep using the Wellbrook loop. Compare Fig. 5 which shows the signals from the active whip, against Fig. 6 which shows the signals from the Wellbrook loop taken three minutes after the whip measurement. The massive peak of noise around 2.5MHz from the whip can be seen to consist of a comb of discrete signals, but the loop antenna shows no sign on these at all, and indeed real signals can be seen in the very region blanketed by the noise produced by the whip. Where did this noise come from? Quite simply from the PC which was running the receiver control software, but this was located within a screened control room some 10m away from the antennas and hence within the near field.

### Surprising Results

I have to admit that I was very surprised by the results and reverted to manual control of the test receiver in order to tune around as a short wave

**Continued on page 22...**

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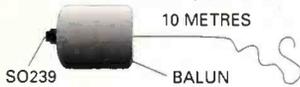
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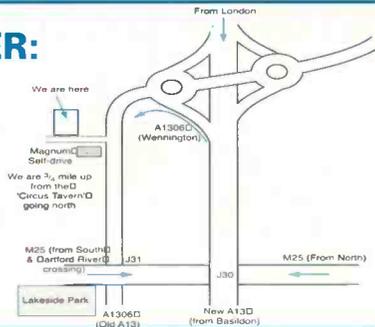
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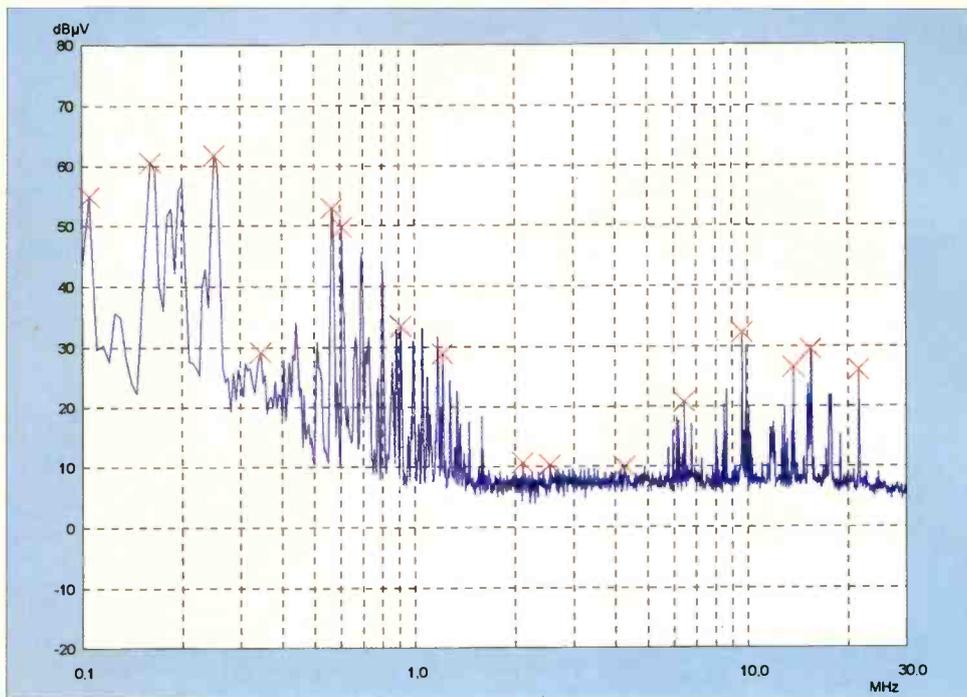
### JM-838



JUMBO WALL/DESK CLOCK.

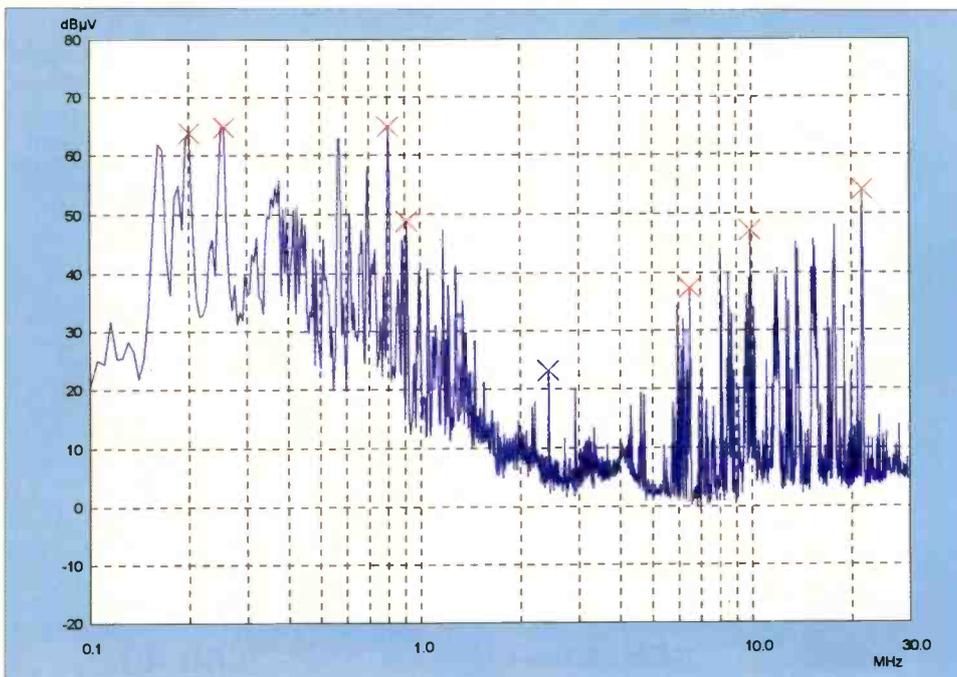
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**Fig. 3: The Rohde & Schwarz screened loop 150kHz to 30MHz.**

**Fig. 4: Wellbrook's £100 loop using exactly the same set-up as for the £3500 antennas from Rohde & Schwarz.**



listener. Sure enough, between 1.5 and 5MHz there was an unholy din from the Rohde & Schwarz whip, and a quiet background from the Wellbrook loop. Switching off the control computer killed the received noise from the whip, but there was still a higher background present, presumably coming from the general noise on the mains wiring of the building. Its really rewarding when theory and practice coincide, and this was just such an occasion. However, to prove the point I took the Wellbrook loop home again and simply plonked it on to my work bench where I do all my receiver measurements. I set my own spectrum analyser (Rohde & Schwarz) [*He's right about being lucky - Ed.*] to sweep between 2 and 5MHz and connected my usual 10m balun fed wire to the input. The results are shown in **Fig. 7**, and you can see evidence of a familiar comb of signals extending right across the frequency range. These were traced

to my own computer (at which I am now sitting) in the next room about 8m from the spectrum analyser, although the 10m wire runs directly away from the PC. I then connected the Wellbrook loop to the spectrum analyser and the results can be seen in **Fig. 8**. Where is the comb? Not there; and doing the same comparison with the HF-350 connected to the wire and then the loop confirmed that you could hear real signals using the loop but nothing but PC generated hash when using the 10m wire. Take a look at the marker on the spectrum analyser display which is set to a signal at 4.711MHz, and compare the recorded levels between the 10m wire and the Wellbrook loop. The loop actually gives a 6dB increase in the received signal and without any background noise. These measurements were taken less than four minutes apart, so they do constitute a real signal difference. I should also mention that the PC in question is only a month old and carries the proper CE labelling, so it fairly represents any recent computer set-up and is not some old clunker of a system from the Dark Ages.

I went on to take a look at another incidental advantage of the using a loop antenna in sorting out signals, particularly at low to medium frequencies. As anyone who has rotated a portable radio will know, the loop (or ferrite rod, which is just another loop) shows a broad peak and very narrow nulls in signal strength the classic figure of eight pattern. The Wellbrook loop exhibits these sharp signal nulls when the plane of the loop is at 90° to the direction of the incoming signal, and this can be used to notch out, or at least reduce the level of an unwanted signal. I used my 900/909/918kHz set-up and watched the amplitude of the 909kHz Radio 5 signal as I rotated the loop (just held in my hand). I was able to see a 20dB reduction in the 909kHz signal, and when I did the same thing on a receiver it was dramatic to hear the 918kHz signal become so much clearer when the 909kHz was nulled out. I am told that you can null out Atlantic 252 and hear signals behind it. Amazing!

As another practical observation, the Rohde & Schwarz handbook for their active whip lays great stress on the susceptibility of the whip amplifier to inadvertent damage from electrostatic discharge. Being such a high impedance device, (several MΩ), a single touch from a charged finger will destroy the input amplifier. If you use an active whip and place it outside on a pole, there is a serious danger that a nearby (and I mean within several kilometres) electrical storm or even a rainstorm will generate a high enough voltage on the whip to cause damage. When I was an active radio amateur using a G5RV antenna with open wire feeders into a parallel tuned antenna coupler, I could

always tell when a thunderstorm was around because I could hear the spark discharges between the plates of the antenna tuning capacitors in the tuner and they were proper wide spaced variables. By total contrast the loop is a very low impedance device and highly unlikely to have any such problems, making it a much safer bet for the hobby listener.

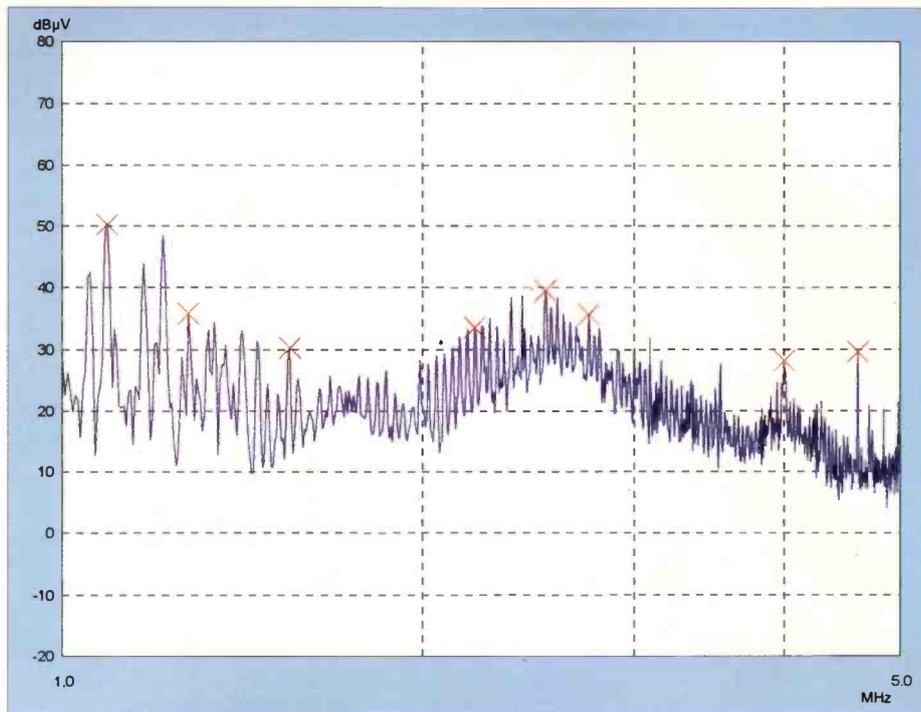
Conclusions? I am going to buy and keep the Wellbrook ALA 1530 active loop since it is clearly a much better listening antenna than my 10m balun fed wire. Everything I have read in the Wellbrook literature is absolutely borne out in practice, and I have to say that you would be well advised to get copies of this literature because it expands on what I have said here and is very informative about antennas in general and loops (of course) in particular. Given the choice between an active whip and an active loop, I would take the loop every time. It is infinitely better than the whip in terms of E-field noise rejection, performs every bit as well if not better than the classic end fed wire, has very useful nulls for rejecting unwanted signals (although you need to rotate it), and is much less likely to suffer damage from electrostatic charges when used as the listener is likely to use it. Its a magic device and works particularly well with the HF-350.

I also intend to send a slightly modified Wellbrook loop off for formal calibration at the National Physical Laboratory, because I can see it as a very useful backup for the Rohde & Schwarz HFH2-Z2 at the EMC Centre. If you want to do the same, be prepared for a calibration bill from NPL for something like £600.

## And So To Other Things

The AR88 review certainly stirred up some activity. I have been truly astonished at the number of readers who own an AR88, and this may explain why so few are available on the market. Regular users obviously feel like I did about the sheer pleasure of having one quietly simmering in the corner and taking a surreptitious twiddle at the tuning dial when the latest solid state device irritates ones ears. Typical comments came from Mike Penn who said, "Closing my eyes I could almost smell that unmistakable odour that came with operating that beautiful radio", and Ted Walker who wrote "I have two SP-600 Hammarlund receivers, an HRO-60, an NRD-525 and AR7030. For audio quality of h.f. and m.w. broadcast band stations, however, I favour the AR88D with its superb tuning and practical control layout". Ted also says that his AR88D which he lifted out of its original box, was complete with all documentation and spare parts such as filter choke assemblies, output transformer and an 'S'-meter which was a 5mA movement zeroed to the right and labelled dB above 1µV reading from 6 to 100dB. However, the meter is marked with the familiar MOD arrow which may suggest non RCA origin, although the spares box is labelled with Canadian Westinghouse markings. Does anyone else have more information? The final remark from Ted is Black boxes may come and go but an AR88 and the like, it seems, go on forever.

Tony Lawes also remembers having an AR88D to



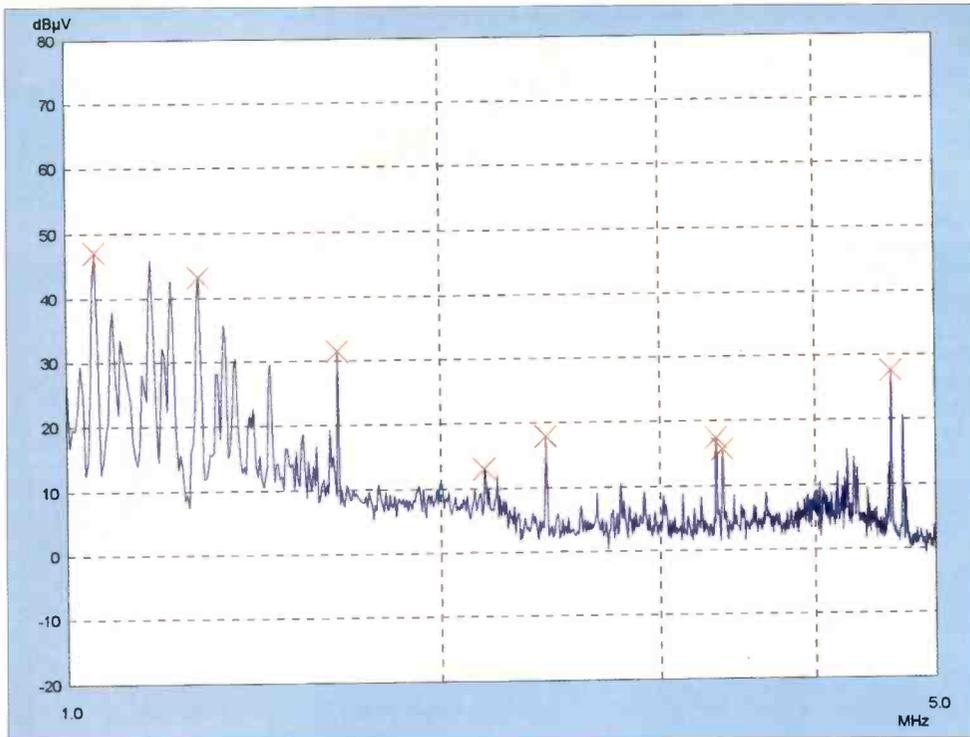
**Fig. 5** The off air signals from the Rohde & Schwarz active whip.

which he fitted what may have been a correct 'S'-meter which had a scale in the same amber colour as the main dial and mounting arrangements which allowed the meter glass to fit almost flush with the receiver front panel. He recalls spending some time in Gibraltar with the RAF, where the club station (remember ZB2A?) used an AR88LF which had the same meter, albeit with a cracked front glass. Jacques D'Avignon recalls that the AR88D used at the Montreal h.f. station for the North Atlantic h.f. circuits in the mid-50s had an 'S'-meter fitted in place of the RCA logo panel and goes on to tell that these were the days when BOAC were flying Stratocruisers and making transit stops in Gander, Newfoundland, and when all h.f. traffic was in a.m., not s.s.b.

A detailed letter from Paul Essery GW3KFE who compares the AR88 performance to that of a recent h.f. transceiver comments, "Perhaps the greatest thing it (the AR88) had was an absence it was designed to be a communications receiver not an ornamental addition to an advert! It lacked hundreds of buttons, the hundreds of memories and the bells and whistles but a stranger could walk up to it and drive it immediately. It would receive c.w., s.s.b., a.m., even f.m. quite happily, one could switch off the a.g.c., and above all it demonstrated the truth of the adage there's nowt that a single valve can do that can't be done nearly as well by a score of i.c.s plus a couple of hundred discrete transistors". Strong words from a man who can truly be said to know what he is talking about.

Finally, a note on an unusual variety of AR88 came from Mr. M. Dixon who has a sample with a blue/grey front panel, a main tuning dial without the bands designated alternately dark and light, and the tone control replaced by one labelled 'Diversity IF gain'. Well there's one clue for a start, because it's fairly clear that this particular AR88 was used as part of a dual or triple diversity receiver set-up. The only information I have on this topic is the RCA handbook for something known as the DR-89 which is a receiving system

"Black boxes  
may come and  
go but an  
AR88 and the  
like, it seems,  
go on  
forever!"

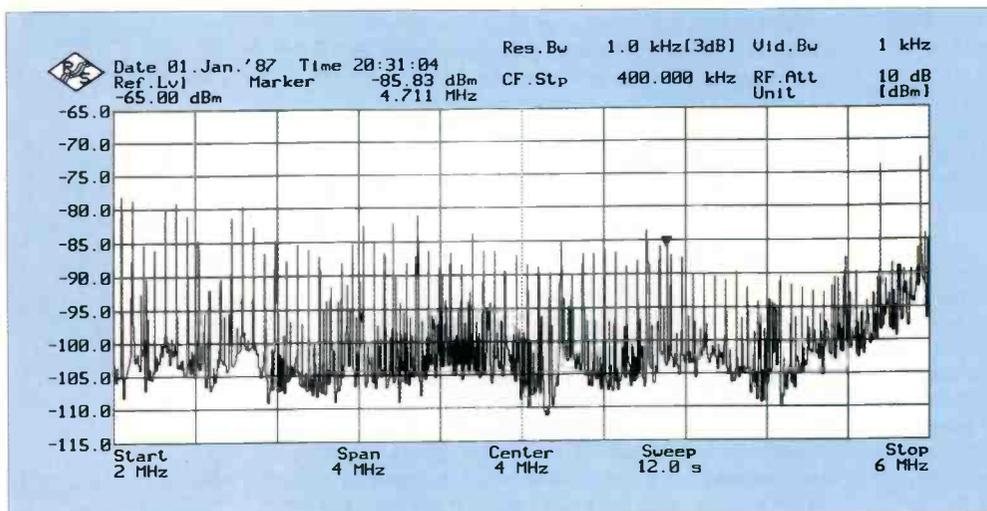


**Fig. 6** The off air signals from the Wellbrook loop taken three minutes after the whip, Fig. 5, measurement.

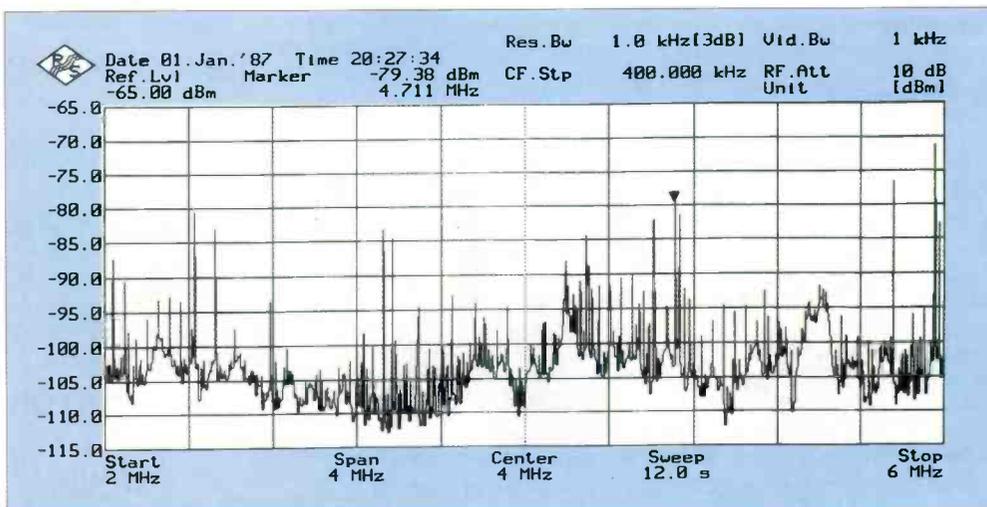
made up from three AR88s mounted in a rack with a unit called a Tone Keyer and another called a Monitor Unit. The handbook contains a wonderful dissertation on the principles and

practice of diversity systems which is almost worth reprinting as a separate article, because it is a useful commentary on the clever engineering that existed in the 1940s and how those engineering skills were used to ensure continuity of h.f. service under difficult ionospheric conditions. If you have a DR-89 and want to use it, RCA recommend that your antennas are erected as an equilateral triangle with a minimum of 1000 feet along each side. Not quite the thing for the suburban garden. However, back to the blue/grey AR88; the receivers shown in the DR-89 handbook have the normal black crackle finish and the tone control in place at the top left hand corner. There is however a small control knob labelled 'Diversity IF gain' fitted between and below the selectivity and noise limiter switches, the position matching that of the phones jack on the left hand side of the lower panel. Having thus failed to identify Mr. Dixon's receiver I turned to the bible covering this

subject, otherwise known as Raymond Moores *Communications Receivers The Vacuum Tube Era: 1932-1981* and located on page 102 the very receiver listed as the CR-88A dating from the 1940s, having a smooth grey panel and forming part of the DR-89A triple diversity receiver unit. So presumably that is the end of the story, except for the fact that the CR-88A should have a crystal phasing control under the main tuning knob, so I am writing to Mr. Dixon to find out more about his particular receiver. The bible also mentions a rather tasty sounding CR-88B manufactured from 1951 which had push-pull 6K6s in the audio and a single band in use tuning dial. Has anyone actually got one of these? Incidentally, Raymond Moores book has just come out in its 4th Edition and is available from the SWM Book Store. Since mine is only the 3rd edition I had better get my skates on before they sell out.



**Fig. 7:** Spectrum sweep of John's usual 10m balun fed wire, note the comb of computer generated noise extending right across the frequency range.



Finally, finally, I am looking for a BC-348 or BC-312 receiver for my own pleasure and would be willing to pay a fair price or better still swap one of my own receivers for it. How about my Trio R-820 as a straight swap? You'll never get a better deal than that (but it has to be an unmodified, complete and immaculate BC-348).

Happy listening, and my thanks to all those who have written in appreciation of my efforts to show just how good the classics can be. At my age (62) there is a tendency to believe that older is better! **SWM**

**Fig. 8:** The Wellbrook loop connected to the spectrum analyzer. Where is the comb?

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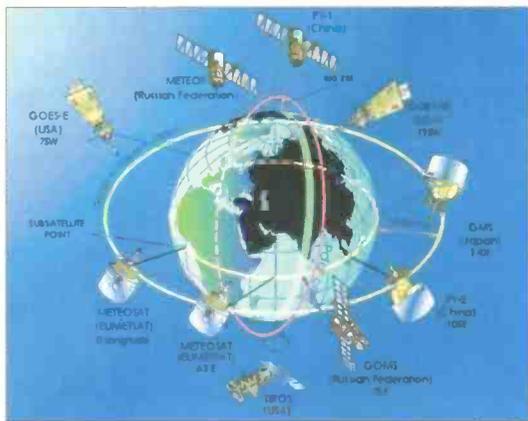


Fig. 2: Meteorological satellite constellations - (graphic courtesy NOAA).



Fig. 3: METEOSAT-7 graphic, courtesy Eumetsat.

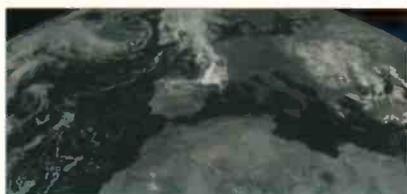


Fig. 4: Primary Data image METEOSAT-7 26 August 2000 1158UTC (unencrypted).

...continued from page 26

in WXSAT monitoring, produced the hardware necessary to decode the signals.

Firms such as Spectrum Communications, Timestep Weather Systems, Martelec, Spacotec and Feedback, were retailing products to those who wanted to buy 'off-the-shelf'

equipment - some producing products for 'cult' computers that would later disappear. In August 2000, Timestep is the only UK company remaining in the field.

Politically, the scene had little to compare with the situation of today. America's NOAA satellites were the only polar WXSATs that could be relied upon to deliver images routinely. Russia's COSMOS and METEOR satellites added the mystique element: you could guarantee raised eyebrows if you told your neighbours that you were receiving signals from Russian satellites!

During a chat with a friend - while discussing astronomy - I mentioned that a long dead Russian satellite had come back to life, for reasons that were not immediately obvious, and that I had picked up some form of picture transmission from it. The reason was later identified by someone (I forget his name) who had the resources to check which old satellites were in the vicinity; he speculated that while commanding a new satellite, the Russians had inadvertently switched an old one back on! Never a dull moment with Russian satellites.

China did not have any WXSATs, but they published plans calling for a FENGYUN (translates as 'wind and clouds') series in geostationary and polar orbits. Both are now operational.

### WXSAT Transmissions - What Satellites?

There are two types of WXSAT: Geostationary and polar orbiting.

Geostationary WXSATs are situated on the Clarke belt, about 35,790km above earth, where the orbital period is 24-hours, so their motion keeps pace with the earth's rotation. Depending on your longitude, you may be able to receive transmissions from more than one geostationary WXSAT, and many provide virtually continuous transmissions. All have an uninterrupted view of the hemisphere over which they are positioned. From any single location on earth, only those above the local horizon can be monitored, but with several operating at various positions around the globe, there will always be one for you!

Polar WXSATs are in near-circular, low earth orbits some 800 to 1200km above the earth. They have orbital inclinations - the angle between their orbital planes and the earth's equator - near 90°, so they pass near the poles on every orbit. Because the earth is rotating, they pass over every place on earth during each 24-hour period.

### Geostationary WXSATs

METEOSAT-7 provides a number of data transmissions, of which two that are of prime interest to us are WEFAX and

Primary Data.

WEFAX (weather facsimile) is one of the most common forms of picture transmission. It is used extensively for transmitting pictures on terrestrial h.f. bands, and is transmitted by several - but not all - geostationary WXSATs. METEOSAT-7 provides WEFAX transmissions on 1691.0 and 1694.5MHz, at specific times during the day, with occasional gaps.

WEFAX images are transmitted according to an easily obtainable schedule, and comprise sequences of images of nominal resolution - see Fig. 5. All images are black-and-white, but because each format always shows the same region, a mask comprising country outlines can be generated to demarcate land and sea.

A computer program then converts the WEFAX image to a fairly realistic colour equivalent in real-time, with shades of white, green and blue in the right places! It is not surprising that people who see these images, get the impression that the satellite actually transmits colour pictures!

Another application of WEFAX images is the production of animations. Because they cover the same regions, identical formats can be presented on screen sequentially, showing the actual movements of cloud systems. Once you understand something of the methods of interpreting these movements, your skill at short-term weather forecasting is likely to increase.

Some years ago, I found myself being asked to forecast summer - in early March! It is not too difficult to forecast the weather for the next few hours, when you have animating METEOSAT WEFAX images in front of you, but a reporter looking for a good story is liable to imagine that your capabilities exceed that of the Met Office.

WEFAX schedules have one more surprise. The images transmitted include specific pictures from some of the other satellites in this group. Selections from the American GOES, the Japanese GMS, METEOSAT-5 (over the Indian Ocean) are included. The return of scheduled images from the next Russian GOMS satellite is also possible. If you are seriously into WXSAT monitoring, you should look at WEFAX reception - direct from the satellites.

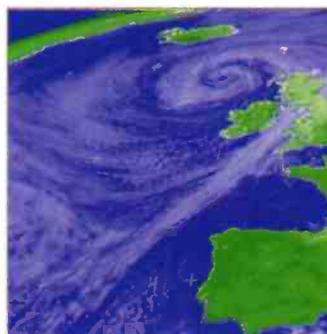


Fig. 5: WEFAX image METEOSAT-731 August 2000 C02 format 1030UTC.

### Primary Data

Wonderful stuff - see Fig 4! I first bought a Primary Data User Station (PDUS) nearly ten years ago, finally enabling me to see near continuous high resolution images. Primary Data is the highest resolution imagery routinely transmitted by METEOSAT.

As with WEFAX, transmissions occur according to a schedule. Each image contains considerably more data than WEFAX images, and is transmitted in digital form on 1694.5MHz. Primary Data formats (the individual images) are of basically three types: European sector, full disc and water vapour. Many images are multi-plexed - they contain interleaved data from both visible and infra-red images.

Only the image transmitted at 1134UTC each day (the AV format) carries the maximum resolution visible-light image - and this is encrypted. All other visible-light images are of half resolution.

One highly regrettable difference between METEOSAT-7 and all other geostationary WXSATs is that Eumetsat encrypt virtually all METEOSAT Primary Data images, leaving only those at synoptic hours (00, 06, 12, and 1800UTC) in the clear. This results from a directive by the individual nations - including Britain - that fund METEOSAT. More about this situation in an accompanying article on page ??.

Transmissions of Primary Data include a selection of high resolution images produced by other satellites, including GOES, GMS and METEOSAT-5. These images are not encrypted,

so add significantly to the value of operating a PDUS system within the severe limits imposed by Eumetsat.

## METEOSAT-6

A few degrees further west, we find *METEOSAT-6*. This spacecraft serves as a standby *METEOSAT* in case of *METEOSAT-7* failure. Located at 9°W longitude, it is regularly tested to maintain operational readiness. These tests may sometimes cause interference on small dish WEFAX systems due to the overlapping footprint of *METEOSAT-7* and wide aperture of the small dish. In general, such interference does not last long.

## GOES - Geostationary Operational Environmental Satellite

Continuing west in longitude, the next WXSAT is *GOES-E* (east), positioned at 75°W longitude, above the east coast of America. Continental USA encompasses a large spread of longitudes, so the nation's weather organisation, the National Oceanographic and Atmospheric Administration, operates a second geostationary WXSAT off the west coast - *GOES-W* (west) - positioned at 135°W longitude.

Both *GOES* WXSATs transmit WEFAX and PD imagery almost continuously from their respective positions. *GOES-E* transmits native images - see **Fig. 6** - with the addition of selected regions produced from the polar WXSAT *NOAA-14*, notably including the polar regions that are effectively out of range of geostationary WXSATs.

Meteorological charts are included, as are selected formats from *METEOSAT-7* and *GOES-W*. The latter transmits a similar range of images - see **Fig. 11** - including those from *GMS*.

This is only part of the *GOES* story. There are several earlier *GOES* WXSATs located at various longitudes over America, and in various states of operability. *GOES-2*, *GOES-3* and *GOES-7* are stand-by spacecraft; *GOES-9* is a stand-by spacecraft in storage mode. New satellites are launched and manoeuvred to either the east or west positions, or in between.

Currently, the east WXSAT location is occupied by *GOES-8* and *GOES-10* is in the west position. The recently launched *GOES-11* has been tested satisfactorily and is now available as a replacement.

One final note about *GOES*. From some regions on the west of Britain, including the south-west and parts of Wales, *GOES-8* is just above the western horizon. Using suitable equipment it is possible to receive WEFAX from *GOES-8* - an attractive proposition when you consider the wealth of imagery available (even if a little noisy at only 3° elevation).

## GMS - Geo-synchronous Meteorological Satellite ('Himawari')

We can continue westwards to the Japanese WXSAT *GMS-5*, but it is further west than 180°, so can alternatively be described as located at 140°E longitude, measured from Greenwich. *GMS-5* is operated by Japan and the satellite is a copy of *GOES-7*. It was launched in spring 1995 and became operational in June that year. It has a design life of five years and was due to be replaced by the first Japanese digital data satellite *MTSAT* (Multipurpose Transportation Satellite). Unfortunately, the Japanese rocket launch failed in November 1999. A replacement satellite will not be available until March 2003. *GMS-5* operations are being extended until June 2003.

## FENGYUN-2

*FENGYUN-2* is China's geostationary meteorological satellite, built by the Shanghai Institute of Satellite Engineering. It is very similar to the Japanese *GMS* (and therefore *GOES-3/7* spin-stabilised satellites, originally built by the Hughes Corporation in the USA). They are operated by the China Meteorological Administration (CMA), National Meteorological Satellite Centre (NMSC).

*FY-2B* can obtain hourly, full-disc earth images of three channels: visible (0.55-1.05µm), infrared (10.5-12.5µm) and water vapour (6.2-7.6µm). The resolution at ground-level of the image is 1.25km for the visible channel and 5km for infrared and water vapour channels.

The current WXSAT, *FY-2B* was launched on 25 June 2000, to replace *FY-2A*, and is in its orbital slot at 105°E longitude over the equator. There is a six-month on-orbit checkout of the satellite before it goes into full operation by early next year. The design life of *FY-2B* is three years and it transmits WEFAX.

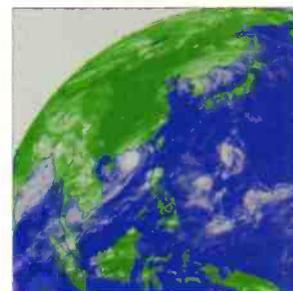


**Fig. 6: GOES-8 via METEOSAT-7 WEFAX LZ format showing hurricane Alberto.**

## INSAT - Indian Satellite

*INSAT-2E* was launched on 3 April 1999, and is different from all the official WXSATs. The *INSAT* series are geostationary, multipurpose (telecommunications, broadcasting and meteorology) satellites, operated by the Indian Space Research Organisation (ISRO) for the Department of Space, Government of India. The satellites carry meteorological imagers.

Following failure of the imager at the end of 1999, current images (provided via the Internet by the Indian Space Research Organisation) are from *INSAT-2D*. I asked the ISRO for some information and received the requested details. The *INSAT* system carries a Very High Resolution Radiometer operating in the visible and infrared regions. Spatial resolution is 2km in the visible and 8km in the infrared.



**Fig. 7: GMS-5 via METEOSAT-7 WEFAX GMSN format 31 August 2000.**

## GOMS (Geosynchronous Operational Meteorological Satellite - Russia)

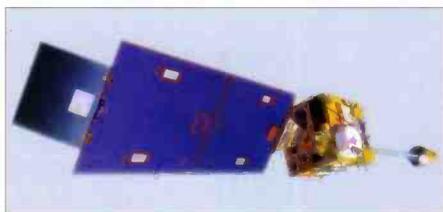
The Russian Federation operated *GOMS-1*, their first geostationary WXSAT, at 76°E, from June 1996 until it failed in 1999. During its lifetime, selected images were re-transmitted by *METEOSAT-7*. A replacement is planned for launch in 2001.

## METEOSAT-5

The final geostationary WXSAT is *METEOSAT-5*, located at 63°E over the Indian



**Fig. 8: METEOSAT-5 (IODC) via METEOSAT-7 WEFAX ITOT format 31 August.**



**Fig. 9: GOES satellite - courtesy NOAA.**

ocean. It was moved from 0° longitude to a location near this position to aid with the Indoex project between 1998 and 1999. Following the end of that mission, Eumetsat has continued to operate it from this location, a service known as the Indian Ocean Data Coverage (IODC) Service, likely to last until the end of 2001.

That completes our review of current geostationary WXSATs.

## POLAR WXSATs

These satellites are in relatively low earth orbits - some 800 to 1200km above the earth - although the oceanographic satellites have even lower orbits. There are different types of polar orbit and the NOAA, METEOR and RESURS orbits illustrate these. Some (notably the METEORs) are in orbits that precess - that is, their orbital planes slowly move around the earth, with respect to the sun.

Others (notably NOAA and RESURS) are in sun synchronous orbits. Currently active polar WXSATs include the American NOAA WXSATs, a Russian METEOR and RESURS and the Chinese *FENGYUN-1C*. Short transmissions may also be heard sometimes from *SICH-1*, *OKEAN-4* (also known as 1-7) and *OKEAN-O* oceanographic satellites.



**Fig. 10: GOES-E Primary Data image 26 August 2000.**

Continued on page 33...

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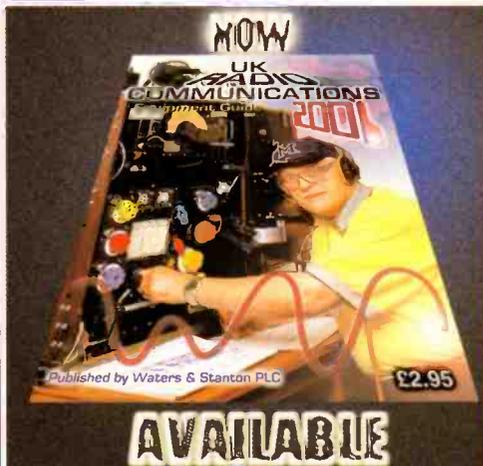
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Was £199.95

**IC-R75 Receiver 30kHz - 60MHz**  
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**YAESU FRG-100 Receiver**  
50kHz - 30MHz



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**0kHz - 32MHz AOR-7030 Receiver**

Needing little introduction, this receiver has become a classic of design. Features USB, LSB, CW, AM, FM, \* 100 Memories \* Dual VFOs \* Resolution to 10Hz \* Clock and Timer \* Variable Bandwidth \* Wide Dynamic Range \* Seamless Tuning using Single Loop DDS \* Clear LCD Readout \* Infrared Remote Controller \* AC Power Supply. Send for leaflet.



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**Fairhaven RD-500VX 20kHz - 1.75GHz**



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This very wide range receiver offers a complete listener station in one package. Features include USB, LSB, CW, AM, FM, Video out \* 5Hz step accuracy \* Over 13,000 memories with 20 Alphanumeric Characters \* Noise Blanker \* Text Search \* Pass Band Tuning \* Stereo CW Reception \* Notch & Peak Filter etc.



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The ideal scanner for those who are mainly interested in VHF and UHF listening. Features include, FM, WFM, AM reception \* 200 memories in 10 banks \* 20 steps per sec scanning \* 6 Tuning steps \* Good sensitivity \* Supplied with rechargeable ni-cads and AC charger. Telescopic antenna included.



### AOR-8200 Series 2 500kHz - 2040MHz

This wide range scanner is fitted with a data port for computer control. Features include USB, LSB, CW, FM, WFM \* Programmable steps \* 1000 memories in 20 banks \* Alphanumeric display \* Built-in AM antenna \* 8.33kHz steps for air band \* Rechargeable ni-cads, AC charger and helical antenna.

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**£249**  
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### IC-R10E 500kHz - 1300MHz

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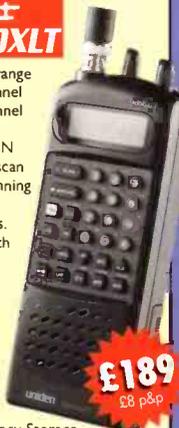
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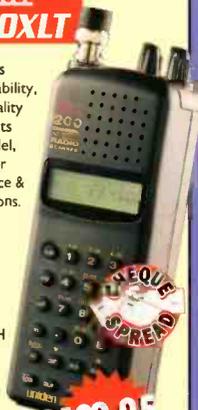


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SCANMASTER DD 1300**

A high performance wideband antenna

- 25-1300MHz
- Ultra wideband TX capability



**£59.95** **£39.95** £6.00 p&p

**SCANMASTER LP1300**

The ULTIMATE Scanner Antenna! High quality 16 element beam

- 105 - 1300MHz
- Gain 11 - 13 dBi
- 'N' Type connection
- 500W TX



**£129.00** £8.00 p&p

**NOMAD PORTABLE**

Fully portable flexible wire scanning receiving antenna. Covering both VHF & UHF it's compatible with all scanning receivers. Compact & lightweight, simply suspend it with the cord supplied. Length: 1.5Mtrs 4M coax & fitted BNC.



**£19.95** £4.75 p&p

**DXI SHORTWAVE ANTENNA**

Covers ALL shortwaves

Standard enamelled copper wire antenna up to 50 metres long with 10 metres of single feed wire. May be adjusted to suit garden. ● (Max) 50mtrs long



**£25.95** £4.75 p&p

## GOODMANS TRACKER

**2 WAY BUSINESS & PERSONAL COMMUNICATIONS SYSTEM**

**SPECIAL OFFER!**



**PAIR**  
**£99**  
£8 p&p

**PMR 446 LICENCE FREE RADIOS!**

**NO LICENCE FEE**

**NO CALL CHARGES**

**NO LINE RENTAL**

Typical range: up to 3km

**THIS MONTH ONLY we will include FREE OF CHARGE**

- 2 X DROP IN CHARGERS
- 2 X VOX HEADSETS
- NiCad BATTERIES

worth **£34!**

**USED EQUIPMENT**

ALL SAFETY TESTED & GUARANTEED FOR 3 MONTHS

SHORTWAVE RECEIVERS	
AOR AR3000A	Wideband Base Receiver..... 475
DRAKE SW2	HF Receiver - ex demo..... 399
GRUNDIG R5500	SW Portable - ex demo..... 99
SONY ICF SW77	Shortwave Portable..... 189
ICOM IC-R72	HF Receiver..... 399
ICOM IC-R75+UT102	HF Receiver..... 525
JRC NRD 535	HF Receiver..... 499
JRC NRD 535	Quality HF RX Base..... 799
KENWOOD R5000	HF fitted VHF module..... 699
REALISTIC DX394	HF Receiver..... 119
YAesu FRG880V	HF Receiver+VHF Converter..... 329
SCANNING RECEIVERS	
AOR AR8000	Handheld Scanner..... 189
BEACAT UBC 3000XLT	Handheld Scanner..... 110
BEACAT UBC 9000XLT	Base Scanner..... 189
COMTEL 510	Handheld Scanner..... 129
ICOM IC-R1	Handheld Scanner..... 159
REALISTIC PRO 2005	Base Scanner..... 175
REALISTIC PRO 2035	Base Scanner..... 125
YUPITERU VT225	Airband Scanner..... 185
YUPITERU MVT1700	Handheld Scanner..... 179

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# can't wait?

We ship FAST 'cos we've got the stock!

**ICOM IC-R75**

**CHEQUE SPREAD**

**IN STOCK! READY TO SHIP!**

The LATEST HOT Receiver from ICOM

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

**PRICE MATCH**

~~£499~~  
**£599**

£8 p&p

**JRC NRD-345**

**CHEQUE SPREAD**

**SPECIAL!**

- AM synch detector
- Low noise PLL chip
- Noise blanker
- Wide dynamic range
- Sensitive receiver
- RS232 computer I/F
- 100 memories
- Clock/Timer functions
- Supplied c/w AC mains adaptor
- INCLUDING MAINS AC SUPPLY

~~£499~~  
**£399**

£8 p&p

**GRUNDIG YB400**

**CHEQUE SPREAD**

**PRICE MATCH**

**PORTABLE SW RADIO**

"Best performance for price size category, and among the choicest portables of any size, at any price."

"The 400's FM performance is right up there with the very best among world band radios."

Passport to World Band Radio

- General coverage receive (144kHz - 30MHz)
- SW: 1.711-26.1MHz
- FM Stereo: 87.5-108MHz
- MW/LW
- SSB reception (both USB/LSB) (+1kHz fine tuning)
- 40 station preset
- Fine tuning
- Dual alarm clock
- Narrow/Wide bandwidth
- DX/Local sensitivity
- Auto Search
- Sleep timer
- Snooze timer
- Mains or Battery powered (with optional mains adaptor)
- Supplied c/w: SW Handbook, Carrying case, Ext Wire Antenna, Carry Strap

**£120**

£6 p&p

**AR 8200 Mk II**

**SPECIAL!**

- 530kHz-204MHz
- All Mode including 8.33kHz AM
- 1000 Memories
- Plus LOTS MORE!

~~£499~~  
**£399.95**

We carry the FULL RANGE of accessories!

**LATEST model!**

**YAESU FRG-100**

**PRICE MATCH**

**CHEQUE SPREAD**

This receiver provides solid coverage from 50kHz to 30MHz with all mode reception of AM, SSB and CW. The set requires 12V DC.

~~£499~~  
**£369**

£8 p&p

**FAIRHAVEN RD-500DX**

**CHEQUE SPREAD**

**IN STOCK READY TO SHIP**

NEW UPDATED MODEL - 20kHz - 1.7GHz

~~£899~~  
**£799**

£8 p&p

**GRUNDIG PORSCHE P2000**

**CHEQUE SPREAD**

A stylish radio designed by F.A. Porsche

- FM Stereo
- AM/FM/MW 13 SW bands from 2.3MHz-26.1MHz
- 20 station presets
- Auto search
- Clock, alarm, sleep function, world times
- Supplied c/w leather cover & in-ear stereo headphones
- Mains or Battery (Optional AC adaptor)

~~£189.95~~  
**£89.95**

£6 p&p

**YAESU VR 500**

**CHEQUE SPREAD**

**SPECIAL!**

ULTRA COMPACT RADIO

- 100kHz - 129999kHz
- FM, Wide FM, USB, LSB
- 1901 Memory channels
- Weight: 220 g!
- C/w Antenna, carrystrap, Belt clip
- Optional Charger

~~£299~~  
**£199.95**

£8 p&p

**SANGEAN AT5909**

**CHEQUE SPREAD**

**PRICE MATCH**

ULTRA COMPACT Digital Multiband Radio with SSB

- Covers: FM Stereo MW/LW/SW
- 307 memories
- Auto Tune System
- RDS (Radio Data System)
- Plus LOTS MORE!

OPTIONAL MAINS ADAPTOR £9.95

~~£299~~  
**£169**

£8 p&p

**SANGEAN AT5B18**

**CHEQUE SPREAD**

**UNBEATABLE VALUE FOR MONEY!**

SW WITH SSB

**SPECIAL!**

- 150kHz - 29.99MHz
- 87.5MHz - 108MHz
- 54 memories
- AM/FM/SSB
- AM Wide/Narrow filter
- RF gain control

OPTIONAL MAINS ADAPTOR £9.95

~~£169~~  
**£99**

£8 p&p

**GRUNDIG YACHT BOY 500**

**CHEQUE SPREAD**

**SPECIAL PURCHASE**

Covers:

- 1.6kHz-30MHz... SW
- 513kHz-1611kHz... MW
- 150kHz-353kHz... LW
- 87.5-108MHz... FM STEREO
- Mode: AM/FM/SSB
- Radio Data System
- 40 Station Memory
- Dual Alarm Clock
- Supplied c/w Leatherette Carrying case, mains adaptor

~~£249~~  
**£139**

£6 p&p

**ICOM IC-R2**

**CHEQUE SPREAD**

**SPECIAL!**

- 500kHz - 1310MHz
- AM/FM/WFM
- 400 memories

~~£149~~  
**£139**

£8 p&p

**ROBERTS RB61**

**CHEQUE SPREAD**

**PRICE MATCH**

Synthesised Receiver FM Stereo MW/LW/SW PLL

- 307 memories
- ATS auto scan
- E2 PROM for mem.
- FM stereo via earphones
- 29 pages SW stations memory
- 8 characters for editing station name

FULL RANGE OF ROBERTS IN STOCK - CALL

~~£179~~  
**£179**

£6 p&p

**SONY SW30**

**CHEQUE SPREAD**

FULLY DIGITAL WORLD BAND SHORTWAVE FM, MW & LW PORTABLE RADIO

~~£74~~  
**£39.95**

£6 p&p

**GRUNDIG YACHT BOY 500**

**CHEQUE SPREAD**

**SPECIAL PURCHASE**

Covers:

- 1.6kHz-30MHz... SW
- 513kHz-1611kHz... MW
- 150kHz-353kHz... LW
- 87.5-108MHz... FM STEREO
- Mode: AM/FM/SSB
- Radio Data System
- 40 Station Memory
- Dual Alarm Clock
- Supplied c/w Leatherette Carrying case, mains adaptor

~~£249~~  
**£139**

£6 p&p

**JRC ST3**

**CHEQUE SPREAD**

HEADPHONES

A real quality pair of headphones designed for the discerning shortwave and communications enthusiasts

~~£69.95~~  
**£49.95**

£4.95 p&p

**AOR AR 5000**

**CHEQUE SPREAD**

**IN STOCK READY TO SHIP**

**PRICE MATCH**

- 10kHz - 2.6GHz

All mode top class receiver & scanner packed with features

AR 5000+3 .....£1799

**YAESU VR 5000**

**CHEQUE SPREAD**

**MOBILE WIDEBAND RECEIVER**

**NEW!**

- 100kHz - 1,300MHz
- Multi mode
- Real time band scope
- Optional DSP bandpass, notch & noise reduction
- Optional filters

VISIT OUR WEBSITE FOR FULL DETAILS [www.nevada.co.uk](http://www.nevada.co.uk)

**ECALL**

~~£699~~  
**£349.95**

£8 p&p

**BEST PRICES ON GARMIN GPS PRODUCTS!**

**GPS III PLUS**

**£349**

£8 p&p

Garmin's most popular GPS with detailed maps & street data.

GPS 12	£129.95
GPS 12 CX	£239.95
GPS 12 MAP	£329.00
GPS 12XL	£189.95
E-MAP	£199.95
E-TREX	£119.95
GPS 148	£209.95

**SCANMASTER SP55**

**CHEQUE SPREAD**

WIDEBAND PREAMP

Improve the reception of your scanner!

- 24 - 1500MHz
- Variable gain (-3dB to +20)
- 3 bandpass filters
- Battery or 12V operation

**NEW LOW PRICE**

~~£75.00~~  
**£59.95**

**AOR AR 3000A**

**CHEQUE SPREAD**

**SHIPPED TODAY!**

**PRICE MATCH**

- 100kHz - 2036MHz

Classic receiver as used by Government, Military etc

AR 3000A+ .....£889

**PRICE MATCH**

**ICOM PCR 1000**

**CHEQUE SPREAD**

**PRICE MATCH**

COMPUTER RADIO SYSTEM

- 100kHz - 1300MHz
- ALL MODE RECEPTION
- PLUS LOTS MORE!

PCR OPTION DSP UNIT MS 106

~~£82.00~~  
**£349.95**

£8 p&p

**STREET PILOT**

**CHEQUE SPREAD**

MONO PILOT Package inc CD, 8Mb Data Card etc. £549

COLOUR PILOT Package inc CD, 8Mb Data Card etc. £649

MAP SOURCE CD ROMS

Available for UK, France, Germany, Italy etc...£69.95

FULL RANGE OF GARMIN ACCESSORIES IN STOCK - CALL FOR INFO & PRICES

**Palstar AM30**

**CHEQUE SPREAD**

Active Antenna/Preamplifier

- ACTIVE ANTENNA
- SHORTWAVE PRE-AMPLIFIER
- ACTIVE ANTENNA/TUNER
- Freq: 100kHz-30MHz
- Power: 12V DC/battery (supplied)
- Antenna: Telescopic whip included for use as an active antenna

**COMBINED 3-IN-1 UNIT**

~~£79.95~~  
**£69.95**

£8 p&p



## ITS EASY TO PAY - Pay by three post dated cheques!

- Simply divide the price into 3 equal payments.
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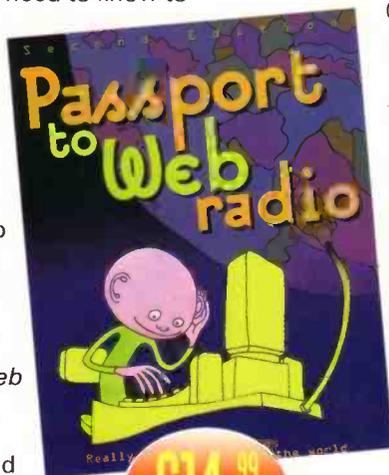


# Book Profiles

A selection of books for you to choose from this month. Remember, you can order your books from the SWM Book Store by 'phone, FAX, E-mail or good old-fashioned post!

## Passport To Web Radio - 2nd Edition

Web radio is an alternative source of f.m./a.m. stations from America and around the world. All you need is your PC and *Passport To Web Radio*. User friendly, *Passport* tells you everything you need to know to enjoy the world of web radio. From advice on how to get started, what's on, what's worth hearing, how to tune into a station, which stations stand out and why, *Passport To Web Radio* is an excellent introduction and comprehensive guide to Webcasters world-wide. All for **£14.99**.

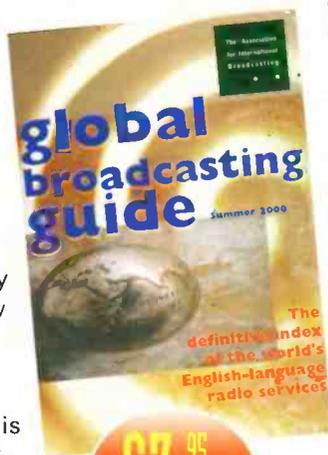


£14.<sup>99</sup>

ever, there's a selection of television information included. The *Global Broadcasting Guide* has been designed to slip easily into your pocket, briefcase or overnight bag, so wherever you're going, you can always be sure of being in touch - don't leave home without it! Order your copy now for **£3.95**.

## Ferrell's Confidential Frequency List - 11th Edition

Why settle for second best when you can have the ultimate in utility frequency guides. *Ferrell's CFL* is now produced by the publishers of SWM and PW, PW Publishing Ltd. The 11th edition is the culmination of years of monitoring experience and loggings. If you hear a utility station, you can be confident in discovering who, what and where with *Ferrell's CFL*, the distinctive first choice. Order your very own copy now for **£19.95**.



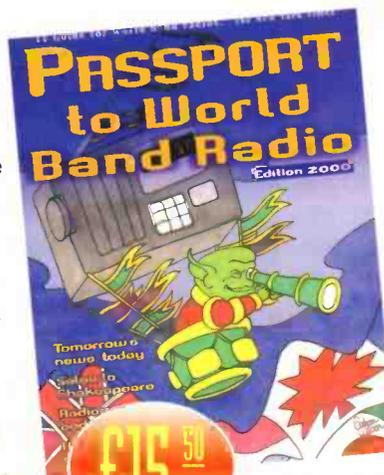
£3.<sup>95</sup>

## Global Broadcasting Guide - Summer 2000

The world's airwaves are bubbling with a multitude of programmes throughout the day and night. But how do you discover what's on the air right now? The answer is inside this unique guide book. Every radio station broadcasting on short wave with English-language international programmes is listed. This book is all you need to listen to the world! And, for the first time, to make this guide more useful than

2000 Edition

It's already tomorrow on the other side of the world, yet with world band radio, tomorrow springs into life while it is happening. World

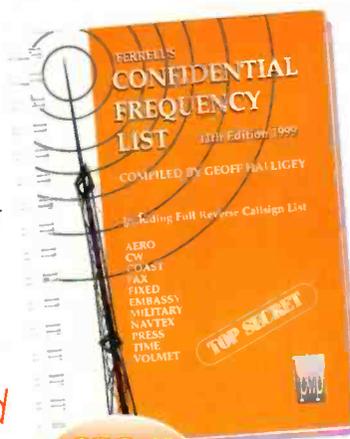


£15.<sup>50</sup>

band radio is unlike anything on ordinary radio or TV. It's non stop, refreshing and *Passport To World Band Radio* covers it all. With chapters on how to get started, best times and frequencies, how to choose a world band radio, table top receivers and loads more, this book is a definite must for your bookshelf. Begin your personal adventure and order your copy now for **£15.50**.

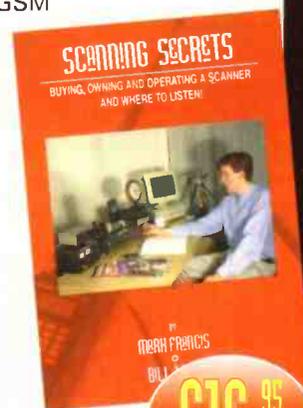
## Scanning Secrets

*Scanning Secrets - Buying, Owning & Operating A Scanner And Where To Listen* contains everything, from the 'birth of the scanner', understanding your scanner, kits, interference, airband listening, the marine band, p.m.r. bands, GSM



£19.<sup>95</sup>

and advice on buying and operating your scanner, where to listen and how to gather frequencies. All the information you need to unlock the potential of your scanner! Get your copy from the SWM Book Store for **£16.95**.



£16.<sup>95</sup>

# New ML&S

## Dressler active antennas

The full range of Dressler antennas are now available from ML&S.

### ARA 40

#### Technical performance

- Frequency range** 40kHz-40MHz at full performance 40MHz-108MHz 2.3dB gain
- Output impedance** 50-75 ohm coaxial
- Connector to Rx** PL comes as the standard. Other standards can be fitted upon request
- Gain** 5dB +/-0.2dBs
- Intercept Point** +45dBm IP 3rd order (10MHz/12V)
- DC power supply** 11.5-13 volt DC at 70mA typ. (230V mains adaptor for 12V DC is supplied with the antenna)
- Mast diameter** 30-50mm can be fitted
- Dimensions** **ARA40** 115cm total length with glassfibre whip. Antenna tube 40mm x 140mm  
**ARA40 TEL** 125cm total length with telescopic whip extended. 45cm minimum length. Antenna tube 40mm x 140mm  
Ideal for portable radio

**£139**

### ARA 60

#### Technical performance

- 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 upon 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

**£169**

### ARA 2000

#### Technical performance

- Frequency range** 50-2000MHz
- Output impedance** 50-75 ohms coaxial
- Gain** 19dB -1000MHz  
18dB -1400MHz  
16dB -2000MHz
- Noise figure** 1.5-2dB -1000MHz  
1.8-2.5dB -1500MHz  
2.5-4dB -2000MHz
- 3rd order IP** +35dB typical
- Output impedance** 50-75 ohms coaxial
- Connector standards** N type connector at the antenna. BNC male connector to the receiver
- Power supply** 12V DC at 160mA DC. Power supply for 230V AC is delivered comes with the antenna
- Dimensions** Length 450mm  
Diameter 90mm
- Weight** 2kg
- Accessories** Mains wall plug adaptor (230V A/12V DC). Interface unit (remote supply unit) 1.2m coaxial cable and mast mounting clamps

**£169**

This outstanding range is ideal for use with all base station receivers, the ICR-8500, AR-5000, PCR-1000, NRD-545, FRG-100 & more! Beautifully constructed and designed in Germany - we are pleased to be appointed for this range of products.

**NOW BACK IN STOCK!**

# The JRC NRD 545 Deluxe Receiver

**RRP £1699 ML&S £1299.**  
Also available on finance,  
**NO DEPOSIT & 48 payments**  
of only **£39.53 p/m**

## Special Package Deal

A new NRD-545 with matching Deluxe Speaker NVA-319 & optional VHF/UHF converter CHE-199 allowing coverage on AM/FM/WBFM up to 2000MHz.

**Total RRP £2197.00 ML&S £1649.**  
Also available on finance, **NO DEPOSIT & 48 payments of only £57.63 p/m**

**Save almost £500 off the package deal & pay nothing until APRIL 2001**

## Specifications

- Frequency Range .1 - 29.9999MHz
- Type of reception USB, LSB, CW, RTTY, AM, FM, WFM (When CHE-199 installed)
- Memories 1000 channels
- Receiving system Triple superhetrodyne
- Image rejection 70dB or more
- IF rejection 70dB or more
- Dimensions 330W x 130H x 285D (mm)
- Weight Approx. 7.5kg

## Features

- Digital Signal Processing by One-Chip DSP
- Wide Band 30-2000MHz
- Converter option (CHE-199)
- Remote control by PC

## NEW YAESU VR5000

Yaesu have just announced a new base scanner. This is their first scanner since the legendary FRG9600 and looks to become another benchmark.

#### Features include:

- 12 volt operation
- 100kHz - 25999.9998MHz frequency range
- Operating modes are CW, LSB, USB, AM, AM-N, WAM, FMN AND WFM
- Real Time Band Scope
- 2000 memories

- World Clock
- Case size is 180w x 70 h x 203 deep. (Weight approx 1.9kg).

#### Options include:

- DSP Bandpass, Notch and Noise Reduction Filters
- Digital Voice Recorders

**ARRIVING MID-NOVEMBER. ESTIMATED RRP £799. CALL NOW TO SECURE AN EARLY DELIVERY.**

**Yaesu VR-500 Pocket Scanner**  
100kHz - 1.3GHz  
AM/FM/WFM/SSB/CW  
BAND SCOPE  
PC PROGRAMMABLE  
Only **£199.95**



## NEW AOR AR-8600

At last the long-awaited base version of the AOR8200.

While the operation and logic of this unit are the same as the AOR8200 the AOR8600 front end is re-designed to cope with base antennae. This radio will be at home in the car or on the desk top. Coverage is 500kHz - 2040MHz.

Options include computer control, Plug-in memory module for 400 memories, CTCSS decode, Record Chip for 20 seconds of audio, Tone Eliminator and Voice Inverter.



**PRICE TO BE ANNOUNCED!**

## Icom IC-R75E

AVAILABLE ON FREE FINANCE - ZERO APR  
ONLY £99 DEPOSIT, THEN 12 x £50 p/m.



**FREE**

MyDel AT-2 Antenna Tuner Worth **£69.95**

**ML&S** martin lynch & sons  
Suppliers of Communications Equipment

**MARTIN LYNCH & SONS**  
140-142 NORTHFIELD AVENUE,  
EALING, LONDON W13 9SB

TEL: 0...  
Martin Lynch can also be contacted via our website and offered with FULL

**Internationally accepted as the benchmark receiver throughout the world, the NRD-545 is still the professional's choice.**

## The JRC NRD-345 New Lower Price!

Whilst JRC offer the ultimate receiver in the shape of the NRD-545, for those of you who can't quite convince yourself, the NRD-345 makes a low cost alternative. Simple to use and built to the same standards as its big brother, take a closer look at the 345 and of course the price!

- 0.1 - 30MHz Coverage
- AM/CW/SSB/Fax
- AM Synchronous Detection
- One Chip DDS-1C
- Digital Synthesizer
- Noise Blanker
- High Sensitivity & wide dynamic range

### Icom IC-R8500



Our dear friend Mr John Wilson gave this superb all band all mode receiver the thumbs up and it's hardly surprising. Icom have actually sold more of this product to HM Governments than enthusiasts. If it's good enough for 'them' it's good enough for you and me.

ONLY £1399 NO DEPOSIT, THEN 48 x £42.57p/m.

### AOR AR-8200 MkII

NOW WITH HIGHER POWER NICADS, TXCXO, NEW BLACK CABINET AND OTHER ENHANCEMENTS.

In stock in limited numbers at £419.00  
No deposit and 48 x £12.75 p/m.

Dear Mr Lynch

I am writing to congratulate you on the service that I have received from your company.

At 13.00 on Tuesday of this week I placed an order for a Yaesu VR500 via telephone. Twenty four and a half hours later I had the unit in my hand! Not only was your delivery time extremely fast, but I also bought my receiver for forty pounds less than I could find it anywhere else.

Your staff were most helpful on the telephone and your website is easy to navigate to locate the product that was required.

Once again thank you very much for your splendid service. I look forward to using you again and I wish you and your business every success for the future.

Kind regards  
Matthew Bird



**ML&S: ONLY £399 with PSU**  
**No Deposit, then 48 x £12.14 p/m**



**AOR AR-5000A**  
RRP £1395.00  
**NO DEPOSIT,**  
THEN 48 x £42.45 p/m.

### AOR AR-5000+3

The AR-5000+3 including AFC, Synchronous AM & noise blanker.  
RRP £1699 **NO DEPOSIT,**



**AOR AR-3000A**  
RRP £749.00  
**NO DEPOSIT,**  
THEN 48 x £22.79 p/m.

**AOR AR-3000A plus**  
RRP £849.00  
**NO DEPOSIT,**  
THEN 48 x £25.84 p/m.

### Icom PCR-1000 FREE MyDEL AT2!

RRP £349. DSP UT-106 at only £59.95.  
**AVAILABLE ON FREE FINANCE - zero apr**  
ONLY £49 DEPOSIT, THEN 12 x £25 p/m.  
including a **FREE MyDEL ATU AT2**  
worth **£69.95!**



### Icom ICR-2E

INCLUDING MATCHING ICOM LC-143 CARRY CASE & FREE CARRIAGE.  
**£149.00**



## New ML&S

### Garmin Street Pilot

The Street pilot is an excellent in car GPS unit with map detail down to street level. The amber backlit display is easy to read and makes the unit ideal for navigation in unknown territory. The Street Pilot is also at home with APRS when used in conjunction with a THD7E or TMD700E. Supplied with *The UK Metro Guide* on CD Rom, an 8mb Ram module cigar Lead, PC lead and a magnetic roof mount antenna the system is all **ready to go at £595.00** including delivery to your Door.



### Garmin E Map

The Garmin Emap is a hand held version of the Street Pilot and comes with Data lead, 8 mb Ram Card & *UK Metro Guide* on CD Rom at only **£329.00**.



### The Garmin GPS3plus

The ever popular GPS3 now has more map detail and allows upload to street level. **Available at £339.00**



**Road and Recreation CD Rom available at £99.00**

### FINANCE EXAMPLE

All examples do not include P&P.

Cash Price	Deposit	PAID IN 6 MONTHS	APR
£299	NIL*	£299	0%
OR	48 Payments of	Total Credit Price (T.A.P.)	APR
Cash Price	£22.79	£1093.92	21.9%

Written quotations available on request

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Many titles are overseas in origin.

# SWM Book Store

## LISTENING GUIDES

### Airband

	Pages	Price
ABC AIRBAND RADIO GUIDE 4th Edition	96	£7.99
ABC BRITISH AIRPORTS (6th Edition) A. Wright	112	£9.99
ABC CIVIL AIRLINER RECOGNITION 6th Edition Peter R. March	128	£9.99
AIR TRAFFIC CONTROL 7th Edition, Graham Duke	112	£8.99
AIRWAVES 2000	134	£9.95
CALLSIGN 2000	168	£9.95
FLIGHT ROUTINGS 2000, Williams	160	£7.95
NORTH ATLANTIC FLIGHT COMMUNICATIONS 2nd Edition (Inc. software)	172	£16.50
UNDERSTANDING ACARS		
3rd Edition, Aircraft Communications Addressing and Reporting System Ed Flynn	80	£9.95
WORLD AIRLINE FLEET & SELCAL DIRECTORY	300	£16.00
WORLDWIDE AERONAUTICAL COMMUNICATIONS FREQUENCY DIRECTORY		
2nd Edition Robert E. Evans	260	£19.95

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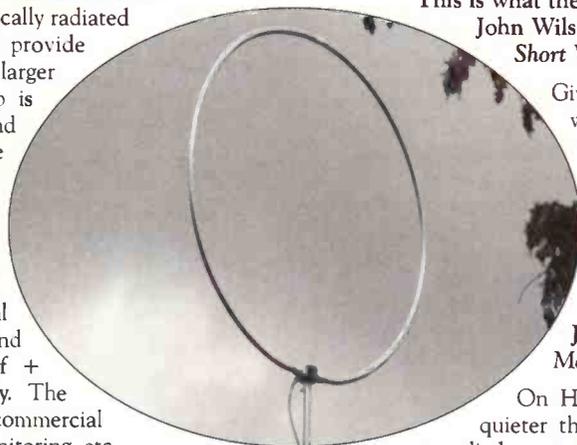
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# WELLBROOK COMMUNICATIONS

## ALA 1530 LOOP ANTENNA

This active loop sets new standards for the listener. For the first time it is possible to reject locally radiated and mains borne noise and still provide improved sensitivity compared to larger antennas. 1m dia. Aluminium loop is designed for outdoors, even at ground level. The loop has a frequency range from 150kHz to 30MHz and matches directly to the receiver. With 30dB nulls to reduce interference, LW, MW and SW its reception is outstanding. Professional performance is assured for high signal environments with excellent with 2nd and 3rd order intercept points of +70dBm and +40dBm respectively. The antenna is currently being used for commercial broadcast and navigation beacon monitoring, etc.

Supplied complete with Antenna Interface and a PSU.



This is what the experts say:-  
John Wilson; November 2000,  
*Short Wave Magazine*

Given the choice between an active whip and an active loop, I would take the loop every time. It is infinitely better than the whip in terms of E-field noise rejection, performs every bit as well if not better than the classic end fed wire, has very useful nulls for rejecting unwanted signals.

Jacques d'Avignon;  
*Monitoring Times*

On HF the Wellbrook loop was not only quieter than my normal wire antenna, but it supplied a stronger and cleaner signal than that supplied by the active short dipole that I had been using for many years.

£119.95 incl. postage. Add £20 overseas.

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Tel: (01425) 674174 E-mail: [sales@wellbrook.uk.com](mailto:sales@wellbrook.uk.com)

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(PRI)
FRI0 NFM
MKR 145.0000
144M HAMBAND
S_■■■■■■■
  
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ADJ
2UFO NFM 14.0k
U-A 145.2100
U-B 76.1000
S_■■■■■■■
  
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(DUP)
2UFO NFM 20.0k
U-A 439.9000
U-B 88.0000
-
  
```

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(AFC)
2UFO NFM 20.0k
U-A 1295.0000
U-B 88.0000
-
  
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COPY 2320
LOAD SAVE
ALL-DATA
Next
  
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SCAN-GROUP 1
ABCDEFGHIJ
abcdefghij
BANK LINK
  
```

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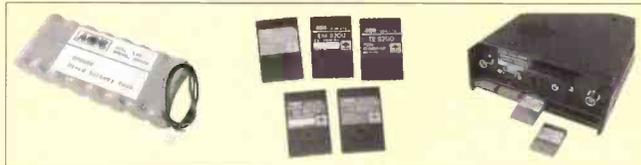
2UFO AM 25.0k
U-A 123.5000
M-WRITE E25
PROTECT OFF
  
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HLD
80.000 ↔ 10M
MKR 80.000
  
```

```

EDIT MEM-CH
MEM LSB 0.05k
A29 14.200
BANK/CH SEL
  
```



# NEW AR8600

MOBILE - BASE - TRANS-PORTABLE

The AR8600 is an extremely versatile **all mode** receiver (530kHz - 2040MHz) which can be used virtually anywhere, mobile, base or trans-portable... powered from an external 12V d.c. power supply, optional d.c. lead from a 12V vehicle or from an optional internally fitted NiCad battery pack. A strong twin metal case with die cast front panel characterises the multi-purpose role. All mode receive capability is provided including Single Side Band with programmable tuning steps down to a resolution of 50Hz with the frequency established by a highly accurate Temperature Compensated Crystal Oscillator (TCXO). An RS232 port further extends the capabilities with free supporting control software available from the AOR web sites.

Although many microprocessor features have been adopted from the trendsetting AR8200 Series-2 hand portable receiver, **the AR8600 RF front-end is an all new**

**design with preselection around VHF to ensure the highest levels of adjacent channel rejection with software spuri cancellation.** In addition to a hinged telescopic whip aerial, the AR8600 is supplied with a **detachable plug in medium wave bar aerial** which locates on the rear chassis of the receiver for localised medium wave monitoring. An additional BNC socket is mounted on the rear chassis so that **10.7MHz i.f. output** may be extracted for use with external spectrum display and vector analyser units such as the AOR SDU5500. The TCXO ensures **high stability** with **minimal internal spuri** and is usually only seen in top of the range (more expensive) models such as the AR5000 and AR7030.

The chassis is manufactured from two metal compartments, effectively a **metal chassis inside a metal cabinet...** this provides excellent screening characteristics and great robustness highlighting its multi application role. The **front panel** is also manufactured from **die-cast aluminium**. Size is 155(W) x 57(H) x 195(D) excl. projections, weight less than 2kg.

The all important **8.33 kHz airband channel step is correctly implemented.** Computer control is available via a standard 9-pin RS232 D-type connector on the rear chassis, just a standard RS232 cable is required for connection to a PC, the extensive RS232 command list is printed in the operating manual. In addition, **'optional internal SLOT CARDS'** (which fit into the rear chassis of the AR8600) extend the capabilities even further, five cards may be fitted with two operational simultaneously. **Supplied with:** Swivel base telescopic whip aerial, MW bar, comprehensive illustrated operating manual with RS232 listing, a.c. power supply.

# AR8200 SERIES-2

NEVER BEFORE HAS ONE HAND PORTABLE OFFERED SO MUCH



The AR8200 represented a beacon when first released, technology marches forward with the **NEW AR8200 SERIES-2** keeping the innovative concept and forward thinking alive and bright. It has not been easy improving on what many thought to be the ultimate, however the **NEW AR8200 SERIES-2** does provide even more with nothing taken away.

A Temperature Compensated Crystal Oscillator (**TCXO**) now forms the heart of the **AR8200 SERIES-2**, this ensures **high stability** with **minimal internal spuri**. Performance too has seen the AOR R&D team fine tuning the design for **best sensitivity and strong signal handling** over the extremely wide coverage of 530kHz to 2040MHz (all mode receive without gaps). The aerial has also been replaced by a **telescopic whip** on a swivel base, this ensures the best results, a medium wave bar aerial is also provided as standard. The design team have certainly been taking account of customers wishes, the keyboard **ZERO** key has been swapped in position with the **DECIMAL** to match the telephone layout, LCD illumination has been increased (for improved visibility) and following requests for longer operation between charges, the **4 x AA size NiCads have been increased in capacity**, again reflecting improvements in modern technology. The obvious change has been left for last... the **cabinet colour** has been changed from green to **black!**

The list of features is vast, tuning step sizes are programmable in all modes down to 50Hz with comprehensive step adjust and correctly implemented **8.33kHz** for the new VHF airband spacing. Connection to a computer is possible with the optional CC8200 lead/interface with free PC software available from the AOR web site. Unique optional slot cards further enhance features (CTCSS, tone eliminator, record / playback, external memories, voice inversion).

# UNPARALLELED SHEER PERFORMANCE

## AR7030 'receiver' winning against the very latest 'transceivers'



**AR7030 £799**  
**AR7030 PLUS £949**  
 0 - 32MHz all mode receive

**Peter Hart** is without doubt one of the most recognised and internationally authoritative technical reviewers with regular reviews appearing in RadCom, the journal of the RSGB. In the July 1996 edition of RadCom, Peter Hart presented a thorough technical review of the standard AR7030 with tabular results supporting his findings. It is interesting to note that over time, Peter Hart has proved very consistent in his approach to reviews, this makes the results available to compare side-by-side.

Presented here is a table of comparison. The first table is for the AOR AR7030 standard receiver, the list price being £799 (RadCom July 1996). The second table (Manufacturer A, model X) is a DSP top end amateur band transceiver with general coverage receive, the list price stated being £2099 (RadCom March 2000). The third table (Manufacturer B, model Y) is another DSP top end amateur band transceiver with general coverage receive, the list price stated being £2799 (RadCom October 2000). The criteria for each model is INTERMODULATION (50kHz spacing), CLOSE-IN INTERMODULATION (7MHz band) and RECIPROCAL MIXING.

**INTERMODULATION (50kHz spacing):** The section of each table presents strong signal handling across the spectrum using a standard 50kHz tone spacing, IP3 is a calculation based upon the receiver noise floor (sensitivity) and dynamic range, a negative figure such as -10dBm is considered fair, 0dBm is good, +10dBm very good and +20dBm excellent... the higher the figure the better. Dynamic range can also be compared, 85dB is good, 95dB is very good and 100dB is excellent, again the higher the figure the better.

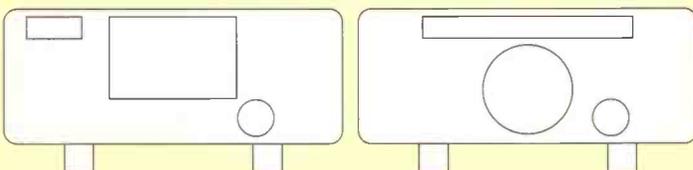
**CLOSE-IN INTERMODULATION (7MHz band):** The second section of each table presents CLOSE-IN dynamic range, this is a measure of how the receiver will perform on a crowded band such as during good propagation or an amateur band contest, the same applies as per 50kHz spacing with 100dB, or higher than +20dBm at 15kHz separation being considered excellent.

**RECIPROCAL MIXING:** The third section of each table presents reciprocal mixing, this is a measure of the receiver purity and is something of a speciality for Peter Hart. If the local oscillator is impure, it will poison the receiver and lead to degradation of the receiver's selectivity resulting in poor selectivity and poor sensitivity close to strong signals. A figure of 80dB at 3kHz is very good with the aim of better than 120dB at 200kHz.

**The matter of comparing the tables will lead to your own conclusions!**

AR7030 & AR7030 PLUS, undoubtedly the best analogue short wave receiver in its class. Voted best receiver of the year 1996/1997 by WRTH, awarded five stars (editors choice) by Passport to World Band Radio in every edition since the launch of the AR7030, many other accolades abound.

The RSGB can be contacted at: Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE



AR7030 - RadCom July 1996					
INTERMODULATION (50kHz Tone Spacing)					
Frequency	PREAMP IN		PREAMP OUT		2 tone dynamic range
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	
3.5MHz	+22dBm	102dB	+30dBm	101dB	101dB
7MHz	+25dBm	104dB	+33dBm	103dB	100dB
14MHz	+24dBm	102dB	+29dBm	100dB	100dB
21MHz	+26dBm	104dB	+31dBm	102dB	102dB
28MHz	+27dBm	104dB	+30dBm	100dB	100dB

CLOSE-IN INTERMODULATION ON 7MHz BAND					
Spacing	PREAMP IN		PREAMP OUT		2 tone dynamic range
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	
3kHz	-6dBm	83dB	+5dBm	85dB	85dB
5kHz	-6dBm	83dB	+5dBm	85dB	88dB
7kHz	-2dBm	86dB	+10dBm	101dB	104dB
10kHz	+3dBm	89dB	+30dBm	104dB	104dB
15kHz	+21dBm	101dB	+34dBm	104dB	104dB
20kHz	+25dBm	104dB	+34dBm	104dB	104dB
>30kHz	+25dBm	104dB	+34dBm	104dB	104dB

RECIPROCAL MIXING		MIXING FOR 3dB NOISE	
FREQUENCY OFFSET			
3kHz	80dB		
5kHz	85dB		
10kHz	95dB		
15kHz	100dB		
20kHz	104dB		
30kHz	109dB		
50kHz	114dB		
100kHz	122dB		
200kHz	127dB		

*A photo-copy of the complete review is available to request*

(Manufacturer A, model X) - RadCom March 2000					
INTERMODULATION (50kHz Tone Spacing)					
Frequency	PREAMP IN		PREAMP OUT		2 tone dynamic range
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	
3.5MHz	+3dBm	90dB	+13dBm	92dB	92dB
7MHz	+0dBm	89dB	+11dBm	92dB	92dB
14MHz	+2dBm	90dB	+13dBm	93dB	92dB
21MHz	+0dBm	89dB	+13dBm	92dB	92dB
28MHz	-2dBm	88dB	+14dBm	92dB	92dB

CLOSE-IN INTERMODULATION ON 7MHz BAND					
Spacing	PREAMP IN		PREAMP OUT		2 tone dynamic range
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	
3kHz	-27dBm	71dB	-18dBm	72dB	73dB
5kHz	-26dBm	72dB	-17dBm	73dB	74dB
7kHz	-26dBm	72dB	-16dBm	74dB	76dB
10kHz	-22dBm	74dB	-12dBm	76dB	82dB
15kHz	-14dBm	80dB	-4dBm	86dB	90dB
20kHz	-8dBm	84dB	+3dBm	92dB	92dB
30kHz	-2dBm	88dB	+9dBm	92dB	92dB
40kHz	+4dBm	92dB	+12dBm	92dB	92dB
50kHz	+0dBm	89dB	+11dBm	92dB	92dB

RECIPROCAL MIXING		MIXING FOR 3dB NOISE	
FREQUENCY OFFSET			
3kHz	83dB		
5kHz	86dB		
10kHz	92dB		
15kHz	96dB		
20kHz	98dB		
30kHz	101dB		
50kHz	106dB		
100kHz	111dB		
200kHz	115dB		

(Manufacturer B, model Y) - RadCom October 2000					
INTERMODULATION (50kHz Tone Spacing)					
Frequency	PREAMP IN		PREAMP OUT		TUNED AMP OUT
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	
3.5MHz	+6dBm	+16dB	+21dBm	91dB	95dB
7MHz	+13dBm	+16dB	+18dBm	95dB	95dB
14MHz	+12dBm	-	+24dBm	95dB	99dB
21MHz	+11dBm	-	+13dBm	95dB	91dB
28MHz	+2dBm	-9dB	+2dBm	88dB	82dB

CLOSE-IN INTERMODULATION ON 7MHz BAND - PREAMP OUT			
Spacing	PREAMP IN		2 tone dynamic range
	3rd order intercept	2 tone dynamic range	
3kHz	-9dBm	77dB	77dB
5kHz	-14dBm	73dB	73dB
7kHz	-12dBm	75dB	75dB
10kHz	-5dBm	79dB	79dB
15kHz	+10dBm	89dB	89dB
20kHz	+18dBm	95dB	95dB
30kHz	+18dBm	95dB	95dB
40kHz	+18dBm	95dB	95dB
50kHz	+18dBm	95dB	95dB

RECIPROCAL MIXING		MIXING FOR 3dB NOISE	
FREQUENCY OFFSET			
3kHz	82dB		
5kHz	87dB		
10kHz	95dB		
15kHz	100dB		
20kHz	104dB		
30kHz	109dB		
50kHz	114dB		
100kHz	120dB		
200kHz	123dB		

**AOR (UK) LTD** 4E East Mill, Bridgefoot, Belper, Derbyshire, DE56 2UA England



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# Info In Orbit

## The Column

There has not been so much weather satellite (WXSAT) activity for months. *METEOR 2-21* re-activated, *METEOR 3-5* in trouble - then 'fixed' - while *NOAA-15* continued its unpredictable performance. The good news is that *NOAA-L* (to be renamed *NOAA-16* when in orbit) should be fully operational as our early afternoon WXSAT by October, replacing *NOAA-14*.

### NOAA-15's Variable Imagery

Engineering tests of the *NOAA-15* AVHRR continued during September. During high elevation passes over the NOAA Command and Data Acquisition stations, the Manipulated Information Rate

Processor (MIRP) was commanded from internal to AVHRR (the imager) synchronisation, then returned to internal sync. before it went out of range. This allowed NOAA engineers to gather instrument telemetry from the AVHRR.

Periodically, we saw some good images from *NOAA-15* and understandably attributed this to specific actions taken by NOAA. Wayne Winston of NOAA, commented that "The recent observation of better quality h.r.p.t. and a.p.t. images from

*NOAA-15* is not related to this, and not the result of something that NOAA has done to the satellite. As we have observed since the failure in July, the AVHRR sync. periodically falls into the operational limits, and produces usable images. But it is just as likely to drift out of sync. at any time. NOAA continues to collect and analyse the instrument data".

One batch of good imagery from *NOAA-15* came during early September, as seen in **Fig. 1**, an infra-red h.r.p.t. image from the early evening pass. Resolution was so good that rivers and land surface features can easily be seen in the picture. On this occasion, I did not capture the a.p.t. image.

### Other WXSAT Operations

*METEOR 3-5* joined the 'ailing WXSATs' group during late August when its image content lost synchronisation. Wavy clouds and landscapes made images unusable. Near the end of August, *METEOR 3-5* was travelling southbound during the morning, and was apparently switched off a few minutes after acquisition of signal (a.o.s.). After a wait of a few more minutes, it resumed transmissions.

First time round I assumed this was fortuitous, but I logged the same event each day. I know the reception characteristics of my antenna well enough to know that this was not a 'null' effect caused by antenna insensitivity. By 4 September, its imagery was once more synchronised, so perhaps some live commanding was in progress.

Kevin Hughes of Tamworth recorded a picture from *METEOR 3-5* on 15 August, shortly before the problems occurred.

*METEOR 2-21* was commanded on during the early hours of 5 September, the first report coming from Mike Kenny of Melbourne, Australia. Transmission was confirmed on 137.40MHz, as last used by the satellite. Reception tends to be poor when the WXSAT is to the east.

### Seasonal Effects

The changing of the seasons is most noticeable on the sun-

synchronous WXSATs. With RESURS and NOAA WXSATs maintaining a near constant aspect to the sun, their imagery is very much a function of the sun's 'power'. When *NOAA-15* has provided recognisable evening images, the visible channel has quickly shown the loss of illumination enjoyed during the summer months.

Similarly, *NOAA-12*'s morning passes now lack 'zing' (to use a technical term!), and need enhancing. Fortunately, the infra-red channels show cloud detail that is absent in the low illumination visible-light channels.

George Newport was impressed with the view of the Canaries - see **Fig. 3** - imaged by *NOAA-14* on 11 September, commenting that he had not seen the islands as clear as this in a long time. The islands are right on the limit of visibility from my location, so I had to wait some time before managing to get an image of this region free from cloud cover. Interestingly, the islands do not show up well on the visible-light channels, but are clear on the infra-red - see **Fig. 4** and **Fig. 5**.

### The ScanEx Image Archive

ScanEx is a private company based in Moscow, Russia. Since its foundation in 1989, they have developed and produced high technology products for applications in education, meteorology and environmental monitoring. They produce hardware and software for the entire production chain of satellite information, from the reception of satellite images, through to their processing and the creation of thematic maps.

Their 'mission' is to make RESURS-type satellite information more accessible in terms of price and technology. They developed Personal Ground Stations (PGSs) to make this vision a reality. Sometime back, I asked Ippolitov Vitaly, their engineer, whether they could check their archive of RESURS images to see if they had a high resolution image of the south-west region near Plymouth.

A few weeks later, they E-mailed me **Fig. 6**, an image of Kingsbridge and Dartmouth. The image was received on 8 April 2000 from *RESURS-01 N3* satellite. Spatial resolution is 30m/pixel. ScanEx explained: "This image was received by a ScanER personal ground station produced by our Centre. Image was received by ScanER station, installed in Moscow". This is the first image that I have received of the 8GHz band from RESURS and from Moscow.

**Figure 7** shows south-west Britain as seen by NOAA high resolution imagery for comparison.

During E-mail correspondence with ScanEx, they mentioned their **Transparent World** project to me, so I requested further details. I have done minimal editing of their reply:

"Transparent World Project. This satellite constellation is a proposal. We offer a new satellite series that can transmit 50m spatial resolution images free of charge, and continuous - like NOAA. It follows the concept of 'Open Sky' of the World Meteorological Organisation. To receive images you need the receiving station. The main idea of this project is democratisation of access to Earth remote sensing data of high spatial resolution - up to 50m on the first stages, and more later. Such data has always had high prices, being distributed from centralised data reception centres. The use of this data was therefore accessible for only a narrow circle of users. In this period of rapid development of computer technologies, the use of such data is becoming accessible for a widening range of users, for example, for a student on their own personal computer.

We developed ScanER personal - it means low price, easy exploitation, use of personal computer for data reception and processing, compact size of antenna station for Resurs



**Fig. 1: NOAA-15 h.r.p.t. infra-red image southern Britain 12 September 1832UTC.**



**Fig. 2: METEOR 3-5 15 August 1312UTC from Kevin Hughes.**



**Fig. 3: Canaries from NOAA-14 1615UTC 11 September from George Newport.**



**Fig. 4: Canaries from NOAA-14 channel 4 (infra-red) h.r.p.t. 22 July 1606UTC.**



**Fig. 5: Canaries from METEOSAT-7 14 September 1201UTC Primary Data infra-red image.**

# Timestep



PROsat for Windows is used by most leading weather satellite enthusiasts. They have grown up using Timestep products and now rely on the superior image quality and ease of use provided by PROsat for Windows. Features such as real time reception, auto-scheduling, temperature readout, totally automatic reception of all NOAA's and Soviet satellites and automatic animation have made PROsat the preferred package. For weather satellite systems contact :

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# Aerial Techniques

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Fig. 6: Kingsbridge, UK, RESURS 01N3 courtesy ScanEx.

satellite series reception and developed technological chain for image processing, so the user can receive images from space on their own personal computer. In several minutes after image receiving, the user can view and process image. Such technology was tested and showed its viability in Russia where the net of ScanER stations was created that allows satellite images to cover all territory of Russia and neighbouring areas. All the chain of this technology can be applied for satellites of 'Transparent World' project because the formats and standards of transmitted data

will be the same as the Resurs satellite series. The realisation of 'Transparent World' project will give the possibility to everyday Earth cover observation and monitoring, with relatively high spatial resolution. Moreover this data will be accessible for any who want to receive it".



Fig. 7: Devon and Cornwall NOAA-14 h.r.p.t. 11 September 1534UTC.

The technical specification of the project was sent to me in detailed form, and indicates that the transmission frequency is 8.192GHz, in line with RESURS transmissions (RESURS 01-N4 also transmits on 137.85MHz). If the project receives the necessary funding - some \$10 million - it could certainly provide unprecedented imagery. A suitable reception system for current high resolution RESURS imagery unfortunately remains far from amateur level prices.

The name of satellites series will be 'Transparent World'. ScanEx hope that the satellites will be launched in 2002, but all depends on the project financing. "The price for ScanER station for reception TW satellites is \$250 000". I enquired about the possibility of non-Russian companies becoming involved in developing reception systems for the TW series, but their view was that their systems are already receiving information from RESURS and OKEAN satellites.

ScanEx is very interested in the creation of receiving centres for TW satellites' data reception in different countries all over the world on the basis of ScanER station. "It is very important for us and we are very interested in this, as it gives the possibility to cover any part of the Earth".



Fig. 8: WEFAX CTOT METEOSAT-7 14 September 1200UTC.

## Beginners' Questions

Whenever we start a new hobby, questions immediately come to mind. For those who have been in the field for decades, it is not always easy to see things from the perspective of a beginner. An E-mail from Carol Bain posed a series of questions that perhaps might be of interest to others who have only recently joined the hobby.

My thanks to Carol for the idea.

## 'Near Polar' Orbits?

Polar orbits are those that have an inclination near 90°. Satellites have orbits that are carefully set to achieve a specific goal. By careful adjustment, a satellite in a 'near polar' orbit will not only pass over every place on earth each day, but can also meet other requirements - such as keeping pace with the sun's apparent daily motion - or alternatively, deliberately moving with respect to the sun. A study of the orbits of NOAA and METEOR satellites shows how different

results can be achieved by changes of inclination and altitude.

When do you need to track satellites with your antenna, and when will a fixed antenna do? There are two situations here. The type of antenna used to receive a signal depends primarily - but not wholly - on the frequency in use.

Monitoring the WXSAT 137MHz

band using a crossed-dipole or quadrifilar helix antenna, we can receive enough signal to decode and produce images. Because of the nature of these antennas, they are susceptible to interference on these same frequencies. Consequently, a basic antenna will receive plenty of WXSAT signal, but the resulting image may be spoilt by different types of interference.

It is possible to set up a high-gain antenna having a stacked 137MHz array that produces a considerably larger signal. The cost of this is higher, and there is a need to track the satellite. Whereas a QFH has a much larger beam-width, and can therefore receive the satellite during its passage across the sky, a high-gain antenna has a consequent narrow beam-width that requires accurate pointing - hence the need to track the satellite.

The other case where tracking is required is where the frequency is high enough to need a high gain antenna. A good example is the 1700MHz band transmissions from the NOAA WXSATS. At this frequency, a dish or Yagi is essential. A 1m dish with suitable feed design can pull in plenty of signal, but the narrow beam-width makes tracking essential.

In general terms, many satellites can be monitored using fairly basic antenna systems - such as a simple dipole. For real quality - where you wish to use the signal for decoding or other analysis - you must abandon the basic form and go for a purpose designed unit.

## What Satellites Are Visible With The Naked Eye?

Anyone who spends time star gazing will be familiar with the sight of satellites regularly crossing the sky. Here in Plymouth, one of the most frequently asked questions that I face during radio interviews and 'phone calls is the request to identify a satellite. In almost all cases it is nearly impossible to identify because the questioner made no record of any relevant information - such as the time and direction.

Yet, with a computer, satellite tracking program and access to the Internet, one can predict times for any selected satellite. Visit the OIG page (details given in the 'Special'), and after collecting the zipped file referred to in that article, open up the 'visible.tle' file and check how many are listed.

NASA advises that although a satellite might be listed, changing circumstances might prevent it being seen and of course there are satellites that might be seen but are not yet included. The list shows that many METEOR and COSMOS satellites are visible, as well as NOAA-12.

## WEFAX

Having included pictures in a.p.t., h.r.p.t., PDUS (and even RESURS high res.) formats, Fig. 8 completes the sequence. It shows the daily WEFAX whole disc, visible light image, transmitted around 1222UTC each day on channel A2 of METEOSAT-7 - with my added artificial colour! Whole-disc images from METEOSAT-5 (positioned over the Indian Ocean) are also transmitted several times each day on channel A2. Do make sure that your METEOSAT monitoring includes both channels!

## Shuttle Launch Schedule

STS-92 *Discovery* scheduled launch 5 October 5th ISS Flight (3A) Payload Z-1 Truss, PMA-3, Inclination 51.6°.

STS-97 *Endeavour* scheduled launch 30 November 6th ISS Flight (4A) - PV Module P6, Inclination 51.6°.

A comprehensive listing of all Shuttle flights and payloads, together with associated information is available from me, at the address at the head of the column, as the *Shuttle Pack*. Please include £1.50 and stamped s.a.e. for the A4 booklet.

## Kepler Elements - WXSATS & MIR

If you want a computer disk file containing recent elements for the WXSATS, AMSATS and others of general interest, together with a large file holding elements for thousands of satellites please enclose 50p with a PC-formatted disk and stamped envelope. A print-out is included that identifies NASA catalogue numbers for the WXSATS. The disk file is ideal for automatic updating of tracking software.



## Frequencies

NOAA-12 transmits a.p.t. on 137.50MHz.  
 NOAA-14 transmits a.p.t. on 137.62MHz.  
 NOAA-15 transmits a.p.t. on 137.50MHz.  
 NOAA-16 likely to transmit a.p.t. on 137.62MHz.  
 METEOR 3-5 transmits a.p.t. on 137.30MHz.  
 METEOR 2-21 may transmit a.p.t. on 137.40MHz.  
 RESURS 01#4 transmits a.p.t. on 137.85MHz.  
 OKEAN-4 and SICH-1 use 137.40MHz for brief transmissions.  
 METEOSAT-7 (geostationary) uses 1691 and 1694.5MHz for WEFAX.

IC-R10  
IC-R2

# Get to Grips with... the terrific twosome! - IC-R10 & IC-R2

## IC-R10 Receiver

The ICOM IC-R10 handheld receiver covers 0.5MHz~1300MHz in all-modes. It also boasts a real-time bandscope function, making it easy to find busy frequencies and observe the receiving frequency band conditions. Also, the passband width of the scope is selectable. Voice-scan function (VSC) pauses scan, but only when modulated signals are received.

### Other IC-R10 functions and features include;

Bank and memory functions plus new SIGNAVI function; this additional feature speeds up scanning and adds to the already impressive range of scan modes available in this power-packed ICOM handheld. Optional CS-R10 P.C. software allows you to edit and load memory data from your computer. The IC-R10 has proved that it has 'Rx appeal', so why not see for yourself just how appealing this handful can be!



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### RS-8200D

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### RS-2700/8000

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Other interfaces for the Icom IC-R2, IC-R10 Trident TRX-100XLT and Alinco DJ-X10 also available.

# WXSAT WWW

## A Guide To Information Sources On The Web

The Internet is one of the best sources of information on most subjects, available at low cost to many people. All you require is a suitable computer, modem, software and a telephone line. Lawrence Harris's own introduction to the Internet was in the years before the name was coined. Here he explains all.

**A**s a scientific establishment, the Radio and Space Research Station in Slough (which later changed its name and then merged with another Laboratory) was closely involved in various NASA and European space projects and was linked across the world to other Laboratories. The emergence of easy access to the expanded version that became known as the Internet, mushroomed in the early 1990s and I became a subscriber.

### Web Sites Bookmarked See the SWM web page for these links

Can I interest you in a selection of web sites? I have 'bookmarked' (to use Internet browser jargon) a number of official sites that I visit regularly.

#### China

<http://nsmc.cma.gov.cn/> and <http://www.cma.gov.cn/> - select the National Satellite Meteorological Centre. China's National Satellite Meteorological Centre is a facility affiliated to the China Meteorological Administration. Their sites carry a wealth of information about the FENGYUN satellites, as well as daily images. There is even a photograph of the computing room where data processing is performed. The webmaster has been kind enough to give permission for me to use site images to illustrate my columns - hence my use of their graphics.

#### USA

<http://www.goes.noaa.gov/> This site is the geostationary satellite server, and carries updating images from continental America, as well as selected regional images. This is a prime source of current USA imagery on the Internet, and full disc images from GOES-8 and GOES-10 are available, together with storm sectors, archived images, and links to other geostationary satellite image sources.

**NOAA Satellite Status Information**  
<http://psbsg11.nesdis.noaa.gov:8080/EBB/ml/nic14.html> This page provides frequency information and equipment status for operational NOAA and GOES satellites. There are also links to current news bulletins and summaries.

#### NOAA Satellite & Direct Readout Information System

<http://140.90.207.25:8080/noaasis.html> This is another page that forms part of the public information dissemination service, and carries links to a range of other NOAA sites.

#### POES (Polar Orbiting Environmental Satellite) Home Page

<http://poes2.gsfc.nasa.gov/> A huge amount of information and links to launch schedules. Remember the whole philosophy of America's WXSAT program is one of availability of information to the American taxpayer, and in effect, the world.

#### Space Monitoring & Information Support Laboratory (SMIS) Of The Space Research Institute (IKI RAN)

<http://smis.iki.rssi.ru/> This site carries various types of information, but perhaps the most interesting is its schedule of h.r.p.t. pass images. They collect images from the NOAA WXSATs, and small versions of these - as received over Russia - are available for download.

#### Sputnik Server

This is a joint project of SRC PLANETA Rosgidromet & IKI RAN

<http://sputnik.infospace.ru/> The site carries a wealth of information about Russian WXSATs, although it is not-updated very often. Information on the fault conditions noted by monitors of METEOR and other WXSATs will (unfortunately) not be found.

#### World Meteorological Organisation

<http://www.wmo.ch/> and <http://www.wmo.ch/hinsman/imagery.html> The home page leads to a very large number of potential sites. For satellite information, select the *WWW-World Weather Watch*, click on the left-hand down arrow

### Getting Access To The Internet

For efficient access, you require a suitable computer. A PC is probably the best, simply recognising the easy availability of upgrades and software. For a web browser, the choice is somewhat limited! Internet Explorer version 5 is probably your best choice. If you wish to collect files, you can use a web browser, but it is more efficient to use a file transfer program, such as WS\_FTP - this and other suitable programs can be downloaded from sites linked from the advisory sites.

### Suitable Mailing

So you now have an Internet access account. You may get the best value from your subscription (in whatever form it takes) by joining (we use the word subscribing, though there is no actual charge) to some suitable mailing lists. The world of weather satellites has several such lists, to which I occasionally refer in my monthly column.

**wxsat-l** - this was the original Internet list for WXSAT enthusiasts, and is American-based. Send a request to join: [wxsat-request@met.fsu.edu](mailto:wxsat-request@met.fsu.edu)

**rig-l** - this was started as a UK-based list (it is not actually run by the Remote Imaging Group). Send a blank E-mail to: [rig-l-subscribe@ONElist.com](mailto:rig-l-subscribe@ONElist.com)

**satelliteimaging** - this is a UK-based list. **weathersat** - another WXSAT group. For mailing lists run via the egroups system (including the latter two), visit: <http://www.egroups.com/mygroups> and subscribe and set-up each list according to your own preferences. I have opted for the digest form - a daily summary of all messages, rather than receiving each individual message.

The reasons for so many groups starting up with apparently similar objectives is historical; sometimes members of one group have decided to split off and form a different group having a slightly different *modus operandi*.

and the option will be found near the end. A link to the *Global Observing System* can be found, from which *satellites* can be selected. A final selection *satellite activities* leads to the essential data on the global WXSAT system and its future. The second link (given above) is part of Donald Hinsman's collection of links to the major satellite image sites.

#### GOES Project Science

<http://rsd.gsfc.nasa.gov/goesb/chesters/web/goesproject.html> Dennis Chesters maintains this personal site that carries a wealth of data and links to the WXSAT program. Foreign geostationary WXSAT links are available, as are movies of weather systems that made the news for all the wrong reasons.

### EUMETSAT

<http://www.eumetsat.de/en/area5/imagery/foreign.html> The European Weather Satellite organisation provides not only information and imagery from the operational METEOSAT satellites (5 and 7), but provides links direct to other national WXSAT web sites. Current transmission schedules, documentation on current and future projects

#### India Meteorological Department

[http://www.imd.ernet.in/main\\_new.htm](http://www.imd.ernet.in/main_new.htm) A few years ago I wanted to include a picture from INSAT, the Indian satellite that carries an imager with its communications package. I had to write to the authorities in New Delhi, and eventually received an excellent photograph that I used in the column. Visit this site and you can download the latest imagery from *INSAT-1D*. Select the *satellite images* option and the choice of full disc or sector, in visible-light, infra-red or colour composite is freely available.

**National Weather Association (NWA) Remote Sensing Committee** [\[net.nesdis.noaa.gov/arad/pd/nwasat.html\]\(http://net.nesdis.noaa.gov/arad/pd/nwasat.html\) This site is maintained by Gary Ellrod of NOAA/NESDIS, and is a page of links to professional \(and some amateur\) sites all over the world. From Antarctica to Bermuda, although the emphasis may appear to be on American sites, there are sections covering Asia, Europe, the western Pacific and Latin America.](http://orbit-</a></p>
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### Commercial Sites

**ScanEx - Research & Development Centre**  
<http://www.scanex.ru/> ScanEx is a private Russian company providing full integrated solutions for satellite remote sensing applications. The site carries links to information on Resurs satellites and the company's own reception systems.

#### TimeStep Weather Satellites - UK

<http://www.time-step.com> TimeStep is a commercial company providing complete systems for weather satellite reception and customised element sets for their tracking software.

#### Kepler Elements

<http://oig1.gsfc.nasa.gov/scripts/foxweb.exe/ap01?> There are several sites on the Internet where the latest Kepler elements can be collected to update your satellite tracking program. The original one is that of the Orbital Information Group given here. When the page is loaded, you can select 'OIG main page', where several options are available. If you want regular, specialist information, you can register and receive a personalised service. For simple Kepler updates, proceed to 'downloadable files', an option near the end. We are nearly there! Seek 'specialist interest TLEs', near the bottom, and by clicking on this, you can download a zipped collection of everything you need. The file is updated at least daily and contains a compressed set of files of geostationary, weather, amateur, visible and other categories of satellites. Use the WXSAT set to update your program.

## The Big One!

If you are doing more than average satellite monitoring, you may wish to collect a file from NASA that includes virtually every known satellite. This big one is available, updated every few days. You can collect it using a web browser, but such files available for efficient retrieval using an FTP (file transfer protocol) program.

The advisory site listed earlier can provide links to suitable FTP programs: my favourite is WS\_FTP. For the Kepler file, you need to visit the following site:

**kilroy.jpl.nasa.gov** and set up your program for the directory: **/pub/space/elements/satelem/** at the kilroy site.

You should log in using the standard anonymous protocol. This means that (in advance) you set your user ID to anonymous and the password is then your E-mail address. This is a courtesy that theoretically allows the site to contact you. This never happens. The Kilroy site archives the year's weekly satellite elements, so the latest set is at the bottom, and is available in a generic form as well as a form that includes the date stamp. The generic form allows automatic data

retrieval by robot programs - but that is another story.

So now you know all my web site secrets! Well, not quite all. There are other WXSAT-related sites, and if you use a search engine or search program, you could find hundreds more. Try the site devoted to *OKEAN-O*. It is rather out-of-date (at least the one that I know about), but answers all the basic questions.

## Best Of The Rest

What about 'amateur' sites? There are so many sites that it would be difficult to select just a half-dozen. Some sites carry the latest images received by users around the world, and descriptions of their hardware are often provided. Let me give just one site: **http://www.riglib.demon.co.uk/index.htm**

Les Hamilton's site (see above) provides a large number of pages of advice on WXSAT matters, including archived sample images, and several 'How to' pages. If you have trouble setting up your soundcard system, Les tells you how it can be done. Have fun!



# The Ultimate Archive

## NOAA WXSAT Raw Data For DIY Processing

I hatched the idea for this feature during summer. For the many people who do not have the equipment required to receive high resolution picture telemetry (h.r.p.t.) direct from the NOAA satellites, two things had to happen that could enable them to sample the quality. NOAA provides a site - the Satellite Active Archive (SAA) - from where you can select a region almost anywhere on earth.

On request, the archive extracts high resolution imagery of your selected region from files containing the data originally downloaded from NOAA WXSATs - so there was the source. Then **David Taylor** produced *HRPT Reader* a freeware h.r.p.t. file reader and display program that reads and processes the data - so there was the answer.

While the idea for writing this article for the autumn 'WXSAT Special' was germinating, along came **Paul Gulliver** with an excellent summary description of the process, published in the June edition of the *RIG* magazine! The Archive introduced new facilities in August, so I decided to continue the project anyway, and write my own version for this 'WXSAT Special', including a description of the use of David's program. To use the whole facility, you need access to the Internet.

### How Much Data?

The amount of data transmitted by the polar orbiting NOAA WXSATs is extra-ordinary. Five channels of digital data carrying up to 1.1km resolution imagery, together with large amounts of non-image data, means that the satellites are phenomenally productive.

If you receive h.r.p.t. data direct from a satellite, you can find that a 10 minute pass may occupy some 40-50MB of space - after compression. Current satellites do not have tape recorders with the capacity to store all the channels of the AVHRR (advanced very high resolution radiometer) on a continuous basis, so a process of selected recording is scheduled.

During the satellite's pass over a specified region, data (called Local Area Coverage - LAC) is recorded on the tape recorder and later downloaded at an appropriate tracking station. LAC data are full (1km) resolution data recorded on-board the satellite, and dumped at the Command and Data Acquisition (CDA) stations (Wallops Island, Virginia and Fairbanks, Alaska) at some later time. In addition, the ground stations that collect data, also make their real-time data available.

Finally, a degraded version of h.r.p.t. is stored on the tape-recorder during the whole orbit (called Global Area Coverage - GAC) and this is also downloaded regularly. The GAC data are produced on-board the satellite by sampling the AVHRR 1km data to 4km resolution - averaging alongscan groups of four samples out of five, and skipping every third scan.

The data includes all five channels at 10 bit precision, with time tags,

Earth location and calibration information. The CDA stations relay this data to the National Environmental Satellite, Data and Information Service (NESDIS), located in Suitland, Maryland, for processing and distribution to forecasting centres of the US and other nations.

### NOAA Satellite Active Archive (SAA)

We are going to visit the SAA site, register our details, specify our requirements, then sit back and wait! The SAA's mission is to provide electronic distribution of data and derived data products from US polar-orbiting environmental satellites (POES). The SAA is an operational component of the Information Processing Division of the NOAA Office of Satellite Data Processing and Distribution (OSDPD). Both OSDPD and NCDC are line organisations of the National Environmental Satellite, Data and Information Service (NESDIS). Data is available freely for the asking.

### Prior To Site Visit

For your first request, consider some region(s) of interest. I decided on the Caspian Sea and the Kola Peninsula. The Caspian Sea is outside my *METEOR 3-5* reception range and the Kola Peninsula is tantalisingly in the noise region near the end (or beginning) of *METEOR* passes. Enter the site by going to **http://www.saa.noaa.gov**

At the top of the page, a set of tabs offer 'search page', 'order query', 'help' and other options. The sequence of operations is straightforward. Start by setting-up the 'User Profile', as indicated for new users: enter your preferred E-mail address and other information. We decide on the region we want, and then set the parameters. The 'help' section provides first-line assistance, and may be worth printing out during an early visit, to provide immediate guidance.

### Make Your Selection

For a first try, you might prefer to select parameters that will produce a relatively small file for downloading and processing. After a few trial runs, the art of region selection becomes easy yet fascinating.

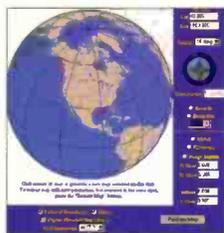
**Parameters:** 'Temporal' (time) settings, 'Spatial range', 'datatype', 'Satellite', 'receiving station' and 'distribution site' are required, but only the 'Spatial range' (location on earth) will take more than a few seconds to enter.

**Temporal:** the time period during which you would like your satellite recording to have been made. Leave at the default settings (current seven

Lawrence ends his 'WXSAT Special' by looking at the alternatives to live WXSAT monitoring.



Fig. 1: SAA home page.



**Fig. 2: Region selection map (setting the desired region - the orthogonal map).**



**Fig. 3: Make your selection - parameter settings.**



**Fig. 4: First results page.**



**Fig. 5: Display a sample view.**



**Fig. 6: HRPT reader display.**



**Fig. 7: Gulf of Bothnia - raw GAC image.**

days) for test purposes. There will always be GAC data meeting this parameter.

**Spatial range:** the new SAA interface provides various methods of identifying your selected region. When I first started writing this article (some weeks ago), you had to specify longitudes and latitudes of the box that covers the desired region. This was tedious and prone to error - but you can still choose this method.

After entering co-ordinates, you click on 'redraw map' and the selected region is highlighted for you. The new option, introduced in August, allows you to directly create a box that bounds the required area. Select the 'orthographic map' and click the mouse button on the part of the globe nearest your desired region. The globe's default display is of America, so if you want central Europe (I selected the Caspian Sea for my first test) simply click near to the limb. The globe will be re-adjusted to show the new region. Click nearer the spot to bring the region nearer the centre.

With the desired region in view, you can zoom in as close as you wish, or pan, or - my recommended selection - 'range search'. Select this, then point and click your mouse at the top left of the region wanted, then repeat at the bottom right. This enters the co-ordinate sets automatically and draws your box. Everything can be edited, but let us assume you got it right! There are many other options here - but let us proceed.

**SAA data sets:** the list shows the wealth of data available. Choose GAC during your first tests, in order to limit the file sizes required for downloading.

**Satellite:** the archive goes back a long time!

For our purposes, select a current satellite - perhaps NOAA-12 or NOAA-14.

**Submit search:** when your preferred options are set, click on this button and the search proceeds.

Within seconds, the first page of results is displayed. Recent changes to this search procedure mean that it now has the ability to find hits where the sub-satellite path (nadir) does not intersect the user defined search region. The 'results' display - see **Fig. 4** - includes complete details of each 'hit', and offers a display - see **Fig. 5** - of the image.

A general glance at the pass time may indicate whether it is a night-time or daylight image - you can see the image by clicking the view option. When you are happy with the selection, tick the 'shopping cart' (yes, really!) for that pass. You can continue to check other hits and basket those that you want. Note that the total file size is listed on the left of the display, and incremented for each addition, so you know what you are going to be downloading.

Finally, click on the button to confirm data selection, and on the 'Place order' button, that completes the process. You can leave the site and go offline, or you can click to return and make a new regional selection. On my second visit, I was ready to select both regions (Kola and Caspian), and to collect several GAC images after checking that clouds did not cover the region!

A confirmatory E-mail is sent to your 'profile' information address, probably within a couple of hours. This gives details about the ftp site and directory where your file(s) will be residing. A standard ftp program (I use the freeware program WS\_FTP) is the perfect vehicle for transport to your hard drive. GAC files are likely to occupy a little over 1MB each, representing a download of just a few minutes using a good connection and 56kB transfer speed.

### LAC Data

After familiarisation with the process of data selection, the logical step forward is to find full resolution h.r.p.t. data of areas of interest. The list

of LAC areas scheduled for collection by NOAA WXSATS is circulated to the 'wxsat-l' list on the Internet once a week. This provides details of all areas that will be recorded on the on-board tape recorders. Perusing that list revealed that the Barents Sea is regularly recorded. **Figure 11** is a sample out of several passes shown in the results list of a search for this region.

### Processing The Data: David's HRPT Reader

You have a file from the NOAA Archive, so now you can complete the task by processing it using a suitable h.r.p.t. file reader. The SAA site provides links to some software; David Taylor's program is available for free downloading from: <http://www.david-taylor.pwp.blueyonder.co.uk/software/wxsat.htm>

After downloading HRPT Reader, while still online, download Correct Geometry. This is a small program that corrects full resolution processed data for the non-linearity of the scanner's image. The scanner takes picture samples at equal angles round its scan, leaving the edges covering more ground than the centre.

In addition, extra files (runtime library modules), for example VCL40.zip, may be required to be downloaded. All necessary links are provided, and if you currently use any of David's other software, these may already be installed on your computer. As of mid-September, David has just incorporated the geometry corrector program into HRPT Reader, and my first tests (just before press deadlines)

are very impressive - see **Fig. 6**.

The program reads h.r.p.t. files of different formats, including the Level-1B format from the SAA, amongst others. The program allows channel selection for file reading, and produces the individual channels, as well as derived vegetation images.

Install HRPT Reader in its own directory, and read the help file for detailed information about the program's capabilities. For our purposes (processing GAC data),

there is little more to do. Rename the downloaded GAC file by deleting the mid-file decimal point and adding the terminator

GAC. The file will then 'load' into the reader. This starts the processing, and all five channels, together with derived products, are produced - see **Fig. 7** - unless you select otherwise.

Individual images can be saved by selecting 'file', 'save rectified GAC' - see **Fig. 8** - producing a BMP format image corrected for scanner distortion. You can normally identify the direction of travel (north-bound or south-bound) by checking the satellite's pass time: an early morning NOAA-12 pass will be south-bound.

If you get it wrong - select 'options', 'flip pass direction'. The saved file can be loaded into any normal image processing program, but should not need enhancing because David's software does it all.

David does not have an h.r.p.t. system, all his development work was (apparently) done using files provided by volunteers. An impressive program!

### Summary

This archive seems to be without competition - where else can you so easily stipulate a region on earth and then collect high resolution (GAC) data within a couple of hours, and process it in all combinations? Do not forget LAC (full resolution) data. Lists of LAC recordings are issued weekly by NOAA, identifying selected regions of 1km data. The opportunities for researchers are endless.

In no way is it an alternative to having an h.r.p.t. receiving system - each achieves a different objective. NOAA have once more given the world a first class resource. My thanks to Dan Gilmore of the NOAA Satellite Active Archive for permission to use their data and to David Taylor for providing his freely available, impressive software.



**Fig. 8: Gulf of Bothnia - corrected image.**



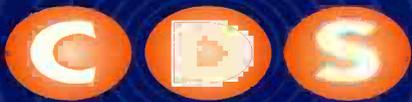
**Fig. 9: Region of Lapland.**



**Fig. 10: Region of Black Sea.**



**Fig. 11: HRPT LAC image of Barents Sea from NOAA-12 on 6 September 2000 at 1142UTC.**



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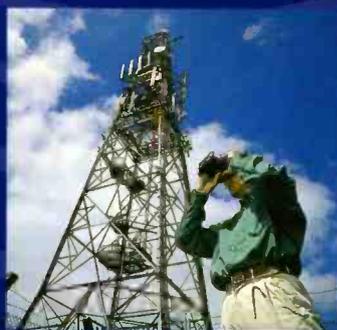
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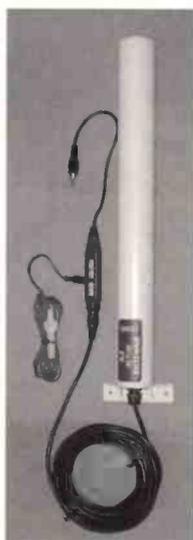
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# Amateur Bands

Progress has been well maintained, to the point of UT7CT and I dropping the h.f. antenna for some rectifications.

Long-time readers will recall that almost three years ago we had a Christmas Eve gale which broke the mast and wrecked the TB3 beam. Yours Truly being a pensioner wasn't about to buy a new antenna when there were six potential triband verticals in the wreckage.

The present situation is that the upper half of a vertical dipole is made from one of the six sets of traps, with the lower part in the form of three separate quarter-wave parts made of wire, one for each band. The insulators are now totally of nylon monofilament which also keeps the wires where they belong.

This 'triband vertical dipole' can in fact also be a.t.u.-resonated on 18 and 24MHz, while 1.8, 3.5, 7 and 10MHz are handled by the end-fed wire operated against counterpoise radials - all in the space of a garden about 9m square - and there are the makings of some more antennas in reserve.

It raises a question. Most new amateurs start with nothing home-brew at all in the station. If there is no firm objective such as contesting, sooner or later boredom sets in and a 'Selling Up' advertisement appears.

## Extra Selectivity

Let's start with our anonymous correspondent who passed the RAE - good! Now she's looking at Morse, and in particular how to get some extra selectivity. Ideally, it ought to be in the antenna, but that's hardly practical yet! A c.w. crystal filter is next, but there are other possibilities.

One method is to use ancient high impedance headphones for listening - they probably have a peaky response already and you can accentuate such a peak by shunting them with a capacitor - obviously the value will depend on the impedance and the resonant frequency. The trick works well enough with modern 'cans' too.

If you insist on using the phones to listen to music as well, then the shunt capacitor can go in a little box with a plug to go in the receiver and a socket for the phones. Again, you just might find a thing called an FL-8 or FL8A which was WW2 surplus, or even the first Ten-Tec - their Active CW Filter CWF-2. I used one for years until I got sick of forgetting to switch it off. I still have both in the workshop.

Next is the thought of using four op-amps to duplicate the CWF2 performance. As an absolutely last resort you could tune the receiver for the lowest beat-note possible - a trick which was easier with receivers having a 'proper' twiddle-able b.f.o.

## Oddments

5A1A reports that 5A/UY0MF was Tripoli Slim and N8OW says he is **not** the QSL manager for VQ9TW. The W6 Bureau is now managed by N6QEK, with a new address of **PO Box 900069, San Diego, CA 92190-0069**. W6LPJ had done 27 years 'at the wheel'.

On the positive side, we see EP2AC is often on around 18.069MHz and IR50NU is a 'special' until the end of the year. SU1HM is now signing SU1HM/D2 - try 14.160 around 2300UTC.

KC4 calls are being reallocated. All KC4 calls are on the US mainland, except KC4AAA-KC4AAF and KC4USA-KC4USZ which are for Antarctica.

Piero F4AUT has finally obtained Mauritius citizenship and hence the call 3B8CO. QSL address to: **Piero Provust, BP78, Curepipe, Mauritius**. For those who missed out on the BQ9P Pratas operation, take heart - we hear of a possible repeat performance around March-April 2001. Thanks *599 DX Report*.

Ever been at the sharp end of a pile-up? **Stepson UT7CT** was the first to hear that Ukraine have signed the CEPT agreement, so a few minutes later he was on Twenty signing MW/UT7CT on sideband and then on c.w. - to my aged ears it approached the sound of a full-bore pile-up but almost 100% Ukrainian callsigns!

## Letters

As promised **Dieter DL2BQD** wrote from Schwedt. Dieter is still recovering from the shock of a complete holiday - Schwedt-Ambleside-Schwedt with not a single traffic jam. On the radio front, the SST20 produced 30 QRP contacts, while the scenery on the Wrynose and Hardknott passes was enough to make Dieter forget to switch on at the summit! Now it's back to the grind - weeding, letter-writing, and preparing for next school term.

Alas, poor **Ted Trowell!** He didn't win the Lottery last week, but he fought off the sorrow and sent us his (c.w. only) report from Sheppey. 7MHz at 1800UTC showed OH0/OZ3GF and at 2100 8J1RL. On 10MHz a session at 0400(!) stumped up with VK2RJ and W0XV. He recovered by 1900 to catch 9H3CL, VK9XY on Christmas Island, VK4FW/P and a couple of hours later VU3VLH and OY/DL8WAA.

More civilised hours on 14MHz - starting at noon - with BV2A, then at 1500 4W6MH and BX7AA. At 1800 YK1AH and at 2100 JY5IN, V26EA, C31PM, VS1AS and RZ9DX/0 on Dickson Is. On 18MHz we see JA3ADW, FR/F6KDF/T (Tromelin) A52AB, 9H1AL, HF0POL, V2/G4DIY, VK9XY, V26EA, FG/JH7BHR, YV1NX, KP2J, HK0VGJ, ZP6CW.

While on 21MHz we see VU2BK, YB2LSR, VR2GW, BV7FF, JY5IN, PP6CW, BX4AD, 8J9XPO, VK9XY, 5N3CPR, BS1AS, PY2NCM, 4S7NE, CP6EB, V26FM, 9H3CL, D2BB, CE3GLR, PY1VOY/PY0F, VP2EY, HC5AI, PY6AN, PY7LM and HK6HFY. 24MHz showed 5R8GS, YK1AO, VK9XY, ZP6CW, V59PP/L, J3/G3TBK, HF0POL, 5H3RK, PZ1AP, and KV4AN, leaving 28MHz for PY2CJ, TZ6DX, FR/F6KDF/T, SU9ZZ, CP6EB, J3/G3TBK, A45XR and V26EA.

Another note from **Godfrey 'Airband' G4GLM** anent waterproof covers notes a new supplier of waterproof containers: **Aquapac International Ltd., 7 Bessemer Park, 250 Milkwood Road, London SE24 0HG, Tel: 0207-738 4466**.

Work has been a worry to **Paul Goodhall**, so his and **Peter's** logs from Oxford have been combined. Their computer log program has been playing-up, but there are still seven pages, so I've had to delete all the EUs. 28MHz gave FY5LS, V26ET PY5BI, 18MHz A92V and 21MHz FY/F5AEG, RA2BK, VK9XY and N7UX, 4Z5FW, WA5VGI, V85BA, JJ1FDS, DU9RG; 7MHz VK1MJ and 3.5MHz 7J4AAL.

On Twenty there was c.w. from S3BGS, UR0VX, then RV9DH W3VL RA9AJX, K2CJP, KF3AA, PS8KW, VK6HD and a string of EUs on p.s.k. Back to c.w. for 4X4NJ, N7WI, W0JMK, XE2NJ, W6WO. Thence to sideband, and WX3B, VK2PS, XE1EK, VK5JJ, KD9QX, SQ8BGJ/P1 on EU129, KC6X, UA9MO, TA3D, VK2DPD, VK2OD, VK2DON, AX7FD, VK2FAY, ZL2ALZ, W2PNF, W6KW, K6IRA, KA4WDX, AD6KB, AB6CF, UA0KBU, KA7KA, KA5FDH, WA6DOJ, KC6AWX, K2KEY, K2CF, HC5SF, W4JRP, 9H4CM, N2II, 8P9JU, ZL1BO, VK7BC, N7TZ, K6DEX, K6JAJ, VE3DOP, K7RI, W6FRH, 5B4BB and N1NMU.

## New Contributor

Welcome to **Peter Bowles** ILA-028 of Seaford in Sussex. On 18MHz is where Peter was during August, finding AP2AGI, A41LZ, BV5BG, CE3CDV, CO2WL, EX8M, FO5NL, HC2RJ, JY5HO, JW7JFB, JAs, KP4IX, KL7O, LU3CQ, OH0RJ, OX2K, OY4TN, OD5LP, PT5000A, PZ5RA, SY7LH, T77M, TT8JA, TR8CA, TE6U, TF3VD, most VK call areas, V26FM, XE1VIC, YB0DX, Z21KW, ZL2AAG, ZS6BAP, 4N1KW, 5N2BHC, 5Z4IC, 70!YGF, 8P6GY, 9V1JA, 9G1MR and 1AOKM - first logged on 1 May 1990 then on 23 July 2000 at 0909.

## More Mail

It's **Colin Dean** from Barnsley who looked on 28MHz to find FR/F6KDF/T on Tromelin, OH0Z, PZ5RA, VQ9NL, 3B8GL, 5ZA4RT, 6W/DK8YY. On 21MHz Colin logged AH8A, AP2JZB, A45XM, BA4DW, BD7NQ, BV2000, BV4VE, BY1DX, DS2BVG, DU3SV, DU8DJ, D2BB, EK6TA, EK7DX, E4/JM1LJS, FK8HC, FM5GU, HF0POL, HL1JV, HL1KTX, HL4HLD, HP1BCK, HS1NGR, all JA call areas, NP2BT, OA100T, R1AND, S21YJ, S92SV, TA3J, TU2CI, VK1TX, VK9XY, VP9FX, VR2LW, V26WP, YB1-0, ZD7VC, Z22JE, 4W6GH, 5H5A, 5R8FL, 6W/DK8YY, 7M4OVD, 7N1LIO, 8M2000, 8R1Z, 9K2MN, 9M2SH, 9M6ST, 9V1WWW and 9Y4GR, leaving 17MHz for AP2JZB, AX8PW/8, DS5USH, FR5GQ, HB0/PI5TUE, JA1-0, OH0RJ, OX/DK6XR, OY/DL5LYM, TA2BK, TK5GF, VK6CTL, VK9XV, VP8DBN, V26WP, YB0DNK, ZA1E, 4W6GH and 9V1XE.

## Close

That's yer lot - your news, stories and letters - as always - to arrive by the first of the month please to **Box 4, Newtown SY16 1ZZ**. The more you write in, the better the column...and maybe Mr Editor would then give me a mite more space!

■ JERRY GLENWRIGHT, 16 COPEMAN STREET, NORWICH, NORFOLK NR2 1HH

■ E-MAIL: shackware@pwpublishing.ltd.uk

# ShackWare

**H**ello and welcome to 'ShackWare' from my new home here in Norwich. We finally made the move at the end of July and we're renting for the moment while negotiating the purchase of a house - planned moving date is end of October so bear that in mind if you choose to write to me with a query. I'll publish my (next) new address as soon as I'm able.

Meanwhile, if you've written recently and haven't had a reply please be patient - we're living out of boxes in a tiny rented house. If you haven't had a reply to a letter written within the past couple of months, it may have gone astray during the move. If you think that might have happened, I apologise and please do write again.

## Mailbag

**Gareth Lamb** of Crediton, Devon, made an interesting boot sale find over the summer which he's being trying to get to grips with ever since. He writes "At a boot sale with my wife, I found a portable PC computer the like of which I'd never seen before. It is an Amstrad machine in an oblong grey plastic case with a solid moulded handle at one end. Lifting the lid reveals a keyboard and a pop-up I.c.d. monitor screen. There are two disk drives of the 3.5in size on the side and a little slot on the top which opens to reveal a telephone cable. Apart from the Amstrad logo, there are no badges to reveal what it is. As the machine was only a fiver I bought it (much to the disgust of my wife!) but I've been unable to do anything with it so far. Please help, otherwise I'm in danger of proving my wife right".

Wives! Mine is kind and understanding, but I have to wait until she's visiting a friend before sneaking old computers into the house. I'm joking, but that scenario isn't far away...

So let's see what we can do to help you. Naming your boot sale find is easy: it's an Amstrad PPC640. This computer was an early attempt at making an affordable and above all, usable portable PC in the late 1980s. The PPC was priced in hundreds rather than thousands of pounds and came with a full complement of DOS base memory (640K), twin floppy drives, a CGA I.c.d. screen, full-size keyboard and - amazingly at the price - a 2400baud modem built in. This latter device was cutting edge back in 1988 when the PPC made its debut.

Under the bonnet, Amstrad used a V30 processor, an Intel-compatible device much like the AMD processors available today (though not so speedy!) which is fast and very compatible. The PPC ran all the popular PC software of the day and really was an excellent computer. It came in several flavours starting with the PPC512 with cut-down memory, one disk drive and no modem to the top-of-range PPC640 - your computer. If memory serves, it had a price tag of around £600.

What you may not have noticed is that the whole of the rear of the machine is covered by a fold-down flap which give access to a full complement of standard PC ports: serial, parallel and a monitor port.

So that's what it is, and now all you have to do is to use it productively. I know from experience that the PPC will run *Hamcomm* and works perfectly with the good old comparator interface. Several years ago, I used one for continuous monitoring of the Yugoslav RTTY news service and it performed faultlessly. Though the flimsy plastic case is no match for computer hash, the I.c.d. screen compensates, so signals aren't too badly distorted.

You'll need a DOS boot disk to bring the machine up but as it works fine with freely available DOS lookalikes such as Caldera OpenDOS, finding software to boot it shouldn't be too difficult. Often, you can find older versions of DOS such as 3.3 at computer fairs for a pound or two. Good luck with it and have fun.

Now for an E-mail from **Mark Harper** with an update about the Packard-Bell computers mentioned in a recent column. "I agree with your comments about Packard Bell PCs. The older Packard-Bells (Executive and Spectra Ranges)

are to some degree upgradable, although oddly, much relies on the model numbers and it is really a hit and miss affair - some models will, some won't.

Just before Christmas I upgraded an Executive P166 to a 333 with 80MB RAM quite easily, using the Spectra upgrade chips. I just swapped a few jumpers over and popped in the extra memory. However, a Packard-Bell I worked on a few weeks later, which was the next model up, would only go to 200MHz, which I thought odd". Perhaps the moral is to try to ensure that you can return upgrade spares if you find they're unusable.

Finally for this time, 'Airband' columnist **Godfrey Manning G4GLM** writes with details of an Acorn BBC Master he's unearthed and which requires a good home. "I've got a Master and disc drives (*Acorn disks were always known as 'discs' - JG*) to give away. My next door neighbour is a silent key and his widow found it. I'm desperate to pass it on to a good home - can you help or make suggestions?"

The Master is a competent computer which came right at the end of Acorn's use of 8-bit processors and was an attempt (I believe) to hang on to its massive installed user base among academic establishments while updating what was obviously an out-of-date anachronism: the BBC B. Though an excellent computer, the world had moved on and the Master was never the success it might have been.

Interested potential owners should write to Godfrey at the address given in his column. (I'd rehome it myself but see comments above!). Godfrey adds "My old Amstrad PCW8512 word processor becomes redundant in September it will then be broken for spares. If anyone wants to lay claim to parts (not the processor or disk drive) then please let me know as soon as possible". Once again, requests direct to Godfrey at the usual address.

## Online Home-Brew

Every so often web surfing throws up an excellent off-beat site from someone who really has something to contribute. That claim can definitely be applied to Harry's Home-Brew Site, web pages devoted to constructing projects of all kinds - including lots for s.w.l.s and computer enthusiasts. Friendly, easy-to-follow yet detailed instructions are available for everything from making single-transistor regen short wave receivers to QRP s.s.b. transmitters to computer projects including an excellent EPROM burner constructed from widely available components. Point your browser at <http://hem.passagen.se/sm0vpo/> and spend a pleasurable hour or two reading through the many projects.

## And Finally

Just space for a quick and welcome snippet E-mailed by **Donald MacMillan** of Oban. Donald writes "Re the item about Greenweld in 'ShackWare'. They were alive and well when they sent out my latest order on 9th August. Incidentally two of the items ordered might interest 'ShackWare' readers: a Commodore 64 Quick Data Drive for £6 and a cheap 1.5m lead Commodore 64 to 36-way Centronics. Hope this helps".

I'm sure many will be pleased to learn that Greenweld continues healthy. Until next time, good listening.

## The New CB?

If I admit to a long-time interest in CB will you hold it against me? Yes, I know all the arguments against it: lunatics, kids and the plain foul-mouthed tainting the band virtually 24-hours a day, yet CB should have been (and should still be) an excellent medium for those of us without an amateur licence (actually I must be one of the few who actually holds a current CB licence but I probably won't renew it when it expires in December).

I admit to owning several CB radios including a mobile rig in the Land Rover and a truly lovely little 80-channel hand-held set from Tandy. However, 30 minutes of tuning up and down the band and I've grown tired of hearing people insult one another (even on the road) and I'm frantically reaching for the off switch!

Recently however, I read something in *SWM* which has utterly renewed my interest in licence-free communications. Dave Roberts's 'Scanning' column made mention of the recently-introduced PMR446 band and suggested that those with suitable sets should call out on Sunday evenings for other s.w.l.s - an excellent idea.

I bought a pair of Binatone sets from Argos (£10 off if you buy a pair) and duly listened. Nothing. Weirdly though, that was rather nice after the wall of unpleasant noise to be heard on 27MHz.

That was two weeks ago and since then we've used the sets for family communications in lots of locations and the band has proved excellent. My wife especially likes being able to summon me when she's exhausted the outfits available for trying on in Norwich's clothes shops - and I like sitting in the car with a copy of *SWM* while she's doing it!

Forgive me. This column ought to concentrate on computers (and avoid sexism) but I feel that the more the word is spread, the more the band will take off among those best placed to make good use of it (you!). PMR446 performs well despite the cheap sets, has no idiots and could be everything CB should have been but isn't - though half a watt isn't going to set the airwaves alight!

There are already several web sites devoted to 446MHz. One of the best is the excellent RF-Man's page at [www.geocities.com/rf-man/pmr446/](http://www.geocities.com/rf-man/pmr446/). This features a complete - and intelligent - run-down of the band, it's users, the transceivers currently available and a host of links. Another is the user forum located at [www.insidetheweb.com/mbs.cgi/mb907766](http://www.insidetheweb.com/mbs.cgi/mb907766)

Just one more quick point: Dave suggested listening and calling out on channel 7 without CTCSS for other s.w.l.s. There's also a move among 446ers to adopt channel 8/tone 8 as a general calling channel (like CB's 14 and 19 channels). If you tune to channel 7 and hear nothing, give a shout on channel 8 with CTCSS tone 8 - you never know who might be listening...

# MilAir

## No Show

After the cancellation of many Airshows last year due to the crisis in Kosovo, I had hoped to travel to a few extra shows this year. Unfortunately, fate has decided to continue to thwart many of my plans - most recently by making it impossible for me to find even a thimble full of unleaded petrol locally and thus allowing me to go a friend's wedding and the Battle of Britain show at Biggin Hill!

However, all was not lost, I did have enough left in the tank to go to the Plymouth Battle of Britain AirAid 2000 on the Sunday, the list on the Internet looked quite promising - wrong! An E-mail from a friend on the Saturday informed me that most of the military participation had apparently been cancelled due to...lack of fuel. The only items of interest were a Russian SU-27 and a Danish Air Force F-16, both of whom apparently gave excellent flying displays.

As I write this mid-afternoon on the Sunday, (from home), the airwaves have been relatively quiet so I assume that the Sunday at Plymouth was also disappointing. Hopefully, some fuel will be available next week for me to travel to the National Collective Training and Air Combat Power exercises at St. Mawgan - Ho Hum.

## Unit News

A re-location for 16(R) Squadron, with their Jaguars moving from Lossiemouth to Coltishall in the third week of July plus 1 Squadron made the shorter move from Wittering to Cottesmore. I would welcome reports from readers to confirm which Operations and Air to Air frequencies 16(R) Squadron are using at Coltishall.

The following were used at Lossiemouth: 242.025, 260.925, 297.1. 28 Squadron are due to reform at Benson this Autumn flying the Merlin HC.3 - once again any reports on Squadron frequencies would be useful.

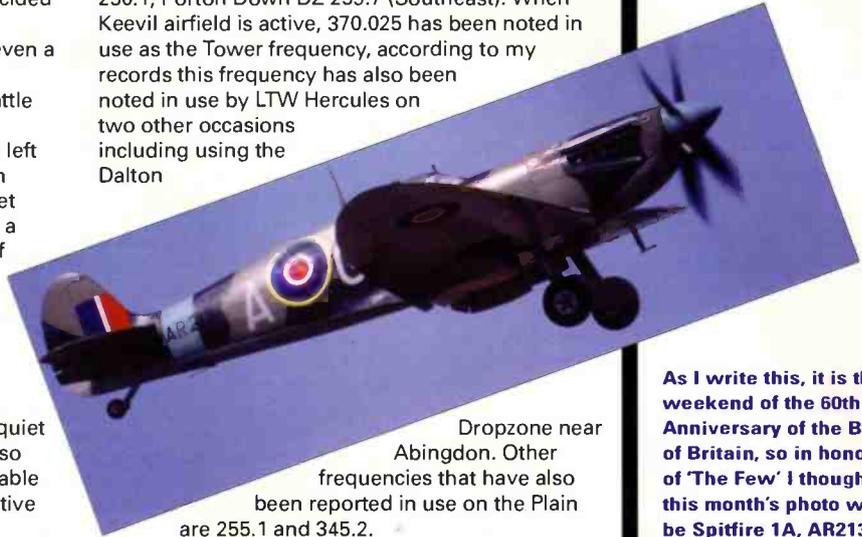
Lastly, by the time you read this, 657 Squadron/AAC will have re-located from Dishforth to Odiham. Another piece of interesting information is that in addition to the USAF C-17As that are to be leased by the RAF, they are now also planning to buy 25 of the new A400M Military Transport Aircraft.

## Salisbury Plain

Three readers were prompted to contact me regarding the September column and the subject of Hercules Paradrops over Salisbury Plain. Thanks to **Chris, Brian and Dave L** from Amesbury who contributed the following information. Some frequencies which are regularly noted in some publications as Forward Air Control (FAC), are often used for the various Dropzones around Salisbury Plain. This includes operations by both the RAF and the Army Air Corps.

Salisbury Ops is an Air/Ground station which uses the primary u.h.f. frequency 282.25 and the range common frequency 122.75 for v.h.f. Both these frequencies are included on the stud listing for AAC helicopters from three airfields located to the East of the Plain, Middle Wallop, Netheravon and Upavon. Helicopters from all three can be heard regularly operating across the Plain.

The Plain also has several Drop Zones which have been identified with their associated frequencies as follows: Everleigh DZ 246.7 (Northeast), Keevil DZ 247.1, (Northwest), Fox DZ 250.1, Porton Down DZ 259.7 (Southeast). When Keevil airfield is active, 370.025 has been noted in use as the Tower frequency, according to my records this frequency has also been noted in use by LTW Hercules on two other occasions including using the Dalton



Dropzone near Abingdon. Other frequencies that have also been reported in use on the Plain are 255.1 and 345.2.

As I write this, it is the weekend of the 60th Anniversary of the Battle of Britain, so in honour of 'The Few' I thought this month's photo would be Spitfire 1A, AR213 seen landing at Greenham Common in 1983.

## Shuttle

Not strictly 'MilAir' but I am sure still of interest to our readers. Two readers reported getting snippets of conversation from the Space Shuttle on the mission to dock with the *International Space Station* in early September. The Shuttle transmissions were received using only a discone antenna and both times the transmissions were heard around lunchtime on 259.7 n.b.f.m.

## The Frece Are 40

I am grateful to one of our European readers for a report on the airshow at Rivolto Air Base in Italy which celebrated the fortieth anniversary of the Italian aerobatic team the *Frecce Tricolori*. He noted the frequencies used by the various Aerobatic Teams which are as follows: Team 60 123.475, Team Aquila 252.5, Patrouille Suisse 376.275, Patrouille de France, 143.1/242.65, Frecce Tricolori 307.8, 142.8 (Ground), Breitling Eagles 123.05. He has also sent a short list of callsigns, but only listed the Air Force and not the unit to which they belong. Thanks again, good to hear from overseas 'MilAir' listeners.

## MilAir Info

Finally this month I would just like to repeat a request for information that I published earlier in the year. *SWM* reader **Ken Hughes** is writing a history of the Military Airband since the Second World War and wants information regarding the equipment used in the aircraft/ground stations and the frequency bands utilised between 1945 and 1970. The reason I have repeated this request is that we have so far had a limited response, but what information we have been sent has been very interesting and I hope to write an article for *SWM* regarding this subject. A big thank you to all those who have sent in information. All correspondence via *SWM*.

■ GRAHAM TANNER, 64 ATTLEE ROAD, HAYES, MIDDLESEX UB4 9JE

■ E-MAIL: [ssb.utilis@pwpublishing.ltd.uk](mailto:ssb.utilis@pwpublishing.ltd.uk)

# SSB Utilities

## NASA On HF

The first letter this month comes from **Alex Scott** in Scotland who wants to know some more about a NASA flight that he heard on h.f. during early August. Alex reports that on 10th August he heard aircraft 'NASA 809' working Recife, Brazil, on 10.096MHz. This is part of the SAM-2 h.f. network covering the majority of the South American continent. Recife is in the north-eastern corner of Brazil.

According to *Airwaves 2000* there are no less than 19 ATC stations which operate on this frequency. The NASA flight gave a position report of 11°S 33°W, and a height of 'Flight-level 600' - naturally, it was this last part that caught Alex's attention! Flight level 600 is 60,000 feet, which even higher than Concorde. Alex says that he was unable to find any later transmissions from the flight, so he was unable to determine the approximate speed and track of the aircraft.

Well Alex, NASA 809 is a very rare bird indeed. Its official designation is an 'ER-2', but if you ever saw one you would instantly recognise it as being a U-2. The 'ER-2' designation stands for 'Earth Resources', and this indicates that the aircraft is used for research into the climate and other resources near the surface of the planet.

NASA has been using variants of the U-2 'spy-plane' since the 1960s, when the first two examples were acquired from the USAF. Events surrounding the shooting-down of Gary Powers in 1960 made the whole world aware of the capabilities of the U-2 aircraft, so the two used by NASA were known as the 'ER-1'.

Various countries around the world were happy to have an 'ER-1' overflying their airspace, but a 'U-2' was a different matter! The aircraft were used for high-altitude sampling flights - something that an orbiting satellite cannot do - and various photographic sorties to investigate land-usage.

The original U-2s/ER-1s were manufactured during the late 1950s, and during the early 1980s Lockheed built a number of improved models; these were originally known as the TR-1. NASA acquired two of these (and retired the earlier versions) and they were christened as 'ER-2'.

The USAF TR-1s were eventually re-designated as the U-2S, but the NASA ones remained with their original title. The NASA ER-2 aircraft are based at the Dryden Flight Research Centre in California, but this is part of the more well-known Edwards Air Force Base.

The exact flight that Alex heard during August is proving a little harder to pin down. I have an idea that during July and early August a number of NASA aircraft were sent to South Africa to perform some high-altitude flights searching for the limits of the ozone hole above the Antarctic. This obviously included an ER-2, and probably some support aircraft.

A similar overseas detachment occurred at the start of 2000 when an ER-2 and supporting DC-8 aircraft spent some time at Kiruna in Sweden. Therefore, I expect that Alex heard the ER-2 returning home from South Africa at the completion of the research flights. Although the NASA ER-2 and USAF U-2S aircraft regularly flight above 60,000 feet, they usually only report their Flight Level as 'above FL600' to hide their true altitude. After all, what else would be up at their altitude?

For those of you with access to the Internet, I have given details of a NASA web-page which includes a large number of pictures of the NASA ER-2 aircraft and links to information about various ER-2 flight programmes.

## Shanwick

**Roy Smart** from Scotland writes in with a question about Shanwick. Roy says that he listens to the NAT frequencies on his Yupiteru MVT-9000, and wants to know if it is true that the entire Shanwick set-up is split across two different locations. D.J Smith's *Air Band Radio Handbook* (6th edition) mentions this, and Roy wants confirmation.

Well Roy, it is true. The radio operators are at Ballygireen near Shannon in Ireland, and the ATC Controllers are at Prestwick in Scotland. There is a dedicated link between the two centres, that allows information to be passed between them. All aircraft clearances are produced at Prestwick, sent to Ballygirren, where the Operators transmit the information to the aircraft concerned. Aircraft position reports are received by the Operators, travel back to Prestwick, where they are used to update the ATC computers.

Aircraft approaching UK and Irish airspace from across the North Atlantic will have been passing regular position reports to Shanwick, so they (the Controllers) know when the aircraft is approaching the boundaries of the UK/Irish airspace. At the appropriate time, Prestwick will co-ordinate with the relevant ATC agency (for example, Scottish ATC) for a suitable v.h.f. or u.h.f. frequency and transponder 'Squawk' code.

This information is passed to Ballygireen where it is sent to the aircraft; the aircraft can then contact the ATC agency directly, and Shanwick is finished with that aircraft. When the aircraft eventually contacts the ATC agency and is picked-up on radar, the relevant flight details appear on the controllers radar screen. This is a very simple overview of the process, and there is a lot more which happens 'behind the scenes' to make everything run smoothly.

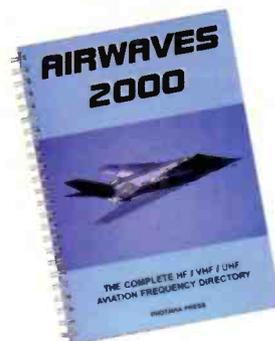
Things are never stationary in the world of communications, and the ATC system changes as time goes by. The Controllers at Prestwick are now able to talk directly to the pilots in some aircraft via a dedicated satellite 'phone link. The aircraft can call Prestwick and pass their position report, or obtain flight clearances, over an almost crystal clear phone connection instead of going via a noisy h.f. radio.

At the moment the system works in one direction only - the aircraft must call Prestwick as Prestwick cannot place a call to the aircraft. Who knows how this may change in years to come. Aeronautical h.f. is not dead yet, and it will be many years before Shanwick ceases using h.f. radio.

Roy also wants to know if there is a similar 'split' set-up at Gander, New York and Santa Maria. I have to admit that I don't know the answer to that one, but I strongly suspect that those OACC (Oceanic Aeronautical Control centre) stations operate as 'single centres'. The controllers are probably at the same site as the usual v.h.f./u.h.f. controllers, but probably in a separate part of the building. However, I suspect that the controllers at these other OACC stations are also the ones who are heard talking to the aircraft on h.f. Can anybody prove otherwise?

## Web Watch

NASA ER-2 -  
<http://www.dfrc.nasa.gov/gallery/photo/ER-2/index.html>



## More CSOS

In recent months I have mentioned several times the various CSOS sites up and down the country, including a list of their sites. Many of them are now closed, but this has prompted a letter from **A.L** who actually worked at Forest Moor. A.L says that he can remember a room with about 150 radio receivers and many acres of antennas including huge rhombics and beverages. A.L says that his job involved monitoring Russian Army signals, and also some embassy signals; later he was involved in 'radio fingerprinting' which was a study to identify transmitter and operator characteristics.

A.L finishes saying that he is still interested in utility listening, and is currently enjoying the delights of ALE. I hope that the recent articles have proved useful; a number of minor ALE networks have been discovered in recent months, but still the busiest system is the USAF set-up.

■ ROGER BUNNEY, 35 GRAYLING MEAD, FISHLAKE, ROMSEY, HANTS SO51 7RU

# Satellite TV News



**Uplink test card from Montanna for the Bill Clinton visit to the forest fires region (via NSS-K digital).**



**Bill Clinton is seen here thanking troops for their firefighting duties (NSS-K).**



**Live launches are often broadcast ex Kourou via the BR channel on Astra.**



**Live feed to Brazil from the Venice Film Festival with Clint Eastwood and Tommy Lee Jones (NSS-K).**



**The commander of the ill-fated Russian submarine, lost off Murmansk, via the Moscow (Reuters) lease on NSS-K.**

Too late for the last column was the news that the Russian submarine *Kutsk* had been lost off of Murmansk. Thoughts were that the crew might still be alive and seemingly the Russians delayed decisions, President Putin remained on holiday. Eventually a UK/Norwegian group arrived on the scene and divers established that all life had expired, the sub was totally full of seawater.

From about the 15th various news feeds were seen coming out of Russia. First were the reports (2-way) from the Reuters Moscow bureau carried on the NSS-K, 21.5°W, but then **John Locker** (Wirral) found direct feeds ex Moscow via *Eutelsat 2F3* @ 21.5°W - unusual for the Russians to let SNG equipment in to uplink out of their territory!

Remarkable VHS quality footage was noted on one transmission from Reuters Moscow showing the crew and smiling captain of the ill fated sub. (Note - despite what the Western media has said over the Russian reactions to the disaster, one of the UK divers that went to Murmansk lives near Romsey and speaks of the Russian navy making very extensive rescue attempts and in considerable danger with their own rescue operations).

The sub disaster following the early August Moscow Metro bombing was but two of Russia's misfortunes in August...August 27th and the Ostankino TV tower - the second tallest man-made structure in the World - caught fire, cabling then spread the fire both up and down the structure. This interrupted 11 radio and 12 TV channels, local mobiles, microwave links and other comms for the Moscow region and TV viewing in the capital went dark.

Dramatic pictures showing the tower smoking was carried over all networks. It is possible to monitor here in the UK a few Russian channels such as the ORT-1 network via *Express-3A* @ 11°W (3.675GHz-RHC) and the PTP network signal via the 40.5°E *Gorizont*, again 3.6765GHz - both C-Band signals analogue. The former on a 1.2m dish overloads though the PTP signal is rather sparklie but will clean up with TE input (TE = threshold extension).

The Russians provided fairly detailed news for their home viewers, PTP perhaps being the more 'aggressive'. Unfortunately, four individuals perished in the blaze, three being firemen using the lift (!) in the burning tower. It was thought the Ostankino tower might collapse or suffer demolition, but it appears the structure will be saved.

Some 30 days after the crash of a Concorde in Paris (25 July), news came that a Bahrain Air flight - Cairo to Bahrain - had crashed off-shore during landing attempts at Bahrain, killing all on board - 23rd August. There seemed to be no footage carried to the outside world over the usual Arabic news carrier *Arabsat 2B* @ 30.5°E, so I checked with the Bahrain TV output over on *Arabsat 3A* @ 26°E - part of a digital channel package on 11.767GHz-H (SR 27500+3/4).

The normal programming timetable was still carried though, with several updating news flashes breaking into the programmes. The next morning the main news carried extensive footage which in turn was also relayed over the European networks that same day. Incidentally, if any of our readers are Arabic or involved in the dish installation trade with Arabic customers, there are numerous strong digital and analogue satellite signals available on *Arabsat 3A* requiring dishes around 1m in the UK.

I found a new Lebanese TV package for example on 3A, 11.785GHz-V (27500+3/4). These included Future TV; LBC-1; Tele-Leban; MTV (not the music channel!!); Al-Manar TV plus several test channels with test cards only intended for forthcoming programme channels. Interesting to note Al-Manar which carries a considerable amount of Arabic/Israeli rhetoric and a political meeting I saw on 1 September involved a large crowd in a park waving flags and shouting.

Dramatic pictures were found when I switched on my equipment early morning of September 10 to check out NSS-K and the Reuters lease, 11.462GHz-V digital (SR 5632 + FEC 3/4). The Shuttle *Atlantis* was relaying live pictures back to earth via Mission Control, Houston, as it approached the *International Space Station*. Samples of air in the first habitable section were due to be collected for later testing to confirm the purity before any

astronauts set foot without protective space suits.

The docking and related operations were shown in great detail all day through to news feed relays in the late afternoon. Pictures from both the *Atlantis* cameras and the control room in Houston were relayed over this lease with commentary courtesy NASA-TV.

Another entertainment witness on the favourite NSS-K was August 26th when US President Clinton arrived in Nigeria. These travels were to prevail on the Nigerian government to increase oil supplies and maintain financial stability in the Western World - the American networks were very interested in the discussions and carried a 'pool' uplink out of the country which was shared by several US network providers, e.g. NBC, Fox, ABC, etc.

As part of the visit a celebratory banquet was prepared together with local native traditional dancing and a rather noisy band! Again the Reuters 11.462GHz-H lease carried pictures, this a secondary feeder link across to the 'States, the primary circuit out of Nigeria would have probably used C-Band.

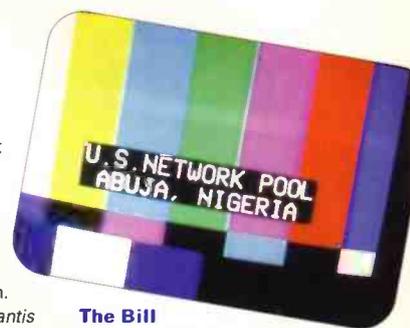
When *Eutelsat 2F3* moved from 36°E back to a slightly inclined 21.5°E the previously available news and programme feeds really took a dive. **John**

**Locker** suggested that this might be caused by the slightly inclined orbits of both 2F3 and the adjacent slotted *Astra 1D* (19.2°E), early morning around 0800 and later afternoon around 1800 the inclined orbital movement brought both satellites to under a 2° separation causing co-frequency interference.

Around the lunchtime period the craft were furthest apart and presented much easier signal acquisition. Interesting thoughts - I find that my 1.2m prime focus dish seems unable to offer much activity at all from 2F3. One report received comments on 'The Greyhound Channel' seen on 2F3 on August 26th with the *Irish Greyhound Derby* uplinked by SISLink 20 - UKI 190 @ 11.685GHz-H @ 5632+3/4 - so 2F3 action can be received!

Having commented on the lack of 36°E activity, I did a scan on September 2nd across W4 and actually found a very strong signal, that of 'HUN-002', 'SNG HUNGARY' appeared on a Philips PM5544 test card! This cut around 1730 to a football stadium and eventually there followed a football match - Hungary v Italy - the match itself being relayed over the SNG uplink for the RAI network in Italy (11.105GHz-H, SR 6111+3/4).

There's been lots of boating action around the Solent on 8, 9 and 10th September with the *BT Global Challenge* yacht race. *Meridian Tonight* were uplinking a live into their



**The Bill Clinton visit to Nigeria resulted in a shared-time basis SNG uplink facility by the American TV networks (NSS-K).**



**African dancers entertain the US President - live feed from Abuja.**



**Philips PM5544 test card via W4 @ 36°E prior to a Hungary v Italy football match.**

programme over the 'BT TES 43 UKI-587' SNG truck from Soton's Ocean Village at 1800 on the 8th using the common 10.988GHz-V - 5632+3/4. The race actually commenced 1200 on the 10th off Gilliker Point, Gosport. Checking across *Intelsat 801* again @ 31.5°W found only encrypted feeds (or MPEG 4:2:2), but the Shuttle *Atlantis* activities on *NSS-K* were more exciting and yachting activities were not pursued further that day!

Having had a tip-off, I checked out the 11.687GHz-V slot on *NSS-K* on August 31st and sure enough, at 1726, there appeared the 'HOL 091 IMAGE UNLIMITED' caption on colour bars, this cutting into footage from the Venice Film Festival running an unusual SR 5750+FEC 3/4, the service ID being 'JONSATEST'. The 45 minute insert featured four well known faces in 'Space Cowboys' namely Clint Eastwood, Tommy Lee Jones, James Garner and Donald Sutherland. The feed was primarily intended for Brazil and subsequent film offerings via 'HOL 091' appeared on September 2, 4, 6 and 8th.

Our Dorking expert **Roy Carman** spends much of his day scanning the Clarke Belt for the new, unusual and exciting...both **Roy** and **John L.** discovered the new satellite *Europe\*Star* @ 45°E running test patterns @ 12.500GHz-V (8680+3/4), the pattern included a subtle commercial inlay seeking clientele for this new craft which is ideally placed to feed all of Europe, Africa and into Asia. Actually another news satellite has also hit the airwaves though over the UK horizon.

Reader **Bandula Gunasekera**, Sri Lanka, found his 2nd analogue Ku-band signal from LMI-1 @ 75°E, on the Southern Ku beam he found the Israeli IBA-3 service in clear PAL, 12.670GHz-H, audio 6.60MHz Hebrew and 7.02 with Arabic. Radio channels are also carried - Reshet Bet 7.38; Kol Hamusica 7.74; Reshet Dalet 7.92; Reshet Gimmel 8.10GHz. IBA-3 opens 1900 Sri Lankan time, news @ 2200. Bandula's family enjoy the Sunday circus, the first programme carried often for two hours! His equipment is incidentally a 600mm offset dish with a 1dB noise Micro-Lab LNB.

I missed the summer's 'Big Breakfast' programme feeds from Southern Spain. This almost traditional annual offering used to appear over *Intelsat K* in simple analogue, but now has disappeared into the digits. This year it jumped up on *Eutelsat W2* @ 16°E, they were found on August 16th at Frengilola (?) on the usual beach location seeking folk to test fried breakfast - washed down undoubtedly with lager! On previous summer ventures a SISLink truck had accompanied the UK *Big Breakfast* troop of technicians and artists, this year however reduced programme budgets produced a Spanish uplink truck 'E17 Galia 2000'.

**Roy Carman** hasn't forgotten that often *Hotbird* @ 13°E carries the occasional news feed, August 20th and APTN were seen in the clear, 12.581GHz-H digital (5632+3/4). The topic was the ongoing naval situation in Russia, scenes of rusting naval hulks heaved on dirty shores around Murmansk, lack of investment to maintain what had been proud vessels - now fit for scrap and seagull perches. The news item then cut to show a basic flat with the grieving family of a lost submarine crewman, a country without purpose and people without money.

A signal that has always evaded me is the Dutch amateur station P16ATH that appears usually on *Eutelsat W2*, 16°E digital @ 12.729GHz-H (2000+3/4). He was seen August 24th with pictures of sailing ships gathering at Velsen, Holland, preparing to set sail on August 28th - the whole estuary was crammed full of small vessels. Oddly though, all the pictures were in black and white!

Whilst with thoughts of the outdoor life, witness *Eutelsat 2F4*, 10°E, the scene is near to a Turkish airport close to the sea. The sky not full of aircraft but full of storks and cranes - birds that is - flying everywhere. A helicopter is seen engaged flying round in a vain attempt to frighten them all away! This signal August 24th - 11.581GHz-H (SR 3000+3/4).

Check out the 7°W slot since the *NileSat-102* satellite was reported to have arrived after the August 21st launch, test signals were noted within the Telecom band from about September 10th - a strong signal noted at 12.130GHz-V. *Nilesat-102* will operate with linear polarisation (i.e. vertical or horizontal) across the 12.110-12.475GHz band. I also checked out the *Express-3A* Ku allocation when I was checking out the C-Band ORT-1 downlink - at 11.518GHz-V digital (16000+3/4) there's the Serbian RTS-Sat TV channel plus several other radio channels (from Stefan Hagedorn's Internet newsletter).

On a sporting note, an unusual split feed was noted on August 22nd from the Brno, (Czech) racing circuit with the Motorcycle Grand Prix 2000. Both live and 'highlight instant replay' feeds were uplinked out of Brno, the 'live' or direct programme output downlinked on 11.080GHz-H and the 'replay'

channel on 10.964GHz (SR 10847 + 3/4) over *Eutelsat 2F4* @ 10°E.

As I type these words on September 13th the fuel shortage is now biting with all stations empty. Near Southampton is the Fawley refinery complete with a peaceful blockade. Meridian TV wheeled out their BT leased truck 'BT TES43' to provide both recorded playbacks and live coverage over the usual *Intelsat 801* frequency - 10.998GHz-V (5632+3/4) for their evening magazine programme.

Interesting to see in the background the BBC South truck with dish erect and their 2.5GHz s.h.f. terrestrial link mast fully extended - this would give line of sight input to their broadcasting centre adjacent to the Civic Centre, Southampton. The tendency for sat-zappers now is to look for digital news feed action first, analogue reception - other than C-Band - seemingly becoming more of an art form and secondary in the interest stakes. Two to three years ago the split was perhaps 50:50, five years ago mostly all feeds were analogue.

## Orbital News

There's a third Spanish language TV channel opening across the USA during 2001 hoping to win up to \$250M of advertising funds. 'Azteca America' is a Dallas, Texas based group which has existing media connections both in the 'States and in Mexico. 'Azteca' will offer 18 hours daily and rival the 'Telemundo' Sony backed network. The network will air both terrestrially and via satellite.

Interesting development from Asia with the production of a 'flatpack' LNBF comprising both C-Band (4GHz) and Ku-Band 11-12GHz) LNBs within an integrated feed for both bands. Advantage for smaller dishes is that the shadowing of the usual combined package of feed horn, polarisers and LNBs is dramatically minimised. More interesting is that a Chinese version is available for under \$50. (LNBF is an LNB package plus integrated feed/polariser).

The new *Europe\*Star* satellite now orbital at 45°W will provide direct (single hop) coverage from Western Europe/UK (52dBW) into the Middle East (49dBW), India (49dBW), the Far East (53dBW) and into South Africa (53dBW). It's a Ku-band only bird operating within the 12.5-12.75GHz, first test signals have already been received in the UK.

Problems on the *Kopernikus DFS-2* satellite @ 28.5°E - the steering mechanism has a fault - led to the *Kopernikus DFS-1* @ 23.5°E being moved along to and replacing the *DFS-2* satellite. Interesting contract has been awarded to Arianespace, Kourou for at least nine flights over the 2003-2014 period over their Series 5 rocket to supply food, water and other related cargo to the International Space Station now approaching completion of the 1st living quarters. The order is worth nearly \$960M.

After delays the *Eutelsat W1* satellite is now orbital following launch on September 6th ex Kourou launch site (carried live on the German Bayerischer Rundfunk Astra analogue transponder in their *Space Night* programme after midnight). The *W1* Ku-band craft will slot at 10°E and offer both European and African coverage down into J'burg via its 28 transponders, replacing the present // F4 bird.

The increased activity into Africa marks the expansionist policy of Eutelsat now breaking clear of its former European confines. In another commercial development, Eutelsat have partnered Belgacom to provide 'Internet via Satellite' from October 2000, a new service for ISP/corporate users offering high speed Internet via the Eutelsat network. Initially the 2F3 sat @ 21.5°E will be used, offering cut price rates due to the inclined orbital problems of the satellite.

As Sky analogue programmes depart *Astra* @ 19°E, several German channels are queuing up to take up the vacated space with both analogue and digital programming. New arrival is the VIVA music channels on 11.127GHz-V analogue (Sky Cinema) and VIVA Zwei will establish on 11.303GHz-H analogue (Fox Kids/National Geographic) on Feb 1st, 2001.

And finally for Chinese readers, the 'TZU CHI TV' channel on *Telstar 12*, 15°W @ 12.620GHz-H has modified its digital parameters and now clocks in at SR 2482 + FEC 0.5.



**Bahrain TV with footage of the crashed airliner in shallow water 24th August via *Arabsat 3A* @ 26°E.**



**Part of the Lebanese digital package on *Arabsat 3A*, a PM5534 test card.**



**AI-Manar TV channel ex Lebanon, *Arabsat 3A*.**



**The test card seen in the Lebanese channel package on channels yet to be filled.**

**C-Band signal from Radio Television Djibouti, relaying entertainment from the Somalian Peace conference via *Arabsat 2B* @ 30.5°E.**





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ICOM	IC-745 HF BASE inc FM 100w	£425.00	MFJ	1278 TNC incl SSTV	£225.00	YAESU	FT-8500 DUAL BAND MOBILE TRANS 50w	£295.00
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ICOM	IC-751 BASE HF CLASSIC!	£425.00	MICRO MOD	Microwave mod's 144/100 100w 2m	£120.00	YAESU	FT-900AT BOXED	£695.00
ICOM	IC-756 HF/6M BASE TRANSCEIVER	£1,050.00	OPTO ELEC	CUB Frequency Counter	£80.00	YAESU	FT-920 HF 50 MHz BASE TRANSCEIVER	£925.00
ICOM	IC-756PRO (AS NEW)	£1,799.00	PACCOM	TINY 11 PACKET TNC	£99.00	YAESU	FT-920 AF HF 50 MHz BASE TRANSCEIVER	£999.00
ICOM	IC-765 HF BASE 100w	£950.00	PACCOM	320 TNC	£99.00	YAESU	MD1 DESK MICROPHONE	£75.00
ICOM	IC-775DSP 200w HF BASE TRANSCEIVER	£1,799.00	REALISTIC	PRO-2026 SCANNER	£99.00	YAESU	VX-1R MICRO 270 WIDE RECEIVER	£109.00
ICOM	IC-821 H 270/6M BASE TRANSCEIVER	£750.00	REALISTIC	PRO-26 HANDY 25-1300 (AS NEW)	£125.00	YAESU	VX-500 HANDY SCANNER	£195.00
ICOM	IC-W31E DUAL BAND HANDY	£175.00	TOKYO	HT 180 80m HF SSB TRANSCEIVER	£200.00	YAESU	FL-2025 25AMP FOR FT-290R MK11	£100.00
ICOM	PS-15 POWER SUPPLY	£100.00	TOKYO	HY-POWER HL 166V 6m 180w	£195.00	YUPIERU	MVT-3300EU MULTI-BAND RECEIVER	£100.00
			TONO	5000E TERMINAL + KEY BOARD	£199.00	YUPIERU	MVT-8000 BASE	£240.00

■ GODFREY MANNING G4GLM, C/O THE GODFREY MANNING AIRCRAFT MUSEUM, 63 THE DRIVE, EDGWARE, MIDDLESEX HA8 8PS

# Airband

Tolerance doesn't seem a prevalent characteristic in modern competitive Britain. Although they accept continuous, intrusive noise from road traffic (probably even contributing to it), there are groups of people who object to even occasional and relatively distant aircraft. I hope the pressure groups who object to the expansion of their local airport will practise what they preach and not expect to fly from there when they want a holiday!

Another aerodrome subject to local scrutiny, as reported to me by **P. Tarry** (Northampton), is Bentwaters. Despite being 13nm outside the MATZ, some aircraft going into Bentwaters contact Wattisham (possibly 123.3 or 125.8MHz).

Apparently, the land is private with just the occasional flight being permitted by the owners. The narrow-minded objectors even complained about a charity event in which disabled children were taken on pleasure flights. Special rules apply, see *A/C 50/2000* from the CAA. I'm not clear as to the grounds for protest, presumably occasional noise. I advise pilots, though, that being a private site, don't practise your forced landing techniques there without the owner's permission.

## Air Traffic Control

Humans do the controlling but computers feed them information that makes their job easier. One facility is s.s.r. The secondary radar head sends a signal up to the aircraft but, unlike primary 2.8GHz radar, it doesn't then 'listen' for its own echo. Instead, the airborne transponder receives the 1.03GHz interrogation signal and replies on a different frequency of 1.09GHz.

The reply is not a simple pulse but, rather, a digital code. On civil aircraft this can carry two pieces of information. The first is a four-digit identity number which, being derived from binary data, can only contain the digits 0 through to 7 (binary represented by octal). The number is set by the pilot in response to the controller's instructions, which are always read back. As long as the controller allocates unique numbers to each flight within radar coverage then every aircraft will be individually identifiable.

The second piece of information is the flight level, derived from an encoder in the altimeter or air data equipment. Flight levels are altitude in hundreds of feet assuming a standard atmospheric pressure of 1013.25hPa (was millibars), equivalent to 29.92 inches of mercury if your altimeter was made in the USA where they do everything differently.

How can this be improved upon? That helpful computer can read the transponder identity 'squawk' code and display it on the radar screen as a flight number. This means that the ground computer must already be programmed with a look-up table, the 'squawk' code for each flight number being predetermined.

If you know the flight number, you know its destination and so that, too, can appear on the screen. If it's an airport,

the last two letters of the ICAO locator will do. All UK airports have a four-letter locator beginning with EG and the entire code for Heathrow, for example, is EGLL. On the radar screen, destination appears as LL. A controller only wants to know where a flight leaves radar cover and is handed over to someone else, so the 'destination' might actually show as a waypoint on the FIR international airspace boundary.

The information shows on the radar screen as a label. The position of the aircraft, a dot, is called the target. One extra code makes the target dot flash momentarily. This is the ident code. When the controller says to 'Squawk ident' the pilot presses the ident button in the cockpit. If the correct target flashes, fine. If not, the controller had better clear up this case of mistaken identity!

The clever computer doesn't stop there. I read in *The Log* (August/September 2000, page 23) that, when the 'squawk' code is received for the first time in the case of departures from a large airport, the computer activates the flight plan. Hence, each controller along the route will receive prior notice of the flight's imminent arrival in their airspace. Usually, the computer prints out a flight progress strip at the air traffic control centre.

Recently, a flightplan was misread and entered into the computer system with a valid, but incorrect, destination locator. The controller at the intended aerodrome was surprised when the flight called on frequency. The controller at the mistakenly entered aerodrome got worried when the expected flight was 30 minutes overdue and alerted the rescue services, only to find that the aircraft had landed safely where the pilot intended but not where the computer anticipated! Could be an expensive slip of the pen.

## Frequency & Operational News

Information from *GASIL 3* of 2000 and **Martin Sutton** (to whom our thanks as always) from the CAA. Belfast (Aldergrove) Approach moves to 124.9 (was 120.9); Cardiff (Tremorfa) Heliport has a new Air/Ground service 120.65; Stansted's Essex Radar (120.625) has been replaced by Stansted Director 126.95MHz, which was itself originally Stansted Radar.

Nostell Priory is a new hang-gliding site in West Yorkshire. The Wolverhampton n.d.b. on 356kHz has a new ident of WBA (the old one, HG, ceased when Halfpenny Green aerodrome changed its name).

Just north of Edinburgh on B226 is new reporting point PIPAR. Close to Barkway v.o.r. is new reporting point BIGLI for the Luton non-airways arrivals procedure. The following new SIDs commence at Manchester, accommodating both the old and new runways: CONGA 1Y/1Z, HON 1R/1Y, MONTY 1Y/1Z, NOKIN 1Y/1Z, POL 1Y/1Z, STOCK 1Y/1Z, WAL 1Y/1Z.

Remember, you can't tell where an aircraft is unless you understand the navigation instructions given. If you want more details about a significant point, SID or STAR, write in and I'll elaborate here.

Royal flight callsigns have been updated. No. 32 (The Royal) Squadron flights carrying dignitaries are KITTYHAWK and The Queen's Helicopter Flight RAINBOW, with letter R (Romeo) following the flight number if royalty are on board. 32 Squadron positioning flights are KITTY and their other flights are ASCOT. HRH The Duke of York's helicopter callsign is LEOPARD. See last month's 'Airband' for advice on tracking royal flights.

## Where Am I?

Now for two readers who know perfectly well where they are, it's the overlying airways they're asking about. The appropriate Racal/Aerad chart will



## Abbreviations

AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
CAA	Civil Aviation Authority
CD-ROM	Compact Disc - Read Only Memory
FIR	Flight Information Region
GASIL	General Aviation Safety Information Leaflet
GHz	gigahertz
hPa	hectopascals
ICAO	International Civil Aviation Organisation
kHz	kilohertz
MATZ	Military Aerodrome Traffic Zone
MHz	megahertz
n.d.b.	non-directional beacon
nm	nautical miles
SID	Standard Instrument Departure
s.s.r.	secondary surveillance radar
STAR	Standard Terminal Arrival Route
v.o.r.	very high frequency omni-directional radio range



Caradair Regional Jet 100.  
Christine Mlynek.

Continued on page 66

■ KEITH HAMER & GARRY SMITH, 17 COLLINGHAM GARDENS, DERBY DE22 4FS

# DX Television

**A**ugust arrived and Sporadic-E activity continued to flourish. Signals from the Middle East were in evidence as late as the 20th, which is most unusual. Settled weather conditions produced tropospheric openings throughout the month, with Luxembourg and Germany being received in central England.

## Reception Reports

**Peter Barber** (Coventry) noticed Jordan on E3 with its broken oval logo between 0942 and 0952 on the 5th. At 1117UTC, **Stephen Michie** (Bristol) logged the signal and again on the 20th, around the same time, during subtitled adverts. Jordan re-appeared at 1729UTC with a news and sports programme which was resolved by **Peter Barclay** (Sunderland). Shortly after, an unidentified station from the south-east was seen co-channelling with Spain on E2. **Ian Milton** (Ryton) also saw it and thinks it originated in the Middle East.

High m.u.f.s have been encountered at times producing f.m. band openings. **Simon Hockenull** (Bristol) heard the Channel R5 vision buzz at 93.25MHz on the 6th at 1700. The same opening produced ORT (Russia) on R3.

## Test Cards

Believe it or not, test cards are still shown! Simon Hockenull captured Slovenia airing the PM5544 at 0433UTC on the 5th. The identification at the top was 'TV SLOVENIJA'. Stephen Michie discovered the Lithuanian TV 'G-204' test card at 1515 on the 7th. This was being broadcast from the Vilnius outlet on Channel R2.

Other CIS countries broadcast the G-204 test card with subtle variations. Usually there is some form of identification in small white lettering, but this can sometimes be confusing when confronted with the Cyrillic alphabet.

Peter Barber identified the Ukrainian version earlier on the 7th at 1117 complete with the striped '1' logo in the top-right of

the screen. At 1121 it went off-air, returning at 1125. At 1130, the logo was removed and returned at 1132! The station opened at 1152.

At 1226, Peter Barclay spotted the new Estonian PM5544 test card bearing the identification 'ETV TALLINN' at the top. The lower identification block is blank but extended for some reason. Stephen Michie has seen a version with just 'TALLINN' in the lower identification block. Unidentified colour bars were seen on the 14th at 0800 on R2 from an unknown CIS country.

Tropospheric reception on the 25th produced Belgian and French stations for Peter Barclay, including Canal Plus on L5 from Lille which lasted all day. This was a 'first' for Peter, as most tropospheric signals arrive from Scandinavia or northern Germany. However, Denmark and Norway briefly showed the following morning.

## Portable TV

A five and a half inch monochrome portable is being advertised in some newspapers and magazines for £29.95. The picture suggests that the receiver covers Bands I and III as it has a band-switch marked VL (BI), VH (BIII) and u.h.f. (as well as f.m. radio). The v.h.f. scale shows numerals 4 to 13, suggesting that the receiver is intended for the South African market. However, Peter Barber has warned that some of these receivers are u.h.f. only, so before ordering obtain confirmation from the suppliers that the equipment you are likely to receive will have the v.h.f. TV band facility.

## Private Stations

**Tim Bucknall** (Congleton) tells us that a Greek private



Fig. 1: Estonia (ETV) identification caption received in Bristol by Stephen Michie.

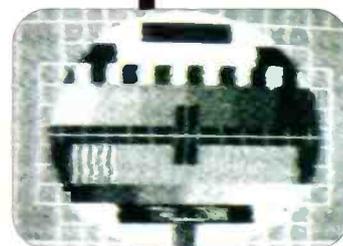


Fig. 2: The Estonian standard PM5544 with TALLINN in the lower identification panel noted by Stephen.

## DXTV Log For August

This month's reception reports have been supplied by Peter Barclay, Stephen Michie, Peter Barber, **Barry Bowman**, Simon Hockenull and **Vincent Richardson**. All reception is via Sporadic-E, except where indicated. All reception times are in UTC.

Day	Log
1	Italy (RAIUNO) A; Spain (TVE-1) E2, E3 & E4.
2	Spain E2, E3 and E4; Portugal (RTP-1) E3; Italy (RAIUNO) A; Italy (TVA) A; Sweden (SVT-1) E3.
3	Slovenia (SLO-1) E3; Corsica (Canal Plus) L2; Italy (TVA) A; Belarus (BT-1) R1; Russia (ORT) R1; Lithuania (LRT) R2; Germany (ARD-1) E2; Hungary (RTL KLUB) R2; Slovakia (STV-1) R2; Czech Republic (NOVA) R2; Italy (RAIUNO) A; Spain E2 and E3; Portugal E3; Switzerland (DRS SF-1).
4	Italy (TVA) A; Italy (RAIUNO) A and B; Corsica (Canal Plus) L2 and L4; France (Canal Plus) L3; Ukraine (YT-1) R2; Ukraine (YT-2) R2; Hungary (MTV-1) R1; Spain E2, E3 and E4; Czech Republic (NOVA) R1; Croatia (HRT) E4; Rumania (TVR-1) R2; Portugal E3; France (Canal Plus) L3; Hungary (RTL KLUB).
5	Germany E2 and E4; Italy (RAIUNO) A; Italy (TVA) A; Croatia (HRT) E4; Hungary (RTL KLUB) R2; Austria (ORF-1) E2a; Czech Republic (NOVA) R1 and R2; Hungary (MTV-1) R1; Jordan (JTV) E3 at 1117; Slovakia (STV-1) R2; Estonia (ETV) R2; Slovenia E3; Serbia (RTS) E3; Corsica (Canal Plus) L2 and L4; France (Canal Plus) L3; Switzerland E2; Portugal E2 and E3; Spain E2, E3 and E4; Belarus (BT-1) R2; Rumania (TVR-1) R2; France (Canal Plus) L5; Belgium E8 (RTBF) and E10 (VRT TV1). Numerous f.m. stations as high as 107MHz.
6	Spain E2 and E3; Portugal E2 and E3; Italy (RAIUNO) A and B; Italy (TVA) A; Czech Republic (NOVA) R1; Moldova (TVM) R1 and R2; Rumania (TVR-1) R2 and R3; Ukraine (YT-1) R2 and R3; Ukraine (YT-2) R2; Lithuania (LRT) R2; Russia (ORT) R3; Unidentified R5 vision carrier at 1700; Norway (NRK-1) E2, E3 and E4; Sweden E2 and E4.
7	Russia (ORT) R1; Ukraine (YT-1) R2; Estonia R2; Norway E2; Sweden (SVT-1) E2 and E3; Spain E2, E3 and E4; France L3; Portugal E3; Italy (RAIUNO) A and B; Croatia E4; Switzerland (DRS SF1) E2; Slovenia E3; Hungary (RTL KLUB) R2; Lithuania (LRT) R2; Czech Republic (NOVA) R1.
8	Italy (RAIUNO) A; Italy (TVA) A; Ukraine (YT-1) R2.
9	Unidentified weak signals on R1 at 0916; Portugal E3; Italy (RAIUNO) A.
10	Netherlands (NED-1) E4 with text pages at 1311.
11	Netherlands E4; Belgium E8 (RTBF) and E10 (VRT TV1).
12	Sweden E4; Spain E2, E3 and E4; Portugal E2 and E3; Italy (RAIUNO) A; Slovenia E3; Croatia E4; Hungary (RTL KLUB) R2.
13	Italy (TVA) A; Spain E2, E3 and E4; Corsica L4.
14	Unidentified colour bars on R2 from 0800 until 0808; Portugal E3; Hungary (RTL KLUB) R2; Italy (RAIUNO) A and B; Italy (TVA) A; Spain E3.
15	Italy (RAIUNO) A and B; Italy (TVA) A; Spain E2, E3 and E4.
16	Norway E4; Netherlands E4 at 1325 (Tropo-scatter).
17	Portugal E2 and E3; Spain E3; Italy (RAIUNO) A; Italy (TVA) A; Sweden E3; Norway E3.
18	Italy (TVA) A; Serbia (RTS-1) E3; Italy (RAIUNO) A; Slovenia E3; Ukraine (YT-1) R2.
19	Netherlands E4 at 1320 (Tropo-scatter).
20	Italy (TVA) A; Germany E2; Slovenia E3; Hungary (MTV-1) R1; Jordan (JTV) at 0942 and 1729; Italy (RAIUNO) A and B; Corsica (Canal Plus) L2; Ukraine (YT-2) R2; Hungary (RTL KLUB) R2; Croatia E4; Serbia (RTS-1) E3; Moldova (TVM) R2; Belarus (BT-1) R1 and R2; Unidentified E2 signal from the south-east at 1756; Estonia (ETV) R2; Lithuania R2; Spain E2, E3 and E4; Portugal E2 and E3; Croatia E4; Czech Republic (NOVA) R1 and R2; Russia (ORT) R1 and R3; Sweden E2 and E4.
21	Spain E2; Italy (RAIUNO) A; Italy (TVA) A.
22	Netherlands E4 at 1007 (Tropo-scatter).
23	Italy (RAIUNO) B; Portugal E3. France (Canal Plus) L5; Belgium E8 (RTBF) and E10 (VRT TV1).
24	Netherlands E4 and u.h.f. (enhanced tropospherics).
25	Spain E3; Portugal E2 and E3. Tropospheric DX: Belgium E3 and E8 (RTBF) and E10 (VRT TV1); France (Canal Plus) L5; Luxembourg (RTL PLUS) E7; Netherlands E4; Germany (ARD) E7.
26	Hungary (RTL KLUB) R2; Hungary (MTV-1) R1; Serbia E3; Slovenia E3; Croatia E4; Spain E2; Ukraine (YT-2) R1 and R2; Czech Republic (NOVA) R1; Germany E2.
30	Spain E3.

# DXTV

Continued from page 65

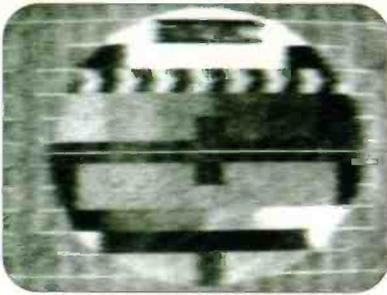


Fig. 3: Stephen Michie's photograph showing the modified PM5544 with ETV TALLINN at the top and an extended lower identification panel.

station operating on E2 has been received in South Africa during an F2 opening. Closer to home, the Italian private station VIDEO seems to have changed its name to TELE-3 or TELE-B since mid-July. Peter Barber has measured TVA's video frequency as 54.245MHz, which is some 500kHz higher than the nominal Channel A frequency of 53.75MHz.

## UK Relays

Stephen Michie informs us that the local Warmley Hill relay mast may be re-sited. A pulse-and-bar test pattern was radiated on Channel 57 on the 22nd, while a BBC survey vehicle carried out tests. A 1W vertical relay at Portbury, south-west of Bristol, is now on-air using Channels 21, 24, 27 and 31. The Middleton relay north of Manchester has

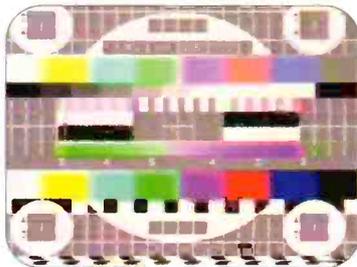


Fig. 4: The G-204 test card used throughout Russia and CIS countries. There are subtle variations radiated by certain transmitters.

recently undergone a channel change with BBC-1 moving from Channel 67 to 57.

## FM Reports

Whilst on holiday near Bantry on the south-west coast of Eire, **Adrian O'Leary** (Cork) identified high-strength signals from several Spanish stations during a Sporadic-E opening on the 4th at around 1250UTC. Stations identified using RDS include Canal Sur (104.9 MHz), Formula 1 (89.1MHz), Radio España (89.0MHz) and LP Radio/92 f.m.

Earlier in the day, Barry Bowman (Manchester) encountered Spanish and East European stations between 87.55 and 87.80MHz. High m.u.f.s were also present on the 6th at 1800 when Stephen Michie heard stations in the Ukraine and Czech Republic. During the same opening, Simon Hockenull discovered Russian stations up to 93MHz.

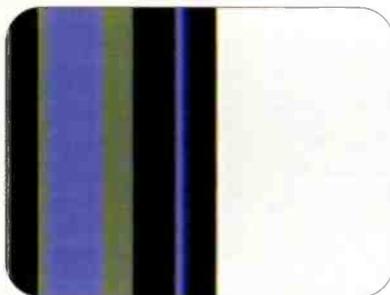


Fig. 5: A typical 'Pulse & Bar' pattern. This particular example, radiated for many years by BBC-1 and BBC-2, was recorded in December 1991.



Fig. 6: In this month's 'Down Memory Lane' spot we feature the very first identification logo to be used by Southern Television in the mid-Fifties.

On the 29th, while mobile DXing atop Great Orme near Llandudno, Vincent Richardson (Dolgarrog) noted a silent carrier from RNA Life FM, a Dublin station, operating on 106.4MHz.

Tropospheric reception on the 25th produced Manx Radio on 103.7MHz for **George Garden** (Edinburgh). Later in the day, France Inter from Lille on the same frequency was identified, along with France Info on 105.2MHz. George advises that Caste FM, a new independent station has started up in Edinburgh on 106.9MHz.

## 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 disks and good-quality video recordings.

# Airband

Continued from page 64



Zodiac HD-601.  
Christine Mlynek.

show them and the control frequencies are usually on the backs of the current issues of these charts. For sources, see my *Airband Factsheet* which I tell you how to get, below.

Let's answer the two readers. **Roy Taylor** has a host of airways overhead in Lancashire and any number of them could carry overflights routing from the Continent to the North Atlantic Organised Track System entry points. Depending on high-altitude winds, flights might first go north over Scotland, or more westerly to join at the southerly entry points. Roy lives immediately south of the London Upper Sector which is an airspace division for control purposes.

Oceanic clearances are available from Shanwick on 123.95, 127.65 and 135.525MHz. A complex range of control frequencies is listed in the *AIP* but I suggest that 120.025, 127.425, 129.425, 132.45, 134.45, 134.9, 135.05, 135.325 and 135.425MHz are likely to cover much of the immediate area.

County Fermanagh only offers a few airways to **Tom Smyth** and all are controlled by Scottish on 125.675 or 129.225MHz. Running NW/SE is UN560 and UN550 is south of that. To Tom's north is UN537 and to his east is UN517 as shown on Aerad chart UK(H)6. A lower airspace direct track between Donegal and Dublin is uncontrolled but Flight Information Service is available on 119.875MHz.

## Information Sources

This month column I mentioned reporting points and procedures such as SIDs. For UK aerodromes, these are detailed in the *AIP* which, if you have access to a computer, is cheapest on CD-ROM (which also holds current *AICs*). Single example copies are available for a modest price. The list of UK ICAO designators is also included, but a worldwide list appears in the *Racal/Aerad Flight Information Supplement*.

How do you buy these? Both are sold by mail order to the public and I list suppliers on *Airband Factsheet* of which **Issue 12** is now current. But please **don't** write to me as I haven't a photocopier! Free copies are available from the Broadstone Editorial Offices on receipt of a self-addressed pre-paid envelope to hold two A4 sheets.

If you can access the Internet then **Roy Smart** (Dalkeith) can tell you how to monitor air traffic controllers at Dallas (Fort Worth). They can be heard on [www.webevents.broadcast.com/simulflite/index.html](http://www.webevents.broadcast.com/simulflite/index.html) so presumably you need a sound-card and appropriate software for audible rendition. Simultaneous comparison with the flight arrivals board on [www.webfids.dfwairport.com/](http://www.webfids.dfwairport.com/) enables you to match up what you hear with the movements list.

I'm not told by Roy if there's a choice when listening to the controller. This airport has Clearance Delivery, Ground, Tower, Departure and Approach services. The radar services (Departure and Approach) are in turn split across different frequencies serving various geographical sectors.

All letters received up to September 13 have been answered. The next deadline (for topical information) is November 6. Replies always appear in this column and it is regretted that **no** direct correspondence is possible.

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# Propagation Forecasts

## 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.

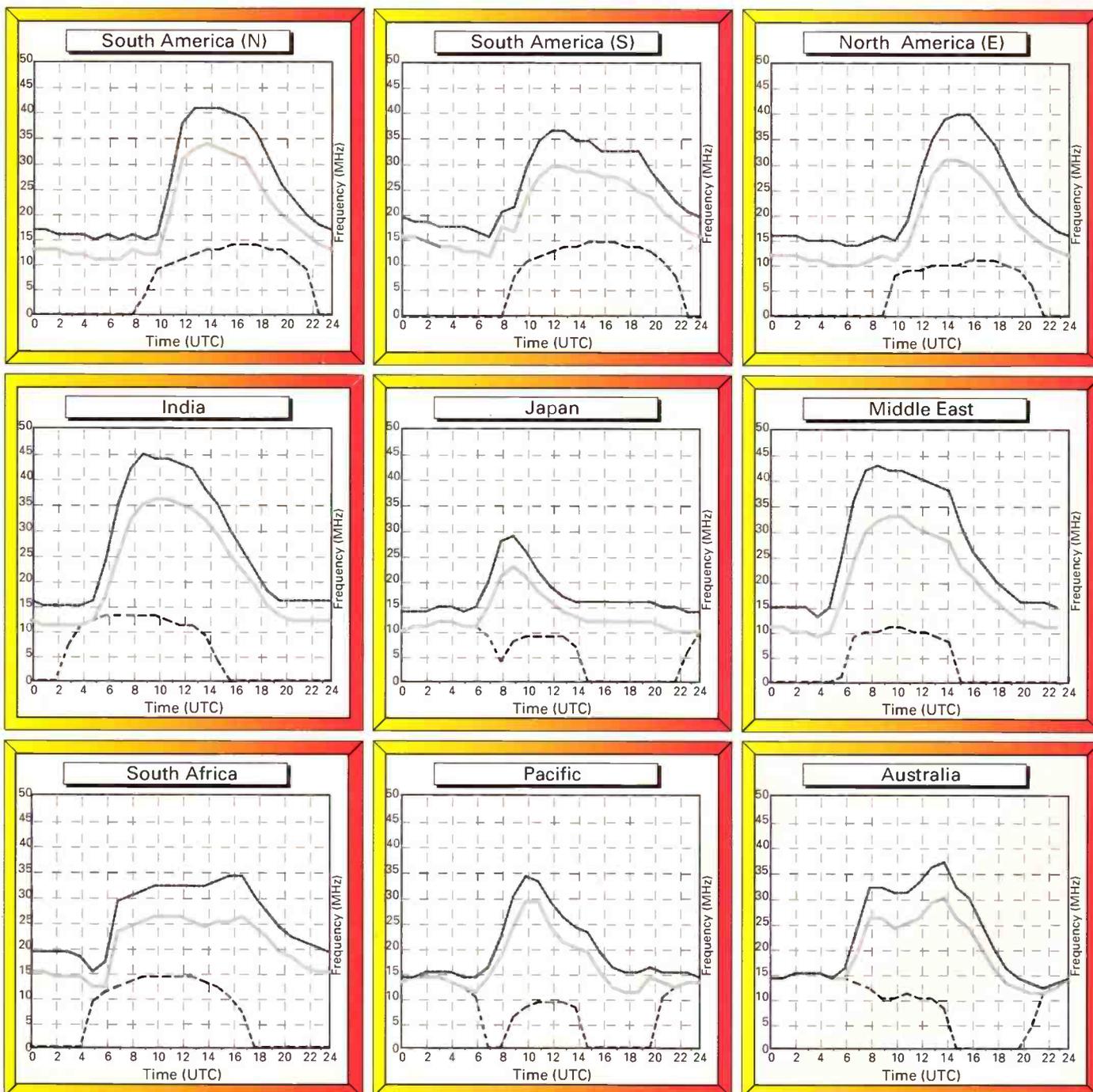
Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50%

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 the frequency.

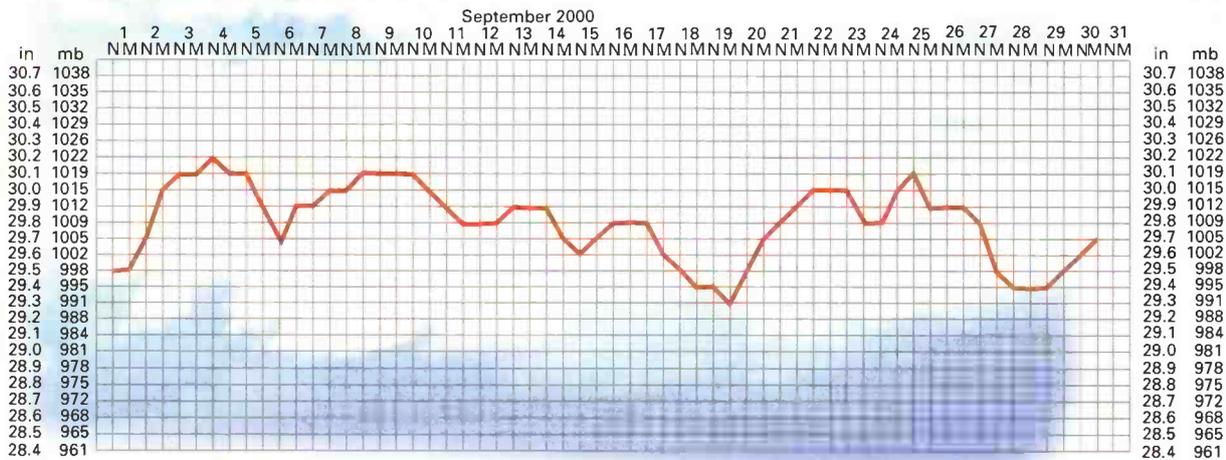
Good luck and happy listening.

November 2000  
Circuits to London



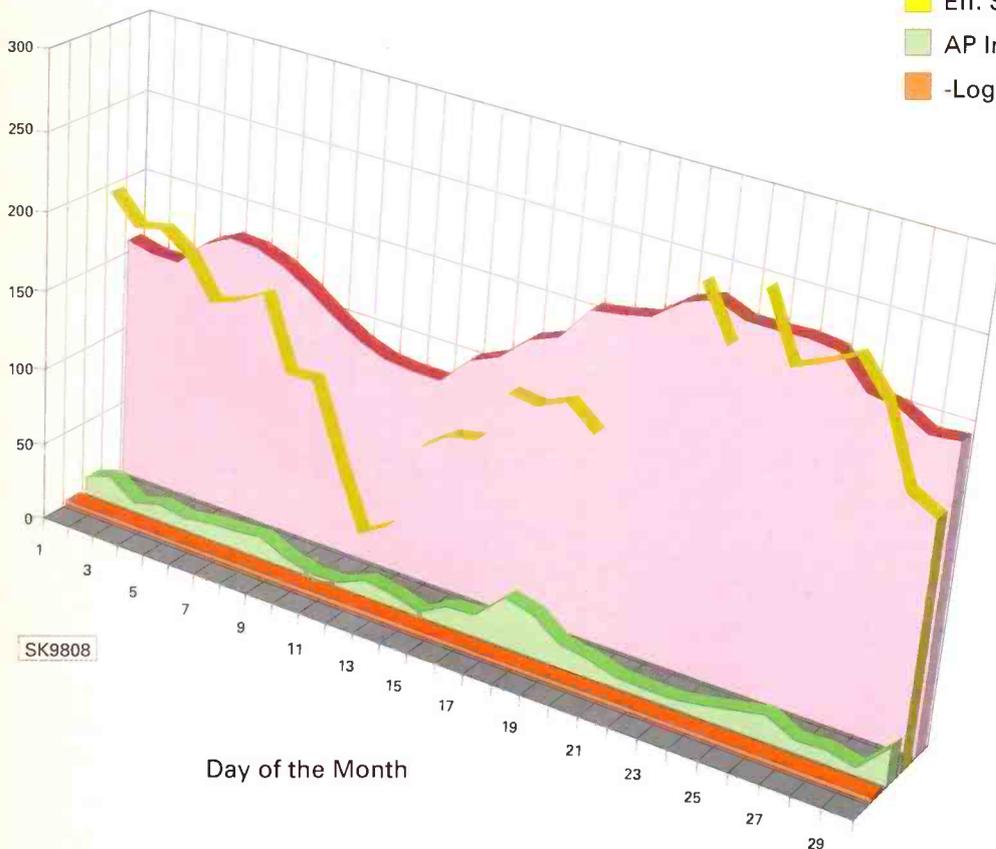
# Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, September 2000.



## September Data

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



## guide to the chart

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

The K and AP indices are measures of geomagnetic activity.

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

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

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

■ DAVE ROBERTS c/o SWM EDITORIAL OFFICES, BROADSTONE

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# Scanning

I know that I should get out more. The problem is that there is always something that I should be doing (like writing this!). If you happen to have radios on search or scan while you are working would you necessarily know to what you are listening? Clearly identifying the frequency is a big help in identifying the user or agency, but some obscure frequencies do crop up in the clear from time to time. As we know, the authorities are increasingly using digital modes and encryption, but on occasions you may still hear traffic that will intrigue you.

Increasingly more and more organisations are training their staff in surveillance techniques and they all use radio. The police and other authorities are particularly fond of Racal Cougar sets for surveillance and the radios used on actual jobs should always be used in training if at all possible, but from time to time you are likely to hear such training 'in the clear' when the correct radio equipment is not available.

Remember that agencies sending staff on proper surveillance courses include Customs & Excise, the military, police, government agencies and even British Telecom! The DSS and other agencies also watch folk, but they tend not to have the manpower or infrastructure to carry out full surveillance. Even shopping centre security staff will sometimes be running people in plain clothes to watch for shoplifters, especially approaching Christmas. So there is still plenty to be heard.

The old crime squad frequencies at 155MHz have been used for training for many years, but also any police simplex frequencies may be used and may occasionally be utilised for the real thing if a surveillance operation has to be 'jacked up' at short notice. The police think that they are the only users of these frequencies at 155MHz, but this is not the case. I have even heard the manufacturers of these radios demonstrating them to a potential customer from Africa.

Should you happen across a surveillance by any competent operators, whether official or commercial, it may help to understand some of the terms and practices used as far as they are relevant to the hobby listener. This is by no means a complete list. It's certainly pointless listing terms that are almost self explanatory. **See the table, bottom right.**

The surveillance operator will not use terms like left, right or stop, etc., unless the target is turning left, right or is stopping. Imagine someone saying 'I'm RIGHT up behind him at the bus STOP'. The convoy would be all over the place in no time at all. So the terms 'nearside', 'offside' and 'bus request' or 'bus pick-up point' or similar have to be used.

If you happen to hear any of this kind of traffic you will soon get the hang of it anyhow. Static observation points quite often use the callsigns 'O P 1', 'O P 2' etc. So you may have a bit more of a chance of realising just what is going on should you hear any of this stuff on air.

That's why I find simplex monitoring more fun. Clearly with most surveillance, using some sort of scrambling or encryption, the opportunities for eavesdropping are limited, but not all scrambling is immune. I read a message on the Internet recently from **Paul** who was able to decode the communications of the heavies employed by a well known London shop owner. He used an Alinco DJ-2 and just by upping the level of the audio inversion decode used by

these types was able to hear what they were saying loud and clear. They were on 169.3625 f.m. and Paul thinks that they are using 127.300 a.m. from their Range Rover to talk to the boss's helicopter.

## Tracking Device

Also some simple data transmissions can be understood. A wide-band moaning and rumbling sound in low band f.m. may well be a tracking device hidden underneath a vehicle by a surveillance agency. These units are not in such widespread use as they once were, but can still be heard. The sound that the unit makes indicates to the surveillance team whether the vehicle is stationary or moving and some other information can also be gleaned.

These units are tracked by a direction finding set fitted in another vehicle which has disguise antennas fitted. The direction of the target vehicle can then be obtained and the technical car can tell other units whether the target is moving or not. The latest tracking gear is not going to be found by the hobby scannist I'm afraid. This leads back on to the subject of d.f. units that I mentioned in September's SWM.

I received a most interesting communication from **Neil Robertson** who has an interest in this subject. Neil currently uses a d.f. circuit that switches between two identical antennas and produces a tone on top of the received signal if there is a phase shift (i.e. a path length difference) in the signals picked up between the two antennas. The antennas should be a quarter to half wavelength apart. Their length is not critical just as long as they are identical and have the same feeder length.

Neil uses two rubber duck whips which are resonant on 145MHz connected to two BNC panel mount sockets on a metal bar about two feet apart with the switching circuitry mounted in the centre, with a lead connected to the receiver. He has found that the tone null is very sharp indeed with accuracy of  $\pm 5^\circ$ . It has worked well from 2m down to the civil air band.

As Neil says, the disadvantage is that this set-up only gives you a line on which the transmitter lies, it could be in front or behind you, but as a plotting tool he has found in valuable. The circuit for Neil's system is available on the Internet and a search under 'Doppler DF' will find a number of designs. Thanks again, Neil, for the very interesting mail.



## E-Group

SWM has many readers in the Irish Republic and for those of you that are within range of Eire, **Frank Flanagan** has set up an e-group called 'scaneire' primarily for scanning enthusiasts in the Republic. Frank is keen to get subscribers, so to join, send an E-mail post to [scaneire-subscribe@egroups.co.uk](mailto:scaneire-subscribe@egroups.co.uk) and if you wish to send a posting to the list then [scaneire@egroups.co.uk](mailto:scaneire@egroups.co.uk) will do the trick.

## CB Frequencies

With a large scale protest against extortionate fuel tax ongoing as I write this, it may well be useful for monitors to listen to CB frequencies as citizen band is being utilised to co-ordinate the protest. It also seems that mould frequencies are busy at the moment with testing in progress so maybe there is a response being planned. It is possible of course that it will all be over by SWM publication date.

## Scruffy & Grubby

And finally, I read a letter in an amateur radio magazine from a nice lady who had been to a radio rally with her husband. She found many of the people attending to be rather scruffy not to say grubby. Well madam, by the time you may read this I shall have had two days at the Donnington Show and in case you wondered, I was the one with the brown leather jacket that stank like a polecat's dinnerbag...

Term	Meaning
TARGET	Person, subject of surveillance
CONVOY	All vehicles comprising the surveillance unit
EYEBALL	Vehicle or person having primary visual contact on the target and who directs the operation for that time
BACKUP	Second convoy vehicle
TAIL END CHARLIE	Rearmost vehicle in the convoy
CONVOY CHECK	Request from the eyeball to check position of convoy vehicles and to make sure no one is lost
STAND BY STAND BY	Eyeball telling the convoy that the target may be about to move
MANOEUVRING	Eyeball telling everyone that the target vehicle is moving in a car park, garage forecourt, etc. but not on a road
OFF OFF OFF	Target is now on the move
HANG BACK	Eyeball telling the convoy...oh you get it!
COME THROUGH	As above
NO DEVIATION	Eyeball is now telling the convoy that the target vehicle is going straight ahead (e.g. at a crossroads - not used on a motorway)
COMMITTED	Means target is now committed to travel on a road
ORIGINAL	The target has now resumed travelling in his same direction after a stop
RECIPROCAL	He's done a U turn and is returning along the same route
NOT ONE, NOT TWO, etc	On the roundabout he's not taken the first exit, or the second, etc
TARGET HELD	At traffic lights or a pedestrian crossing perhaps
TEMPORARY LOSS	Due to terrain, traffic etc.
TOTAL LOSS	That will make the boss cross
EYEBALL REGAINED	Phew!
CONTACT CONTACT	Indicates eyeball regained after a search, N.B. This means something entirely different on military jobs.
STRIKE STRIKE STRIKE	Go and grab 'em
SHADOW CAR(S)	Vehicle used to support footman
MAKE GROUND	Eyeball's instruction to back up vehicle to get in a position to take over the eyeball
WAIT	Don't transmit for the time being

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# Decode

In this month's 'Decode' I'm going to concentrate on one new program that uses the latest technology to decode and display good old-fashioned RTTY. The program uses your ordinary PC soundcard to handle the link between your radio and the PC. This means that, in most cases, you just need to get your hands on the software and you're in business!

## RTTY With Flare!

RTTY only systems are few and far between in these days of sophisticated multi-mode decoders, but there's a lot to be said for doing something simple well. That is exactly the approach that **Mako Mori JE3HHT** has taken in putting together his excellent *MMTTY* RTTY program that has just been released at version 1.58.

This program has clearly been designed with the keen amateur radio contest operator in mind, as it supports transmit and receive. It also has a host of automated facilities that will be of great benefit to the contest operator. However, there are also lots of features that will appeal to utility enthusiasts, including top quality filtering so that you can really dig stations out of the noise.

The first task is to check out the system requirements to make sure you can run it on your PC. Fortunately, the demands are reasonably modest and you should be able to run it on just about any PC that will run *Windows 95* successfully. *MMTTY* will work successfully with *Windows 95, 98* or *NT* and only requires a minimum display resolution of 640 x 480 pixels.

The soundcard needs to be a 16-bit SoundBlaster or compatible able to handle 16-bit sampling at 11025Hz - most will. If do have any problems in this area, *MMTTY* comes with an excellent Tune-up section to help you get things going. As to the processor speed you will really need a 100MHz Pentium or faster.

The best way to get a copy of *MMTTY* is via the Internet. The English language home site is: [www.geocities.com/mmtty\\_RTTY/](http://www.geocities.com/mmtty_RTTY/) I have also placed a link on my new-look Home page - [www.mikespage.btinternet.co.uk](http://www.mikespage.btinternet.co.uk) - so you can find it via that if you prefer. Once you've got the program, you just need to unzip it into a spare directory and run the Setup program to install it.

With everything loaded you just need a screened lead between your radio and the Line-in on your soundcard and you're in business. You should start seeing signs of life in the tuning indicators as you tune your receiver around. If all seems a bit dead, take a look at the program's help file - particularly the computer tune-up section that should put you on the right track.

One of the first things you'll notice when you run the program is the array of tuning screens in the top right hand corner. The three boxes provide a conventional spectrum display with vertical markers to show the tuning points, plus a tracking spectrogram and a wonderful X-Y scope display.

The spectrum display is pretty much self-explanatory as you just tune the signals so that the two peaks of the RTTY signal line-up with the markers. The spectrogram was an added bonus and gave a useful alternative.

The real masterpiece was the X-Y scope. This system was developed a very long time ago and was always a favourite with the 'expert' RTTY operators. There can be little doubt that this system provides by far

the most accurate tuning indication and is especially good when dealing with very noisy signals. I won't go into the technicalities of how it works here - all you need to know is how to use it.

## Modernised Version

Coming back to this modernised version has reminded just why it was always so popular. The best way to use it is to get the signal roughly tuned-in using the spectrum display and then fine tune it so that the scope shows as near to a plus sign or cross as you can. In many cases you will find that the best you can achieve is a vertical and horizontal ellipse - that's fine.

When you do this you will find that the tuning control you have is very fine indeed. You can also be certain that when you have the cross the tuning is absolutely spot-on and you will get the best decoded signal. I think it's this certainty and clarity that makes it so good. This is a prime example of combining established ideas with modern technology to provide an excellent result. You will also find that the display shows-up the poor quality of some of the RTTY signals.

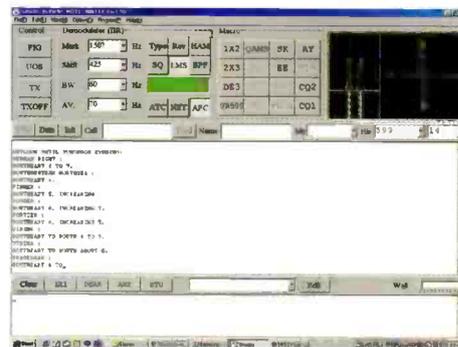
Before you get to use the program to look at some utilities you need to make a few adjustments to the set-up. This is necessary because the program has been designed primarily for radio amateurs and they almost universally use 45.45 baud with a shift of 170Hz. However, most of the commercial stations use 50, 75 or 100baud with shifts of 400, 425 or 850Hz.

Changing this is really easy. Just go to the Options menu and choose Set-up *MMTTY* - the really quick way to do this is to press and hold the Alt key and press the letter O twice. Click the Demodulator tab and adjust the shift to 425Hz. Now select the Decode tab and change the baud rate to 50 - hit OK and you're done.

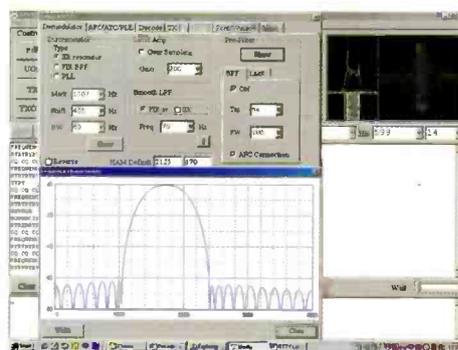
Now for your first RTTY weather station try-out Hamburg Meteo (DDK2) on 4.583MHz. This station is usually running 24 hours-a-day and puts a pretty reliable signal into the UK. When there are no weather reports to send, it usually transmits strings of RY's followed by the stations operating frequencies and callsigns. If you've managed to capture this then you have your basic set-up right and can now start playing with some of the more advanced features. You will also have seen for yourself just how good that tuning display is!

The next step is to make use of the *MMTTY*'s automated signal tracking to take the pain out of tuning. The great thing about this option is that you don't have to bother about changing the shift for different stations - the program does it for you!

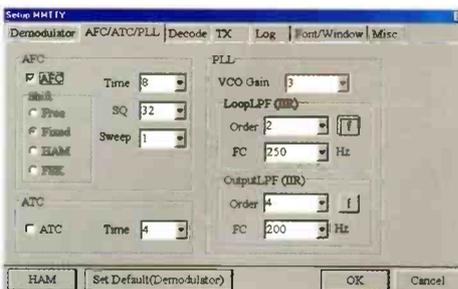
To turn this on press Alt OO to get the set-up menu then choose the AFC/ATC/PLL tab and set the Shift to Free. If you now go back to your main screen, press the AFC



MMTTY main screen receiving Hamburg Met.



Setting-up the MMTTY Bandpass Filter.



Configuring MMTTY Automatic Frequency Control.

Frequency (MHz)	Station
0.1473	DDH47: Hamburg Meteo Finneberg GER 1646 RTTY/50/83
0.2950	FUE: FN BREST 0441 RTTY 75/N/850
2.2031	MGJ: RN Base Clyde SCO 1958 RTTY/75/340
2.7890	FUE: Marine Brest F 2010 RTTY/75/850
3.3900	MGJ: RN Base Clyde SCO 2016 RTTY/75/850
3.7820	CTP: PN Lisbon POR 2011 RTTY/75/850
4.2800	PBC: RNLN Goeree Is NLD 2033 RTTY/75/850
4.5700	HZN46: Jeddah Meteo SDA 2043 RTTY/100/400
4.5830	DDK2: Hamburg Meteo 0123 RTTY 50/550
4.7680	CCS: CN Santiago 0550 RTTY 100/800
4.8182	CCM: CN Magellanes 0435 RTTY 100/825
5.0775	FDG: Air Bordeaux F 2051 RTTY/50/400
5.0970	CFH: CF Halifax 0440 RTTY 75/850
5.1635	FDG: Air Bordeaux F 2058 RTTY/50/???
6.4830	PBB: Dutch Navy Den Helder 0105 RTTY 75/820
7.4600	FDG: FAF BORDEAUX 1748 RTTY 50/R/400
7.5055	FDY: FAF ORLEANS 1843 RTTY 50/N/400
7.5080	ZSJ: SAN Silvermine 0948 RTTY 75/170
7.6250	HZN47: JEDDAH MET 7625 RTTY 100/R/800
7.6460	DDH7: HAMBURG MET 1258 RTTY 50/N/440
7.7840	NAR: USN Key West 0643 RTTY 75/850
8.3030	LOR: AN Puerto Belgrano 0630 RTTY 75/170
8.4545	RFFME: Marine Paris F 1446 RTTY/75/150
8.4760	FUX: FN Le Port 1528 RTTY 75/850
9.3875	FDY: FAF ORLEANS 1920 RTTY 50/N/400
9.9650	FDY: Air Orlans F 2133 RTTY/50/400
10.1008	DDK2/DDH7/DDK9: Hamburg Meteo 1605 RTTY 50/480
10.2150	HZN48: Jeddah Meteo SDA 2128 RTTY/100/870
10.3747	RPTMB: PP Navrad Porto Santo 1715 RTTY 75/850
10.9450	CFH: CanForce Halifax NS CAN 2211 RTTY/75/850
11.0800	YKP28: SANA DAMASCUS 1354 RTTY 50/R/400
11.4530	IMB33: Rome Meteo 0123 RTTY 50/788
11.6025	6MK64: YONHAP Seoul 0810 RTTY 50/400
12.5660	UIXJ: RTM Grafit 1010 RTTY 50/170
12.5675	UEXP: TSM Ostankino 0900 RTTY 50/170
12.5690	UBWU: TH Lesozadodsk 1140 RTTY 50/170
12.5690	UGIO: PB Rzhikoe Vzmore 1115 RTTY 50/170
12.5720	UBJO: BMTR Dimitry Pashchenko 1135 RTTY 50/170
12.5740	UAZB: Russian Ship Boronin 1344 RTTY/50/170
12.6665	RFFME: Marine Paris F 1337 RTTY/150/850
12.7320	USU: MARIUPOL RADIO 1723 RTTY 50/R/170
12.8235	CTP: PN Lisbon POR RTTY/75/850
12.8775	UIW: KaliningradRadio RUS 1628 RTTY/50/170
13.5100	CFH: CanForce Halifax NS CAN 1129 RTTY/75/450
13.5300	NAR: USN Saddlebunch Key 1246 RTTY 75/850
13.6650	6VU23/73: Dakar Meteo 1720 RTTY 50/728
13.8570	: FAPSI Link 00063 1648 RTTY/75/500
13.9723	WA9XHN: 0120z RTTY 45/170R
14.5350	Unid: FAPSI 1641 RTTY 75/500
14.8220	: FAPSI Link 60069 1625 RTTY/75/500
15.9200	CFH: CanForce Halifax NS CAN 1611 RTTY/75/850
16.7860	UCUC: RTMKS Leonid Gal'chenko 0650 RTTY 50/170
16.7860	UDYO: TH Petr Zhitnikov 0840 RTTY 50/170
16.7975	UDAB: TSM Okhotino 0840 RTTY 50/170
16.7980	SHIP MARCAL SADEC 1618 RTTY 50/R/170
16.8010	UGVX: PB Marshal Sokolovsku 0800 RTTY 50/170
16.8010	UITZ: TH-RV Baltijsku 0815 RTTY 50/170
16.8015	UALU: NIS Atlantida 0820 RTTY 50/170
16.8020	UAYC: BMRT Lovozero 0820 RTTY 50/170
16.8025	3FT06: TR Malabo 0735 RTTY 50/170
16.8035	Unid: Sovship Zvesda 1755 RTTY 50/170
16.8040	Unid: Sovship RTM Leningorsk 1705 RTTY 50/170
16.9150	FUX: FN Le Port 1300 RTTY 75/850 RY/ID/SG
16.9222	VTH: IN Mumbai IND RTTY/50/850
16.9515	RFTJE: FN Dakar 1551 RTTY 75/850
16.9578	FUJ: FN Noumea NCL 1300 RTTY/75/850
16.9615	FUF: FN Fort de France MRT 1609 RTTY/75/850
16.9840	CTP: Portuguese navy Portugal 0856 21 Aug 00 RTTY 75
16.9860	CTP: NATO Lisbon 1650 RTTY 75/850
17.0200	UDK: MurmanskRadio RUS 1605 RTTY/50/170
17.0900	UAI3: Nakhodka rdo 0030 RTTY 50/170
17.5900	HZN49: Jeddah Meteo 1255 RTTY 100/850
18.2540	SUU: Cairo Meteo EGY 1331 RTTY/100/640
18.3045	: FAPSI Link 0937 RTTY/75/500
18.7250	Unid: FAPSI 0846 RTTY 75/500
18.8840	URIL: RTMKS Fedor Korobkov 0750 RTTY 50/170
19.4629	SUNA KHARTOUM 1011 RTTY 50/N/85
19.7230	RLK7: ArkhangelskRadio RUS 1220 RTTY/50/170
19.7245	UIW: KaliningradRadio RUS 1705 RTTY/50/170
22.3630	UCQS: RTMS Eisk 0620 RTTY 50/170
22.6035	UIW: Kaliningrad R. 1518 RTTY 50/170
22.6520	UHY: MURMANSK RADIO ? 1309 RTTY 50/R/170
23.3700	HZN50: Jeddah Meteo SDA 0955 RTTY/100/760

Table 1. Special frequency list of active RTTY stations.

button and return to your station, you will find that the markers in the spectrum display move around to line-up with the peaks in your signal. When doing this make sure you don't have the SQ, LMS and BPF pressed. The accuracy of the automatic tuning is really excellent and delivers a perfect cross in the X-Y scope. Once you're in tune, it's as well to turn-off the AFC or it will keep trying to retune when your signal fades.

Next area to experiment with is the type of decoding system. *MMTTY* comes with three separate software

decoders to give you the best possible change of decoding signal under a wide range of conditions. The three options are IIR, FIR and PLL with IIR being the default and the preferred choice of the author.

Switching between decoders is simply done by pressing the TYPE button on the control panel. This cycles through the available options. If you want to get really technical you can even go into the set-up and adjust the decoding parameters of each system.

Finally we need to quickly cover-off the excellent filtering system. There are two very powerful filters included with *MMTTY*, an adaptive LMS filter and a d.s.p. Bandpass Filter. Both are selectable using the LMS and BPF buttons on the main control panel. Let's just quickly explain what they do.

The LMS is a very special type of filter that can only really be created using modern d.s.p. techniques. The reason it's so special is that way it automatically adapts itself to the signal - I won't tie you up with the details of how it does it but the net result is a huge reduction in the noise level.

To see the effect, tune into a signal with all filters of a take a close look at the spectrum display. You will probably find quite a lot of noise around the two peaks of the signal. Now press the LMS button and see how clean the signal becomes - impressive isn't it!

If you want to see it working press Alt OO for the set-up menu, choose Demodulator and select the small LMS tab on the lower right. You can now hit the 'SHOW' button and watch the software adapting to the signal.

Finally, let's take a look at the Bandpass Filter. In comparison with the LMS filter this is pretty conventional, but the d.s.p. implementation still delivers an impressive performance. One point to watch here is that the default settings are optimised for narrow-band amateur RTTY so it's worth softening the filter to avoid losing one of the tones when receiving one of the wider spaced signals.

Just in case you thought RTTY was dead, a special frequency list of active RTTY stations is shown in Table 1.

## Brand New Web Site

To help overcome the occasional typo with web addresses and to give everyone a chance to get the latest software I've just completely re-vamped my web site using *Front Page 2000*. The site is bang up-to-date and using *Front Page* makes it really easy to keep that way. If you'd like to take a look, it can be found at: [www.mikespage.btinternet.co.uk](http://www.mikespage.btinternet.co.uk)

## Hot CW

Not enough space to do the program justice this month, but I've just received the latest update of the excellent *CWGET* Morse decoder which is now at version 1.10. This Windows based Morse program is just about the best around and well worth a look - more next time but here's the URL if you want to try it:

<http://www.dxsoft.com/micwget.htm>

Just one tip - make sure you keep the filter setting wide if you're listening to Morse at more than 15w.p.m. If you try to use one of the narrow settings you will introduce a lot of errors.



CWGet Web Page.

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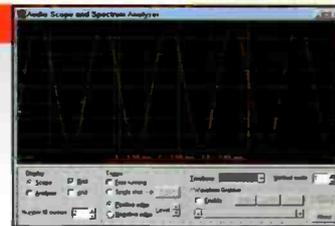
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Frequency range

Modes

Tuning resolution

IF bandwidths

Receiver type

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IF shift (passband tuning)

DSP in hardware

IRQ required

Spectrum Scope

Visitune

Published software API

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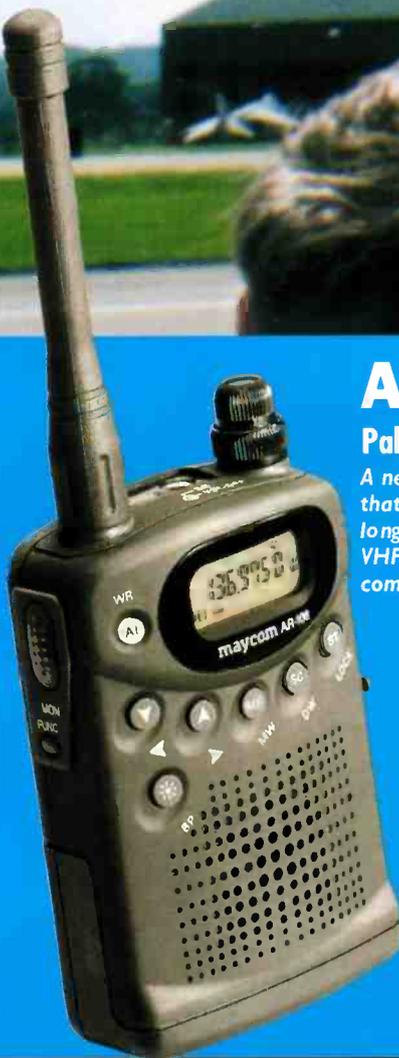
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