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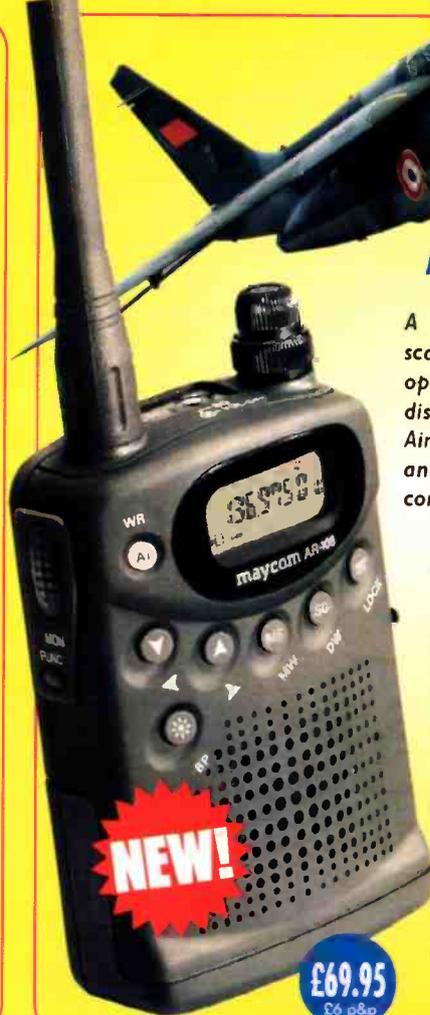


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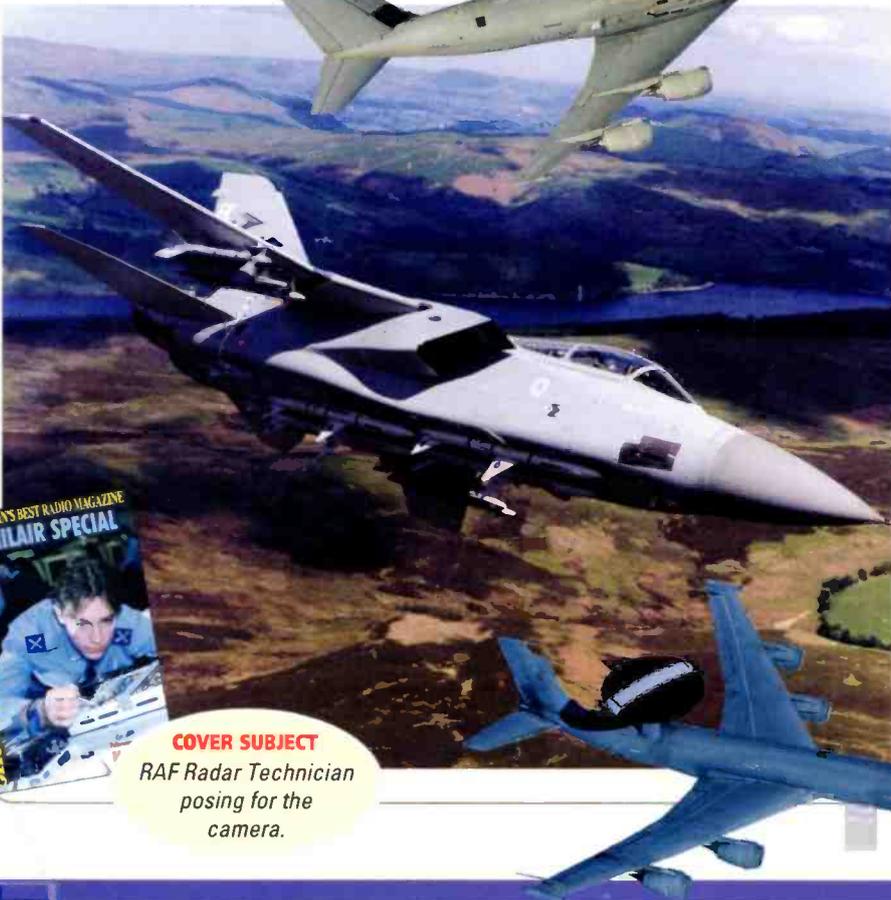
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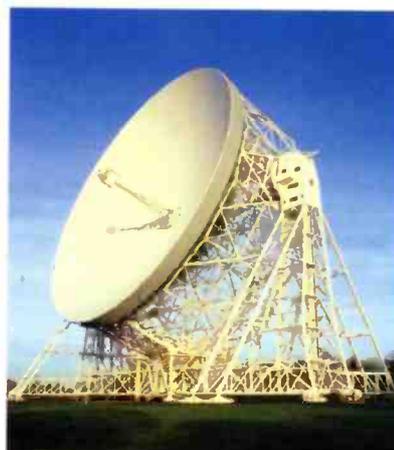
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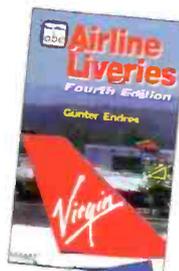
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Components For SWM Projects

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 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. A complete review listing for SWM/PW is also available from the Editorial Offices for £1 inc P&P.

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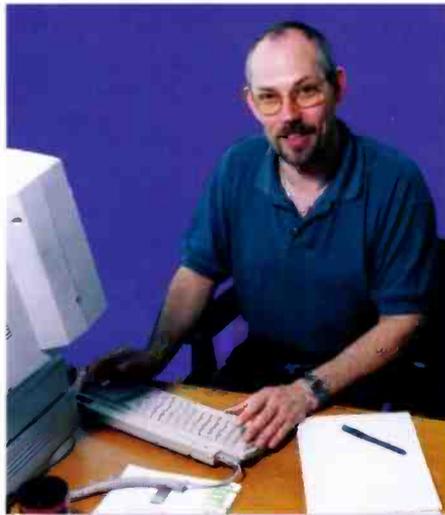
Technical Help

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

ed's comments

REA4 Again

I had a 'phone call recently from 'Bob', an ex professional monitor, who assures me that REA4 is indeed a Russian military WX station. 'Bob' used to work in and around the 'Gateway to The Cotswolds' and is therefore reasonably well equipped to make definitive statements on these matters. I had already concluded to myself that the station was definitely intended to appear to have this function, but this just 'puts the cap on it'. Mystery over?



ALE

No, not the glorious product of malted hops, which reminds me, I must renew my CAMRA membership, but the Automatic Link Establishment kind. There has been an explosion just recently of listeners able to monitor this modes activity. This is all due to the efforts and resulting ALE Terminal program written by Charles Brain G4GOU. This terrific piece of software actually allows use of a transceiver to establish best path links world-wide, using h.f. band communications, a system widely in use by military and government agencies around the planet. So, there is much to monitor!

By disabling the transmit capabilities, it is possible for the listener to utilise the program to watch traffic and ALE sounding activity. The topic is much too extensive to cover in the space available here, anyhow I'll leave it for Mike to cover in a subsequent 'Decode' column. For those who can't wait, you can download Charles' Terminal software from the 'net. The program comes as four zip files which total 4.5Mb. You'll need a sound card and a Pentium (100MHz min.) and at least Win95 to run it. Point your browser at: www.chbrain.dircon.co.uk and follow the link to ALE Controller.

For up to the minute loggings from the utility community, see the WUN list server postings. ALE reporting seems to be the order of the day, with a very high percentage of daily traffic on the list being

related. If you aren't familiar with the World Utility Network, then you've not been paying attention! Find out more at: www.wunclub.com

Inmarsat and...

I notice that there is an increasing amount of interest in monitoring traffic that used to be on h.f., but has now migrated to satellite. If you were to believe some people, there are no h.f. stations to listen to any more, how mistaken can you get?

I will be covering satellite monitoring within the next couple of months. I'll take a look at the equipment needed and the techniques involved, keep your eyes peeled.

US Amateurs

News just in, the ARRL have just announced that the US amateur radio licensing is about to be restructured. The new structure will be operational commencing April 15, 2000, with three license classes - Technician, General and Amateur Extra - there will also be a single Morse code requirement of 5w.p.m.

In the recent announcement the FCC stated that, "We believe that an individual's ability to demonstrate increased Morse code proficiency is not necessarily indicative of that individual's ability to contribute to the advancement of the radio art."

Interesting, and I for one totally agree with the Morse statement. I wonder how long before we follow



suit across the board for amateur licence requirements in the UK?

QRT

That's it, I'm done for this month, the magazine film work is shortly off to the printers and I have just had the latest Kenwood amateur radio mobile rig delivered for me to review. No peace for the wicked, eh? Now that's going to slow down my Land Rover rebuilding project!

vy 73

Kevin Nice

Dear Sir

I started my hobby of scanning and s.w. listening about a year ago and I am finding it very interesting.

I wrote to you in March regarding a problem I had with the airband frequencies and you answered my letter - thank you. And to my surprise, I won the top QSL in April's edition. I spent the voucher on guess what - *Airwaves 99* and *Callsign 99*.

I wonder if you can help me once more, as in my first letter to you back in March I said I own a Realistic PRO-26 (200 channels), which I still have. I keep dropping hints to my wife on what I would like on my Christmas wish list, that's an Icom IC-R8500, but funds as they are, she said no chance. It looks like I will have to stick with my PRO-26.

The problem is that I have found out that I do not have enough channels for what I want to use it for (airband listening). I have wrote away to two companies that advertise in your magazine regarding upgrading my PRO-26 from 200 channels to 1000 channels or even more, they both sent me replies saying they cannot help me with my problem.

Can you or your readers help me by putting me in touch with a company who can do this for me, I would be very grateful. Since I started my hobby a year ago, I buy *SWM* and *PW* every month and find them, especially *SWM*, very helpful. I have learnt a lot about my hobby just by reading these magazines.

Thank you and your staff for publishing a brilliant magazine. Best Wishes to you all.

A. Jennings
Yorkshire

I don't recall any memory expansion mods for the PRO-26. Most of the mods of this type double the capacity, so you'd still be 600 channels short! - Ed.

Dear Sir

Many thanks for your magazines over the years, although the price has increased with the passage of time, I can still afford it. *Practical Wireless* and *Short Wave Magazine* are my two luxuries in reading. I enjoy John Wilson's reviews on different receivers and also the colourful range of equipment which is displayed each month. I must compliment you too on the binding of the magazines, as I've done a lot of that myself years ago, I remember one magazine I went to (no names), on opening a copy, all the pages fell out.

I am 75 years young. I have, through your magazine, purchased a few pieces of equipment from Haydon Communications and was quite satisfied. I am at present considering buying a new receiver. I was impressed by the reader who bought an R75 and sings its praises. I am torn between one myself or the Fairhaven RD500VX. I only live a 20 minute bus ride from Spondon and it would be only £1.50 return and no carriage to pay for the receiver.

I discovered the joy of radio just after the war when a lot of ex-government equipment was around. My first set was an aircraft receiver. I lived in Sheffield then and went to Buxton to a huge warehouse. It cost £5. I struggled on the bus, much to the amusement of the conductor as it was quite heavy!

R. Hargate
Nottingham

Dear Sir

I was initially surprised and then rather shocked to see the article on the Voltage Probe Antenna, which appears in the January 2000 issue of *SWM*, as it duplicates one in the December 1999 issue of *PW*. I was particularly interested because I had constructed the antenna, tested

Dear Sir

I would be very grateful if you could answer the following question for me. I own a small boat, which is fitted with a marine v.h.f. radio (not a mobile). I recently purchased a scanner so that I could listen to the marine bands from my house, (I live near the sea).

I intend to fit an antenna outside on the roof to obtain better reception. My question is regarding the antenna. To obtain the best possible reception on the marine v.h.f. band, should I use a marine v.h.f. antenna as fitted to my boat, or would something like a 'Moonraker Super Scan Stick 2' give better reception? (both are about the same price).

As a complete beginner to scanning, I will take heed of any advice you can give regarding the best antenna to use. In the short time I have been using the scanner, it has proved very interesting. I think I may have caught the scanner/radio 'bug'. Thank you.

M. McMillan
Ayrshire

Easy question, potentially very difficult answer. My standard response to this kind of question is what frequencies do you wish to monitor? If the answer is a narrow band 1-2MHz say, then a dipole cut to the centre frequency mounted vertically. If the answer forthcoming is up to 1GHz and beyond, then you'll need a genuine wide band antenna. These come in two flavours, discone for omni-directional consistent gain or log periodic, which is a directional antenna and needs mounting in such a way as to allow its rotation. For general scanning, log periodic's needs to be mounted vertically polarised, i.e. elements running vertically. I would suggest you start with a discone and add an LPA later. There are examples for sale of both types of antenna within these very pages. - Ed.

it and had been particularly impressed by its performance on v.l.f., subsequently writing to the Editor of *PW* congratulating him and its author G1TEX on the design and publication.

As the photographs of the antenna are identical to those in *PW* and the article is modified but identical in content, can we assume that *SWM* is not guilty of plagiarism from its sister magazine, but that Peter Buchan is an alias for G1TEX, 'Tex' Swann. I must say that in the 50 or more years I have read *PW* and *SWM*, I have never seen this happen before, hopefully this is not to continue and support the rip-off syndrome now endemic in this country.

Thankfully, although I have had to wear bifocal glasses for around 55 years, I can still read the smaller print contained in your articles (Readers' Letters, January) and have no cause for complaint.

Wishing you and the staff of *SWM* best wishes for 2000.

Norman Smith
Staffs

*Norman, I am puzzled by your shock regarding this article. Also, your assumptions are erroneous. Let me explain. *SWM* and *PW* are both owned by the same publisher. Both magazines are radio oriented, I'm sure you will agree. There is much exchange between the Editorial team of both magazines, in fact, we share the same floor in our building. It is not uncommon for both magazines to publish similar information. Based on the same source information, just take a look at the news sections in both magazines. Regarding Peter's VPA article published in *SWM* January 2000, this is a full feature article dealing with the concept and construction of the antenna. Tex Swann's coverage of the antenna however, amounts to a*

*mention in his 'Antennas in Action' column. This piece was in no way a detailed coverage of the VPA, nor was it plagiarised. As a matter for the record, *SWM* had accepted Peter's article for publication well before *PW* featured the piece. What we have done is not 'rip off' the readers, but bring an interesting project to two sets of enthusiasts that overlap slightly. - Ed.*

TOP
QSL

Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

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

Dear Sir

As a fairly long term reader of *Short Wave Magazine*, I cannot help but notice the lack of articles dedicated to short wave portables. I myself use a Sangean ATS-818 and a Sony SW55 receiver, but apart from the LM&S column, no mention is made of receivers such as these. Instead the excellent magazine focuses most of its attention on 'top gun' radios from AOR, JRC and Icom, etc.

What I would really like to see in *SWM* from time to time are re-visits and roadtests on established radios, such as mine, complete with DX logs perhaps. Maybe you could set up a portable users' column? Don't get me wrong, there is no substitute for a quality communications receiver, but sometimes I feel like a Lada owner browsing in a Mercedes showroom.

Mark - via E-mail.

Thanks for your loyalty Mark. We have and will continue to feature articles and reviews of portable receivers. I also use a Sangean receiver an ATS-803, it is an excellent receiver and for the price, terrific value and performance. Since you feel so strongly about this issue, perhaps you'd like to contribute an article regarding your own experiences. Please feel free to contact me to discuss if you wish. - Ed.

World Wide Radio Guide

■ PAUL BEAM c/o SWM EDITORIAL OFFICES, BROADSTONE

■ E-MAIL: wwrq@pwpublishing.ltd.uk

Hello and welcome to the first of a new monthly column providing details of International Broadcasters with programmes transmitted in English. After a fairly long term exchange with the Editor I have stepped into the breach to bring this service to a significant proportion of readers who have been demanding such a reference.

In the ensuing month I will feature some more detailed information regarding stations and programme content. If any of you have any specific request or requirements please feel free to write to me, either by E-mail or by post via the Editorial Offices. Please note that as my work takes

me away from home on a very regular basis, E-mail is the preferred option as there is no significant delay with this method. Whereas conventional post will need relaying to my home address and will then need me to return before I can even collect it!

I hope that the format that I've elected to use suits those that have requested this column, if you have any comments regarding format then I'll listen to all suggestions. Enough of the introductions, here's what you were waiting for.



Enjoy and happy listening.

Important Note

Due to space limitations, we will bring you the whole day's station listings for medium wave broadcasts and the day up to 1800 for short wave frequencies. Next month I will feature the busy station schedules from 1800 until midnight.

SHORT WAVE

Time (UTC)	Station	Country	Day	Frequency (MHz)	Time (UTC)	Station	Country	Day	Frequency (MHz)
0000-0100	R.Japan	Japan	-	6.050	0400-0500	BBC World Service	UK	-	3.955
0000-0100	R.Japan	Japan	-	6.155	0400-0500	BBC World Service	UK	-	6.195
0000-0100	R.Pyongyang	Korea (DP.Rep.)	-	3.560	0400-0500	BBC World Service	UK	-	9.410
0000-0100	R.Pyongyang	Korea (DP.Rep.)	-	11.735	0400-0500	R.Ukraine Int.	Ukraine	-	6.020
0000-0100	R.Pyongyang	Korea (DP.Rep.)	-	15.230	0400-0500	R.Ukraine Int.	Ukraine	-	9.600
0000-0100	R.Pyongyang	Korea (DP.Rep.)	-	17.735	0400-0500	R.Ukraine Int.	Ukraine	-	9.810
0000-0200	Merlin Network 1	UK	Fri-Sat	3.985	0400-0500	Voice of America	USA	-	7.170
0000-0200	Merlin Network 1	UK	Fri-Sat	6.180	0400-0500	V.of Turkey	Turkey	-	6.010
0000-0200	Merlin Network 1	UK	Fri-Sat	7.165	0400-0500	WYFR Family R.	USA	-	9.985
0000-0200	WEWN	USA	-	9.355	0400-0900	WMLK	USA	Sun-Fri	9.465
0000-0300	RFPI	Costa Rica	-	6.975	0400-1200	WWCR-4	USA	-	2.390
0000-0300	RFPI	Costa Rica	-	15.050	0415-0440	RAI - Int.	Italy	-	5.975
0000-0300	RFPI	Costa Rica	-	21.460	0415-0440	RAI - Int.	Italy	-	7.150
0000-0700	HCJB	Ecuador	-	21.455	0500-0515	Israel Radio Int.	Israel	-	9.435
0000-1400	WWCR-2	USA	-	5.935	0500-0515	Israel Radio Int.	Israel	-	11.605
0000-1600	KTBN	USA	-	7.510	0500-0515	Voice of America	USA	-	7.170
0000-2400	WJCR	USA	-	7.490	0500-0515	Voice of America	USA	-	9.700
0000-2400	WJCR	USA	-	13.595	0500-0515	Voice of America	USA	-	11.825
0100-0130	R.Yugoslavia	Yugoslavia	Mon-Sat	7.115	0500-0515	Voice of America	USA	-	15.205
0100-0200	IBC-Tamil	UK	-	9.355	0500-0530	Swiss Radio Int.	Switzerland	-	9.655
0100-0200	R.Pyongyang	Korea (DP.Rep.)	-	3.560	0500-0600	R.Japan	Japan	-	7.230
0100-0200	R.Pyongyang	Korea (DP.Rep.)	-	11.735	0500-0600	WSHB	USA	Mon	7.535
0100-0200	R.Pyongyang	Korea (DP.Rep.)	-	15.230	0500-0600	WYFR Family R.	USA	-	9.985
0100-0200	R.Pyongyang	Korea (DP.Rep.)	-	17.735	0500-0600	WYFR Family R.	USA	-	11.550
0100-0200	R.Ukraine Int.	Ukraine	-	6.020	0500-0700	BBC World Service	UK	-	3.955
0100-0200	R.Ukraine Int.	Ukraine	-	9.560	0500-0700	BBC World Service	UK	-	6.195
0100-0200	R.Ukraine Int.	Ukraine	-	9.610	0500-0700	BBC World Service	UK	-	9.410
0100-0200	R.Ukraine Int.	Ukraine	-	9.810	0500-0700	BBC World Service	UK	-	12.095
0115-0120	Kyrgyz Radio	Kyrgyzstan	-	4.010	0500-1000	WWCR-1	USA	-	3.210
0115-0145	V.of Africa	Libya	-	15.235	0515-0530	Voice of America	USA	-	7.170
0115-0145	V.of Africa	Libya	-	15.415	0515-0530	Voice of America	USA	-	9.700
0115-0145	V.of Africa	Libya	-	15.435	0515-0530	Voice of America	USA	-	11.825
0130-0200	V.of Greece	Greece	-	7.450	0515-0530	Voice of America	USA	-	15.205
0130-0200	V.of Greece	Greece	-	9.420	0530-0600	R.Austria Int.	Austria	-	6.155
0130-0200	V.of Greece	Greece	-	11.645	0530-0600	R.Austria Int.	Austria	-	13.730
0130-0200	V.of Greece	Greece	-	15.630	0530-0600	R.Thailand	Thailand	-	9.655
0200-0230	R.Yugoslavia	Yugoslavia	-	7.130	0530-0600	R.Thailand	Thailand	-	11.905
0200-0300	IRRS-Shortwave	Italy	Sat-Sun	7.120	0530-0600	R.Thailand	Thailand	-	15.115
0200-0300	R.Pyongyang	Korea (DP.Rep.)	-	11.845	0530-0600	Voice of America	USA	-	7.170
0200-0300	R.Pyongyang	Korea (DP.Rep.)	-	13.650	0530-0600	Voice of America	USA	-	9.700
0300-0330	Merlin Network 1	UK	Sat	9.735	0530-0600	Voice of America	USA	-	11.825
0300-0330	R.Belarus Int.	Belarus	Fri-Mon	6.070	0530-0600	Voice of America	USA	-	15.205
0300-0330	R.Belarus Int.	Belarus	Fri-Mon	7.210	0540-0550	V.of Greece	Greece	-	7.450
0300-0400	BBC World Service	UK	-	6.195	0540-0550	V.of Greece	Greece	-	9.420
0300-0400	BBC World Service	UK	-	9.410	0600-0620	Vatican Radio 1	Vatican City State	-	4.005
0300-0400	WSHB	USA	Mon	7.535	0600-0620	Vatican Radio 1	Vatican City State	-	5.880
0300-0800	RFPI	Costa Rica	-	6.975	0600-0620	Vatican Radio 1	Vatican City State	-	7.250
0300-0800	RFPI	Costa Rica	-	15.050	0600-0629	R.Canada Int.	Canada	-	6.0450
0340-0350	V.of Greece	Greece	-	7.450	0600-0629	R.Canada Int.	Canada	-	6.150
0340-0350	V.of Greece	Greece	-	9.420	0600-0630	Swiss Radio Int.	Switzerland	-	9.655
0340-0350	V.of Greece	Greece	-	11.645	0600-0700	IRRS-Shortwave	Italy	-	3.985
0340-0350	V.of Greece	Greece	-	15.630	0600-0700	R.Japan	Japan	-	5.975

SHORT WAVE continues on page 22...

New Board Director

The **United Kingdom Hydrographic Office** in Taunton has appointed a new Director of Marketing, following the recent retirement of Ian Harkness, who spent three years in the position. **Bob Moss** joined the organisation back on 1st December 1999. He was formerly Commercial Director of Bank Line, who operate multi-purpose vessels on a westbound round the world route serving the South Pacific Islands.

Speaking on his appointment, Bob said, "I became aware of the Admiralty Chart very early in my shipping career and quickly realised the enormous respect in which the brand is held by mariners world-wide. I am delighted to have the opportunity to protect and build upon the strength of that brand and help it realise its fullest commercial potential".

Successful Show

The Radio, Computer & Electronics Show, organised by the **Blackwood & District Amateur Radio Society** was held at its new venue of the Newport Centre in Newport, South Wales, back on Sunday 17th October 1999. The much larger air conditioned hall was host to over 38 traders, plus repeater and special interest groups.

Nearly 100 fellow enthusiasts and those that were just inquisitive visited the show and the only complaints centred around the catering, the centre was not ready for the numbers that attended, but this will be corrected for next year's show, which will be held on **Sunday 15th October 2000**.

There were three winners in the lucky program draw. The raffle of an AR108 was won by **Mike Davies G0JMD** of Yate - the prize was presented to Mike by **Jean GW0APT** who sold the winning ticket.

More information from **Stuart GW0NPL** on (01495) 240260 (combined telephone and FAX number) or (07970) 777756 or E-mail: fireham@aol.com



Mike Davies G0JMD being presented with his prize by **Jean GW0APT** who sold him the winning ticket at the **Blackwood Radio, Computer & Electronics Show**.

Spicyle Version 2

Those Engineers have recently announced the release of *Spicyle* Version 2, a major new release of the Schematic capture, Simulation and p.c.b. program for Analogue, Mixed Mode and RF Engineers. At simulation time, modifications made to SPICE netlists cannot only be back annotated to the schematic (thence to p.c.b.), but any new components are automatically inserted ready for manual placement. With its three separate routes for accepting data, *Spicyle* is believed to be the

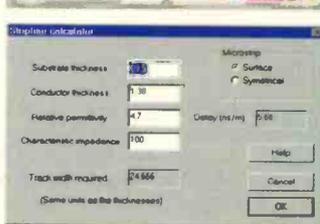
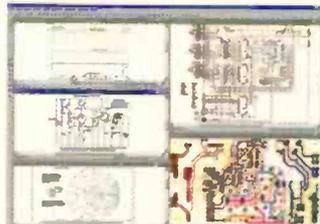
most flexible of all currently available ECAD, it retains its respected user drawing interface, Gerber file import and SPICE file import.

Charles Clarke of **Those Engineers** says, "Importing patches of archived circuitry into a drawing is usually a nightmare for engineers because track and component designations are likely to clash. *Spicyle* features a drag and drop facility to allow sections of a large drawing to be incorporated into a different drawing. It is equipped with powerful indexing which can be set to automatically flag up and amend any clashes. This concept virtually makes redundant the traditional multi-sheet approach to drawings".

Spicyle from the outset struck a first with its capability of simulating straight from the p.c.b. - the ultimate design rule check. The new version features traditional multi-zone design rule checking; multi zone copper fill and, uniquely, a stripline calculator to help the tracking of microstrip lines.

Those Engineers operate a policy of maintenance and upgrading to all their software, which is available from **Those Engineers** and their agents. For a limited period, purchasers of *Spicyle* will receive a free of charge update to their *SpiceAge* software and those already with *SpiceAge* maintenance will receive a free extension to their contract.

For further details contact **Those Engineers** at **31 Birkbeck Road, London NW7 4BP, Tel: +44(0)20-8906 0155, FAX: +44(0)20-8906 0969**, E-mail: sales@those-engineers.co.uk or look up their web site at: www.spiceage.com



Oxford Meets

The **Oxford & District Amateur Radio Society** is affiliated to the RSGB and was formed in 1923. The Society is very active with a friendly and growing membership. They even have their own web site, check it out at

<http://members.aol.com/g5lo/myhome/club.html>

The web site is run and managed for the Oxford & DARS by **Paul J. Goodhall BRS 176562** and 13 year old junior member **Peter A. Goodhall G 20998**. The Society also have a twice monthly newsletter, once again done by Peter and Paul.

Membership is open to anyone interested in Amateur Radio. Meetings take place at 1945 on the 2nd and 4th Thursday of the month at **The Grove Club House, Grove Street, Summertown, Oxford**. More information from **Mr D. Walker G3BLS**, Hon. Sec., on (01865) 247311.

Continued on page 10...

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.

2000

February 6: The 15th South Essex Amateur Radio Society are holding their Radio & Computer Rally at the Paddocks, (situated at the end of the A130), Long Road, Canvey Island, Essex. Doors open from 1030 and features include Amateur Radio, Computer & Electronic components exhibitors, Bring & Buy, RSGB Morse testing on demand (two passport photos required). There will also be home-made refreshments, free car parking with space outside main doors for disabled visitors. Admission is just £1. More information from **Brian G710** on (01268) 756331 before 2100 please.

February 6: Harwell Amateur Radio Society will be holding a Radio & Computing Rally at the Harwell Science & Engineering Centre located just off the A34 between Oxford & Newbury. Doors open 1030-1530. Signposted from A34. Talk-in on 145.550MHz. Further details from **Ann G8NVI** on (01235) 816379 or on <http://www.hamradio.harwell.com>

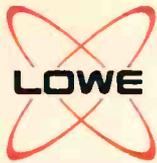
February 13: The Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield, in one large hall, just out of town on the Horbury Road, easy access from M1 J39 & J40 - well signposted and with talk-in on 2m and 70cm. Doors open 1100 (1030 for disabled visitors and Bring & Buy). Details from **Roy G0TBY** on (01924) 893321 (combined telephone and FAX number), E-mail: rally@sandalmagna.demon.co.uk or check their Web site at <http://www.sandalmagna.demon.co.uk/rally/>

February 13: Cambridge & District ARC are holding their annual club Rally and Car Boot Sale in the Ambulance station at Addenbrookes Hospital, Cambridge. Opens at 1000 for disabled visitors, 1030 to the general public. There will be a Bring & Buy, WC, Bar, Talk-in on S22, car park, adults £1.50, children free. For further information contact **John Bonner G0GKP**, 40 Lyles Rd, Cottenham, Cambridge CB4 4QR or Tel: (01954) 200072.

March 11/12: The London Amateur Radio & Computer Show. There will be the usual mix of exhibitors at this two-day event, including: computer software providers, special interest groups, a large Bring & Buy, local clubs, large and small Amateur Radio equipment dealers, electronic component vendors and lots more. In addition there will be free parking, family attractions (sport, cinema, swimming, golf, etc.), bar and restaurants, lectures, on-demand Morse tests, disabled facilities and a talk-in. Further Information is available from **RadioSport** on (01923) 893929.

Continued on page 11...

Send your news to Zoë Shortland at the Editorial Offices



LOWE ELECTRONICS

LOWE BOOKSHOP



- Air Traffic Control Today£8.99
- Air Traffic Control Today and Tomorrow£8.99
- Airband Radio Handbook 6th Ed£7.99
- Air Traffic Control£10.95
- Airwaves '99£9.95
- Calling Shanwick£10.95
- Callsign '99£8.95
- Fax, Satellite and RTTY Weather Reports by Philip Mitchell£11.50
- Ferrell's Confidential Frequency Guide£19.95
- Flight Routings 1999£7.95
- Monitoring the War in Kosovo£5.00
- More Out of Thin Air£6.95
- North Atlantic Flight Communications£16.50
- Passport to World Band Radio '00£14.99
- Pooley's Flight Guide '97£5.00 inc P&P
- Receiving Antenna Handbook£17.50
- Scanners 3£9.95



- Scanning the Maritime Bands 2nd Ed£9.75
- Short Wave Propagation Handbook£15.95
- Shortwave Listening Guidebook - Harry Hiems£16.95
- Shortwave Maritime Communications£14.50
- Shortwave Radio Listening for Beginners - Anita McCormick£10.95
- UK Scanning Directory 7th Ed£19.50
- UK Scanning Frequency Chart£3.00
- Underground Frequency List£14.95
- Understanding ACARS£9.95
- Weather Radio - Tony Curtis£14.95
- Weather Reports from Radio Sources by Philip Mitchell£7.50
- World Airline Fleet and Selcal Directory£16.00
- World Radio and TV Handbook 2000£19.95
- Worldwide Aeronautical Communications Frequency Guide£19.95

Pooley's Flight Guide '98



Last year's Pooleys now available for all aviation enthusiasts. Airport runway maps and loads of frequencies and other really useful data inside. Quantities are limited this year so get yours now before we run out!

Just £5.00 plus £3.00 p&p.



NRD545

A superlative short-wave receiver, designed to fulfil the needs of professional monitoring stations, the NRD545 is equally at home with the serious hobby listener.

The DSP implementation starts at IF frequencies so don't confuse this with lesser DSP receivers that simply process the recovered audio. You can therefore control the IF bandwidth from 10kHz down to just 40Hz allowing total control for AM, SSB, CW or data signals, really helping to reduce interference. Heterodynes and noise can also be removed and the notch filter will automatically track changes in the frequency of the interfering tone. As you would expect from a top-flight receiver, computer control is fully integrated and there are 1000 memory channels, with memory and and programmable scan features.

NRD545 inc FREE CHE199 or NVA319
£1595.00

NRD345

SPECIAL MILLENNIUM OFFER



The NRD345 continues to be a popular option for listeners with a keen eye (and ear!) for quality. Easy to use and with great specification, the NRD345 is a great choice if you have a limited budget but want the best. Terms available.

- Frequency range 100kHz to 30MHz
- Dynamic range 100dB, 500kHz bandwidth
- Image rejection 70dB
- RS232 interface
- Modes AM, CW, SSB, Synchronous AM
- Noise blanker
- Clock & timer functions

NRD345 Offer price **£399.00**

Icom PCR100 & PCR1000



Icom PCR100 & PCR1000

For those of you that like to combine scanning and computing, these two Icom receivers are for you!

The PCR100 offers 100kHz to 1300MHz with AM, FM and WFM reception, it covers all popular broadcast and communications channels, including TV sound. There is a choice of operating screens

including a multi-function control panel, with bandscope, memory list and scan controller screens just some of the options. There are multiple scanning functions too as you would expect and the software can store multiple files of 1000 memory channels giving unlimited choice

The original PCR1000 offers a similar specification but adds SSB reception and IF shift so is able to monitor the many utility stations to be found in the short-wave bands. An option DSP processor can also be added for improved performance.

Prices **£199.00** for PCR-100 & **£349.00** for PCR-1000.

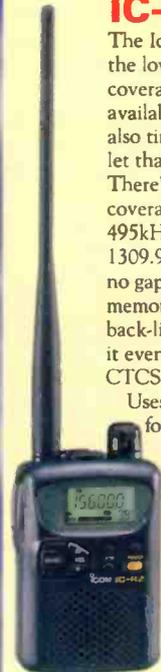


ICOM IC-R2

The Icom IC-R2 is the lowest priced full coverage scanner available today. It's also tiny but don't let that fool you! There's frequency coverage from 495kHz right up to 1309.995MHz with no gaps, 400 memories, clear back-lit display and it even includes a CTCSS tone scan.

Uses 2 x AA cells for power, contributing to the small size.

Price **£149.00**



GENERAL ENQUIRIES

All catalogue requests to Matlock address or fax please or by e-mail to: info@lowe.co.uk. NB Carriage extra on most items. Orders also to Matlock address or fax or e-mail to orders@lowe.co.uk Check our website out for latest product information www.lowe.co.uk

Matlock
Chesterfield Road
Matlock
Derbyshire
DE4 5LE
Fax 01629 580020
Tel 01629 580800

Bristol
79 Gloucester Road
Patchway
Bristol
BS12 5QJ
Fax 0117 931 5270
Tel 0117 931 5263

GARMIN GPS Receivers



own custom-made items like our world-famous low-cost magnetic mount GPS antenna!

Pop in to one of our showrooms now to see the latest models and get a full demonstration of their accuracy



and capabilities. Check out how you can combine your computer with a GPS receiver and Personal Navigator Professional software to give you full route planning and tracking with local hotels, restaurants, pubs, places of interest and even filling stations.

£149.00

If you walk, sail, ride or drive, there's a Garmin GPS just for you! As a Garmin main distributor, you'll find a complete range of GPS receivers and accessories to suit your outdoor activities, including some of our

own custom-made items like our world-famous low-cost magnetic mount GPS antenna! Pop in to one of our showrooms now to see the latest models and get a full demonstration of their accuracy and capabilities. Check out how you can combine your computer with a GPS receiver and Personal Navigator Professional software to give you full route

GPS3+ £349.00
Mono Street Pilot £499.00
Colour Street Pilot £699.00

Selected
Garmin receivers
down in price!
Phone for details!

Low GPS Accessories



Our world-famous Active GPS Antenna continues to lead the market! We've sold thousands of these all over the world - a testament to it's high-performance and great value! It is complete with magnetic base and 4m lead with BNC connector. We also offer an adaptor to MCX for more flexibility.

GPSANT, Magnetic mount GPS antenna£39.95
GPSLEG, GPS leg strap£8.00
GPSCAB, Power data and computer lead for Garmin GPS receivers£29.95
GPSCAR, Cigar lighter lead for Garmin 12V receivers£15.00
MCXADAPT, MCX to BNC adaptor lead£15.00

Short Wave Accessories



AT2000, Short wave listener's ATU£99.95
CTU8, Short wave listener's ATU£00.00

RF Systems - World leading antennas for the very best in short wave reception.



AA1, Antenna adaptor for portable receivers£31.00
AA150, Active antenna£148.00
AA150M, Marine active antenna£97.00
AA2, Antenna adaptor for portable receivers£31.00
DX10, Active antenna£125.00
DX1PRO, High quality active antenna£295.00
EMF, Portable SW antenna£49.00
MINIWINDOM, Indoor windom antenna£33.00
MLB, Magnetic Longwire Balun£33.00
MLBAMK1, MLB Antenna kit; 12.5m£54.00
MLBAMK2, MLB Antenna kit; 20m£60.00
MTA, Magnetic Transfer Antenna; Vertical antenna for short-wave use£125.00
SP1, Antenna splitter / combiner£48.00
SP2S, Antenna splitter / combiner / with precision attenuator and medium wave filter£95.00
SP3S, Antenna splitter / combiner£69.95
T2FD, Tilted Terminated Folded Dipole; Low noise RX antenna; 3 - 35MHz£135.00



Icom R75E



Icom's latest receiver combines analogue

and digital technology to bring you a receiver with excellent performance at an excellent price. With expanded frequency coverage from 30kHz right up to 60MHz it will truly expand your listening horizons.

On the technical side, it features a high stability receiver circuit and better than 100dB dynamic range. Synchronous AM detection, twin passband tuning and optional IF filters help to reduce distortion and interference and at the audio stages, an optional Digital Signal Processor unit adds noise reduction and notch filtering. Operation is easy with several tuning step sizes and direct frequency entry complementing the tuning dial and FM is provided as standard. For those who need them, there are 101 memory channels that can also be named and optional computer control will extend many of the functions. The May 99 Short Wave Mag said it all - "little I could not resolve, even in poor conditions" ... "remarkably easy to programme" ... "I can't praise it too highly" ... Need we say more?

R75E from **£699.00**

AOR AR5000

A dream receiver if ever there was one!



Free handheld scanner with AR5000

- Very wide frequency coverage 10kHz - 2600MHz
- All mode reception: AM, FM, USB, LSB & CW
- Automatic electronic preselection of the front end
- Excellent strong signal handling
- NCO (Numeric Controlled Oscillator) with tuning steps down to 1Hz
- TCXO fitted as standard
- Multiple I.F bandwidths 3kHz, 6kHz, 15kHz, 40kHz, 110kHz & 220kHz
- Auto mode bandplan selection

IT IS WORTH EVERY PENNY OF IT'S **£1445.00** PRICE TAG

and buy during February and we will include an MVT7100 multimode handheld absolutely free! *This offer is limited as long as stocks last so get in quick if you want the best of fixed and portable operation!* Offer also available on AR5000+3 model at £1699.

Yupiteru MVT7100

Still our best selling scanner and no doubt about it! Okay so it may lack computer control but that's hardly a problem when 99% of the time you'll probably be in a situation where it's hardly practical to lug around even the lightest of palm tops. Let your fingers do the walking over the back-lit keyboard to access the 503kHz to 1650MHz range with 1000 memories,

am/fm/wfm and ssb reception and it is so easy to use! (Carr. £10.00).



£199.00

Scanner Accessories



AOR
ABF125, Band 2 interference filter£28.50

Low
LEP300, High quality ear piece£9.95
FC1001, 10 to 2.8 frequency counter£59.95
LA801, Scanner antenna 25-2000MHz£12.95
LA881, Scanner antenna 25-2000MHz:
Enhanced gain£19.95
LABC, Civil Airband ground plane antenna£29.95
LABM, Military airband antenna£39.95
LACI, Window mount for BNC antennas£14.95
LSA1300, Wide range disccone antenna; 25 - 1300MHz£59.95
TW535, Telescopic whip antenna£8.95
WBANT, Wideband mini-mag mount antenna for scanners£19.95



AIRMASTER 2000, Software decoder for ACARS£89.95
NEXCEL, Pack of 4 NIMH rechargeable batteries 1.35Ah£8.00
NEXCH, Special charger for NEXCEL batteries£9.95

SSE

BHA3, Table top stand for handheld scanners£14.95
NF943, Tuneable notch filter£29.95
PSU101, Scanner PSU & base stand£34.95
SW2, Short Wave antenna for scanners£14.95

Watson

QS200, Mobile mounting bracket for handheld radios£10.00
WSC1, Universal carry case£19.95



GREAT SECOND HAND BARGAINS!

Why not look at our great range of pre-owned scanners and receivers? We often have current product available at well below RRP so you make a great saving and with our full workshop inspection and warranty prior to sale, you'll have no worries either!

Ask for free second hand list.

... continued from page 7

CARA's Web Site

The web site for the **Cheltenham Amateur Radio Association** is at <http://www.cara.cheftweb.co.uk>

Bangor & DARS

Members of the **Bangor & District Amateur Radio Society** meet on the 1st Wednesday of every month in the Clandeboye Lodge Hotel at 2000. On Wednesday 2 February 2000 they are hosting a talk on BFBS radio. Visitors and new members are most welcome.

More information from **Mike G14XSF** on **028-4277 2383** or visit the club's web site at welcome.to/bdars

Radio & TVDX News

A report received from Holland (BDXC) advises that all TV transmitters operating in POLAND on chs. R1 thru to R6 have been closed down. I would suspect this refers to chs. R1 thru to R5 inclusive as ch. R6 is in Band 3 whereas the lower channels occupy parts of the Bands 1 (TV) and 2 (f.m.) broadcasting bands.

Not good news for European TVDXing! And the *Six News* bulletin reports that all German amateur stations class 1 and 2 may now operate within the 50MHz (6m) amateur band.

TV-12 the RSL-TV station operating from Rowridge, Isle of Wight, on ch. E54 horizontal has increased its power from 1 to 2kW e.r.p. Signal quality has improved on the mainland, the extra signal levels helping to reduce co-channel interference from the Mendip transmitter. The

Callsign Reservation

The **Radiocommunications Agency** has informed us that a further contract has been awarded to **Subscription Services Ltd. (SSL)** for the administration of Citizens' Band and Amateur Radio Licences on their behalf. This contract covers the period April 2000 to March 2003 with an option for a further two year renewal. Under the new contract, a number of improvements are planned to the licensing system.

One important change will be the withdrawal of the reservation facility for those who wish to reserve a callsign. Currently, anyone who applies for an Amateur Radio Licence may reserve a particular callsign, providing it is one that has not previously been reserved and is due to be issued within the forthcoming six months. The applicant then has to wait until that callsign is automatically generated by the system before a licence can be issued. That can mean a long wait for someone who is eager to get their licence.

Therefore, the system will be changing so that callsigns can be generated out of sequence. Once the change is made, applicants will be able to choose any callsign in the current series providing it has not already been issued or reserved.

It will also no longer be necessary to choose callsigns that are due to be issued within the following six months and applications will be accepted up to 'ZZZ'. Applicants will need to telephone SSL on **0117-925 8333** to check that the callsign is still available. The callsign will then only be allocated once the completed application is received. Callsigns will be issued on a 'first come first served' basis.

This change is due to be made by 1 April 2000,

TV-12 group have been awarded an RSL-TV licence for the Chichester, West Sussex area and hope to be on-air Autumn 2000.

A new RSL-TV group may be on-air also Autumn 2000 operating in Romsey, Totton and East/South New Forest area (SW. Hampshire) including the Lymington area. The two transmitter sites are known - one at Toothill, North of Southampton, and a second within Lymington town.

There are plans to open a new commercial TV network in Australia, though only operating in digital, this is pencilled as being on-air during 2007. Interesting to note that in the Melbourne region several analogue u.h.f. relays are being opened within the next 18 months to provide compensatory TV reception should the normal main v.h.f. analogue channels suffer

interference from the new digital v.h.f.-TV transmissions. The v.h.f. channels likely to suffer interference are Melbourne's chs. 6, 8 and 11.

Our Australian correspondent **Robert Copeman** would like to contact any reader that has an interest in collecting vintage TV programme recordings. He has a collection of vintage Australian programmes and can



offer 'swaps' for UK material. Contact him directly at **10 Cratloe Road, Mount Waverley, Victoria 3149, Australia.**

but it is likely that it will be introduced at an earlier date. Until then, SSL will be taking reservations (completed applications only) for any callsign in the current series:

Full Class A:	M0 + three letters
Full Class A/B:	M5 + three letters
Full Class B:	M1 + three letters
Novice Class A:	20 + three letters
Novice Class B:	21 + three letters

All reserved callsigns will be issued as soon as the new system is in place. This only affects new applications; existing licence holders will not be permitted to change their callsign. Any enquiries about this should be made to this section on **0171-211 0160.**

New Transceiver

Icom (UK) Ltd. are pleased to announce the launch of the new IC-F4SR(446) u.h.f. transceiver. Designed to meet the demands of the new licence free PMR-446 service, this new transceiver is aimed specifically at the commercial user or those who require a more robust product, such as outdoor activity enthusiasts.

The IC-F4SR(446) offers



Ericsson have launched a small f.m. radio that clips to your mobile 'phone to offer radio as you go between receiving 'phone calls. You just plug in your headset and the radio plays in the earpieces. When a call arrives it's automatically switched to your headset, muting the radio music. The headset also includes a built-in microphone to ease your return communication.

Ericsson are developing more services through mobile 'phone access such as internet and other on-line services being part of their WAP (**Wireless Application Protocol**) programme as applied to cellular 'phone technology.

The latest gizmo for mobile 'phone anoraks - music whilst you dial - a combined radio and mobile 'phone by Ericsson.

maximum flexibility and instant communication between members of a group in and around buildings and over short distances. This makes it the ideal tool for a huge number of uses, such as leisure, on building sites, catering, events management, neighbourhood watch, factories, farms as well as orienteering, walking or rambling.

Featuring a whole host of easy to use features, the radio is extremely well designed, with a simple and uncluttered display. Housed in a rugged, die-cast aluminium chassis for high reliability in the toughest of conditions, the IC-F4SR(446) has been tested to the international standard, MIL-810 C, D and E for shock and vibration.

Delivering all eight of the new u.h.f. channels, an l.c.d. screen on the IC-F4SR(446) clearly indicates the operating status at a glance, so you know which channel is being used, how much battery life is left and other essential information. Channel searching is easy for the user because the radio automatically does it for you.

The IC-F4SR(446) has an auto-channel selection function to find a free channel. There is also a group call function that allows exclusive groups to use the equipment without interference from each other. A ringer function gains the user's attention, which adds a spot of familiarity for first time users.

Each radio is supplied with a wall charger, belt clip, comprehensive handbook, quick reference guide and rechargeable battery. And to give added confidence, the IC-F4SR(446) has a three year warranty. A comprehensive list of accessories is also available.

The IC-F4SR(446) has a guide price of £169. Find out more from Icom (UK) Ltd. direct at **Sea Street, Herne Bay, Kent CT68LD, Tel: (01227) 741741, FAX: (01227) 741742** or E-mail: **info@icomuk.co.uk**

ML&S Millennium Web Site

After being one of the very first Amateur Radio dealers in the UK to have a web site, ML&S have just announced a brand new site for the millennium.

Again a first, the new **mlands.co.uk** site features full shopping basket facilities to its visitors who care to browse and literally 'shop on-line'. The ordering mechanism uses a 'secure server' which encrypts customer details and holds them on a special server for retrieval by Martin and his team. Once an order is placed, a confirmation is sent to the customer and the goods are despatched from ML&S.

The MLandS site is split into eleven categories. Of particular interest is the 'Products' section. Martin has split this into major manufacturers allowing customers to view almost the entire brochure containing pictures, description and specification for each amateur and s.w.l. product from Yaesu, Icom and Kenwood, with many more to follow. The section also allows you to view every single accessory for a particular product. This can be particularly useful when trying to decide which item to add to an existing or future purchase.

Another area is the 'LynchLine' free service for swaps and sale of amateur and s.w.l. equipment.

Mobile Power

Run virtually anything in your car. On long journeys, keep your kids amused with a portable TV and a Playstation, use an electric razor on the way to work or run a complete 'mobile office' on the move. Cherokee simply plugs directly into the cigarette lighter and converts low voltage battery power to standard 230V a.c. mains power. A standard UK socket on the front of the unit allows direct connection of appliances.

The Cherokee 150 is capable of supplying up to 150W of power continuously. For appliances that require a surge of power (for example televisions), the Cherokee 150 can provide 300W instantaneously.

For safety, the Cherokee is protected against overload, overheating and short circuits. In the event of the input battery voltage dropping below 10.8V, the unit will cut out. This ensures that you can re-start your car's engine.

Cherokee is remarkably efficient. Thanks to advanced switch mode circuitry

within the unit, over 90% of the power taken from the battery is converted into clean, 'spike free' a.c. power. Available from Merlin Equipment, Cherokee is part of a larger range



of products designed for in car, caravan and use on boats.

For further information, contact **Merlin Equipment at Unit 1 Hithercroft Court, Lupton Road, Wallingford, Oxfordshire OX10 9BT, Tel: (01491) 824333, FAX: (01491) 824466**, E-mail: **sales@the-merlin-group.com** or check out their web site at **www.the-merlin-group.com**

Martin introduced a BBS back in 1994 offering customers a similar system whereby you complete a simple form on the page, 'post' the contents and your details together with your item wanted (or for sale) appears in a table almost instantly. It was on the original MLandS site and proved a tremendous success so once again this page will take a 'hammering' as before. The major advantage Martin informs us of buying through his 'LynchLine' is that he is able to offer buyers the safety and security of letting ML&S handle the sale for a small fee. Purely optional, this service offers the obvious advantage of paying by credit card or low rate finance and more importantly the validity, warranty and right to return the goods if unsatisfactory.

Articles, reviews and dozens of new manufacturers will be added in the coming months. Take a look at **http://www.mlands.co.uk**

rallies

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

The Editorial Staff of SWM cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Editor

March 12: The Wythall Radio Club are holding their 15th Annual Radio & Computer Rally at Wythall Park, Silver Street, Wythall, near Birmingham. Doors open 1000 till 1600 and admission is only £1.50. Plenty of traders in three halls and a large marquee with bar and refreshment facilities on site plus a big Bring & Buy stand. Talk-in on S22. There will also be a unique free park and ride for easy and comfortable parking. Contact Chris GOEYO on 0121-246 7267 evenings, weekends for details, FAX: 0121-246 7268 or E-mail **chris@goyeo.freereserve.co.uk**

March 18: The 7th West Wales Amateur Radio & Computer Rally will be held at Penparcau School, Aberystwyth. Doors open 1000 till 1530 and admission is just £1. Good parking facilities with easy access for disabled and traders for all stalls. Demonstrations of h.f., v.h.f., packet on the air. Amateur Radio and Computer Traders, Bring & Buy, clubs and special interest groups. Catering facilities also. Talk-in on S22. **Ray GW7AGG on (01686) 628778** or home QTH.

March 19: The Norbreck Amateur Radio, Electronics and Computing Exhibition, organised by the Northern Amateur Radio Societies Association (NARSA), is to be held at the Norbreck Castle Exhibition Centre, Blackpool. Don't miss the largest single day exhibition in the country. **Peter Denton G6CGF on 0151-630 5790.**

March 19: Bournemouth Radio Society's 13th annual sale is to be held at Kinson Community Centre, Pelhams Park, Millhams Rd, Kinson, Bournemouth. Doors open 1030 and close at 1630. Talk-in from G1BRS on 2m/S22. Amateur Radio and computer traders, clubs and specialised groups, excellent refreshments, admission £1. Details from **Oliver or Frank Goodger, 66 Selkirk Close, Merley, Wimborne, Dorset BH21 1TP** or Tel: (01202) 887721.

April 16: The 16th Yeovil QRP Convention is to be held at Digby Hall, Sherborne, Dorset. Doors open at 1000, talk-in on S22. There will be traders, construction challenge contest judging, three talks, QRP forum, in-hall catering, free parking, invalid facilities. Further details on (01935) 813054.

April 16: Swansea ARS will be holding their annual show in the Swansea Leisure Centre on the A4067 Swansea-Mumbles coast road. Doors open 1030-1700 and attractions include: trade stands, Bring & Buy, local interest groups and full catering & licensed bar. Admission is only £1, children just 50p. Further details from **Roger Williams GW4HSH, Show Secretary, on (01792) 404422.**

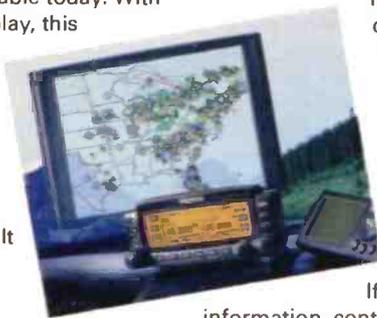
April 16: The Cambridgeshire Repeater Group are holding their annual rally at Bottisham Village College, Bottisham, which is six miles east of Cambridge, access is via A14 and A1303. Features include a large hall, car boot sale, Bring & Buy and their renowned auction of radio and electronic equipment. Doors open 1030 and admission is £1.50. Refreshments available. Talk-in on S22. **Paul Dyke G0LUC on (01462) 683574.**

Send your news to Zoë Shortland at the Editorial Offices

Data Communicator

New from **Kenwood** is the TM-D700E Data Communicator. Kenwood say they call it an APRS transceiver, built for tomorrow's communication needs with advanced features available today. With its extra large amber and black display, this new transceiver is fully equipped to make the most of the exciting opportunities offered by SSTV, GPS and APRS (Automatic Packet/Position Reporting System) that is rapidly gaining popularity world-wide.

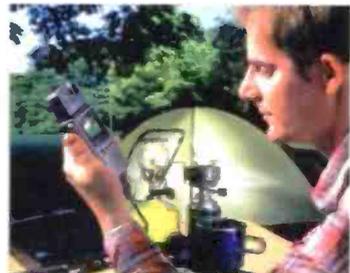
This mobile transceiver, with built in TNC, offers a wide range of data communications options, including simple packet operation using the AX.25 protocol. You can also send and receive SSTV images using Kenwood's VC-H1.



The TM-D700E is a full dual-band mobile and comes with many features: 9600bps PC-based packet communications for chat, improved key operation announcement with optional VS-3 voice synthesiser, SSTV functions with fast f.m. and dual receive for voice and image transmissions.

With 200 memory channels and up to ten programmable memory scan banks, Kenwood say that the menu is easy to use, similar to the TH-D7E. List price of the new TM-D700E is £519.95.

If you would like further information, contact Kenwood direct at **Kenwood House, Dwight Road, Watford, Herts WD1 8EB, Tel: (01923) 816444.**



Red Devil's Last Tribute

A former Red Devil and amateur radio operator Hubert Griffiths from Holywell, North Wales, died following a visit to Arnhem Cemetery, for the annual ceremony to honour fallen comrades.

The 76 year old ex member of the 3rd Battalion Parachute Regiment set out from Holywell towing a caravan, on his own, intending to spend three weeks away, visiting some of his amateur radio friends in Germany and Belgium after the ceremony at Arnhem. Harry, to his many friends in amateur radio, had the callsign GW0WPT.

In the tower of Eusebius Church, Arnhem, an amateur radio station was set up to commemorate 'The Battle of Arnhem' that raged on for ten days in September 1944. Harry helped with operating the station PA6BTF, 'Bridge To Far'.

Although there was a lift to the top, it only went to the last four feet. The old soldier, suffering with an arthritic knee and heart trouble, had to climb the last part on his own. He

made many contacts on the radio, particularly across the UK where many operators wanted to log the special callsign.

Following the event, Harry became ill and wanted to return home. He was taken back to Rotterdam to catch the ferry by John Dorpel PB0AOA, who lives at Arnhem. Harry had based his caravan at John's home.

Arriving back at Hull in the next morning, Harry was taken from the ferry in a wheelchair by Paramedics who wanted him to go to Hospital in Hull. Harry refused saying that he would rest a while before setting off for Holywell.



Harry talking to his friends in the UK from the PA6BTF Special Event Radio Station.

Towing the caravan, Harry started the journey. He contacted a friend on his 2m mobile radio, Albert Harradine M1BTZ from Northwich, Cheshire, who stayed with Harry until he arrived home. Albert also arranged for someone to be there when Harry arrived. Harry was rushed into Hospital, where he later died.

The funeral was held at St Michael's Church, Brynford. The ex Red Devil was buried with honours. Members of the Regimental Parachute Denbighshire Branch attended. The Last Post was played as the Regimental Colours were lowered over the grave. In true British style, the Old Soldier made it home.



The Parachute Regimental Association Denbighshire Branch honour their comrade.



Albert Harradine M1BTZ who kept in touch with Harry on 2m.

Company As Well As Charity

The **British Wireless for the Blind Fund** is now registered as a company limited by guarantee. Still a registered charity, this means a new charity registration number as well as the new company number.

"As far as we are

concerned, this will not alter, in any way, the service we provide," said Chief Executive Margaret Grainger. "It does, however, bring us into line with modern day charitable practice and will enable us to move forward into the millennium with our new strategy for growth".

The British Wireless for the Blind Fund announced a new strategic direction last year to

enable the charity to work with partially sighted people in need as well as those who are registered blind. In order to assess the level of service that will be required, a number of pilot projects are already underway.

The original charity was founded in 1928 and since that time, British Wireless for the Blind Fund has provided over three quarters of a million

radios to registered blind people resident in the UK who are in need.

More information about the British Wireless for the Blind Fund at **Gabriel House, 34 New Road, Chatham, Kent ME4 4QR, Tel: (01634) 832501, FAX: (01634) 817485** or log onto **www.blind.org.uk**

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

LM&S

For at least four billion years our nearest star, which we call Sun, has been turning hydrogen into helium and releasing a wide range of electromagnetic radiations and charged particles into space. Some are vital to life on Earth but others have harmful effects. The ultra violet and X-ray radiations which are present ionise the oxygen, nitrogen and nitric acid in the rarified atmosphere above the earth to form the ionosphere, which plays such a vital role in the propagation of short wave radio transmissions.

The radiation from the sun is far from constant and changes to the ionisation of the ionosphere can affect s.w. reception. During the peak period of the 11 year sunspot cycle (as now) frequent eruptions (solar flares) take place on the surface of the Sun. The bursts of intense radiation from the flares may increase the level of ionisation in the lowest D-layer of the ionosphere to the point where it absorbs all radio waves before they can reach the higher reflecting F-layers and result in a Dellinger fade-out - a complete or partial loss of all signals, which may last a few minutes or an hour or more!

Long Wave Reports

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

The latest reports suggest that Polish Radio's new 1000kW l.w. transmitter, which has been under construction near Bydgoszcz, is now in service on **225kHz** but so far official confirmation has not arrived here. Several listeners in the UK have been receiving Polskie R-1 during daylight! Over in Co.Down **Eddie McKeown** (Newry) rated the transmission SINPO 34232 at 1247UTC. Further reports, with SINPO ratings and times, would be welcome here.

Medium Wave Reports

There were no reports of m.w. transatlantic reception at night during November. The band was checked by **Robert Connolly** (Kilkeel, Co.Down) on a number of occasions at night, some around 0400UTC, but nothing was received from m.w. stations in E.Canada or the USA.

In contrast, the sky waves from quite a few of the many stations in the Middle East, N.Africa, Europe and Scandinavia were picked up after dark by some listeners in the UK - see chart. Those from the BSKSA high power outlets at Dammam (1600kW) on **1440kHz** and Duba (2000kW) on **1521** were logged on November 2 by **Simon Hockenhuil** (E.Bristol) as SINPO 25343 at 2210UTC and 34433 at 2215 respectively.

Searching for the ground waves from distant local radio stations during daylight is a popular aspect of our hobby. No doubt the sea paths helped those from stations along the coast between Cornwall and Kent to reach **George Millmore** in Wootton, loW, but a number of quite distant stations inland were logged by him too! Quite extensive logs were compiled by **Brian Keyte** (Gt.Bookham), **Ernie Strong** (Ramsey, Cambs) and **Fred Wilmshurst** (Northampton) - see chart. Despite the high level of electrical noise in E.London, **Phil Townsend** compiled an interesting list.

Short Wave Reports

The occupants of the **25MHz (11m)** band have now been joined by R.For Peace Int, Costa Rica. Their upper sideband (u.s.b) transmission on **25.930** (Eng 1200-?) was rated 45444 at 1230 by **Alan Roberts** in Quebec, Canada, and 23232 at 1450 by **Fred Pallant** in Storrington.

There were no reports to indicate how well the broadcasts from Deutsche Welle on **25.740** (Ger to S & SE.Asia? 0800?-1400?) are being received in the intended area but they were logged as 55544 at 0802 by **Richard Reynolds** in Guildford; 25443 at 0907 in Storrington; 33333 at 0940 by **Bernard Curtis** in Stalbridge; 35533 at 1000 by **Martin Goodey** in St.Mary's, Is of Scilly; 35543 at 1100 by **David Edwardson** in Wallsend; 35533 at 1145 in Northampton; 35523 at 1240 in E.Bristol; 45554 at 1310 by **John Parry** in Larnaca, Cyprus; 32232 at 1340 by **Robert Hughes** in Liverpool.

The daily broadcasts from R.France Int. on **25.820** (Fr to E/C.Africa 0900-1300) have also been received in some areas of the UK. Typical ratings were 33333 at 0935 in Stalbridge; 55534 at 1045 in Guildford; 35543 at 1104 in Wallsend; 35533 at 1104 in Northampton; 32232 at 1130 in Liverpool; 35243 at 1152 in Newry; 23332 at 1155 in Kilkeel; 35433 at 1210 in St.Mary's, loS; 25422 at 1220 in Storrington; 35533 at 1225 in E.Bristol.

Broadcasts from many areas have been reaching the UK in the **21MHz (13m)** band. During the morning RAI Rome **21.520** (It to Africa 0600-1300) was rated 44444 at 0811 by **Rhoderick Illman** in Oxted; R.Austria Int, Moosbrunn **21.765** (Eng to Australia 0930-1000) 54444 at 0935 by **Stan Evans** in Herstmonceux; R.Australia via Shepparton **21.820** (Eng to Asia 0900-1400) 35433 at 0900 in St.Mary's, loS and SIO 222 at 1000 by **Philip Rambaut** in Macclesfield; R.Norway Int **21.490** (Norw to W.Africa, S.America 1000-1029) 43333 at 1020 by **Thomas Williams** in Truro; Swiss R.Int via Sottens **21.770** (Eng, Ger, Fr, It to Asia 1100-1330) 44333 at 1100 by **Sheila Hughes** in Morden; REE via Noblejas **21.570** (Sp to S.America? 1100?-1600?) 42342 at 1104 in Newry; DW via ? **21.780** (Eng to Africa 1100-1157) 44444 at 1106 by **Martin Venner** in St.Austell; UAER, Dubai **21.605** (Ar to Eur 1055-1330) 45555 at 1115 in Northampton; R.Finland via Pori? **21.595** (Fin to ?) 45554 at 1117 in Wallsend; Vatican R, Italy **21.850** (It, Fr, Eng to Eur?, Asia?) 45544 at 1125 in E.Bristol; R.Denmark via R.Norway **21.490** (Da to W.Africa, S.America 1130-1158) 44343 at 1156 in Oxted.

After mid-day, R.Prague, Czech Rep **21.745** (Cz, Eng to S.Asia? 1200-1300) was 44444 at 1200 in Kilkeel; R.Norway Int **21.755** (Norw to SW.Asia, W.Australia 1200-1230) 35553 at 1200 in Wallsend; R.Sweden, Stockholm **21.810** (Eng to N.America? 1230-1300) 55555 at 1235 in Liverpool; HCJB Quito, Ecuador **21.455** (Eng [u.s.b. + p.c.]) 33433 at 1240 by **David Hall** in Morpeth and 25443 at 1824 in Guildford; BBC via Cyprus **21.470** (Eng to E.Africa 1300?-1700) SIO 333 at 1300 by **Tom Smyth** in Co.Fermanagh; VOA via Sri Lanka **21.840** (Eng to Africa? 1400-1500?) 43334 at 1400 in Stalbridge; WYFR via Okeechobee, USA **21.525** (Eng, Ar, Port?, Fr to Eur, Africa 1600?-2145?) 22222 at 1642 by **Tom Winzor** in Plymouth.

In the **18MHz (15m)** band R.Norway Int **18.950** (Norw to N.America 1300-1330) was rated 35553 at 1315 in Larnaca, Cyprus; R.Denmark via R.Norway **18.950** (Da to N.America 1430-1500) was 43334 at 1445 in Stalbridge;



Continued
on page 15.

Long Wave Chart

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

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

Listeners:-

- (A) Simon Hockenhuil, E.Bristol.
- (B) Sheila Hughes, Morden.
- (C) Rhoderick Illman, Oxted.
- (D) Eddie McKeown, Newry.
- (E) George Millmore, Wootton, loW.
- (F) Fred Pallant, Storrington.
- (G) Tom Smyth, Co.Fermanagh.
- (H) Ernie Strong, Ramsey, Cambs.
- (I) Phil Townsend, E.London.
- (J) Fred Wilmshurst, Northampton.

£89.95

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.)

£169.95

LOG PERIODIC MLP62

Freq. Range Receive 7 transmit 50-1300MHz Length 2085mm
Wide Band 16 Element directional beam which gives a maximum of 12-14Db Gain Forward and 17Db Gain Front to Back Ratio. Complete with mounting hardware.

£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" STAND OFF BRACKET

Complete with 'U' Bolts

£6.00

T&K BRACKETS

Complete with 'U' Bolts



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 N582.50 each
- N TYPE for RF213 ..2.50 each
- SO239 to BNC1.50 each
- PL259 to BNC2.00 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.

MICRO MAG MTS42

Freq. Range 25-2.1 GHZ
Length 225 mm

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

(Simple and easy to install a must for the enthusiast who has it all.)

£29.95

SUPER SCANAIR 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.)

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.)*

£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)*

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)*

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 DBh
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)**

MWA-H.F. WIRE ANTENNA

Freq. Range 1.1-30MHz Adjustable Length up to 60 Metres
Internal or external use. The long wire is known to be one of the best antennas for shortwave (HF) receiving. Comes complete with con box and dog bones, wire etc. *(A must for the short wave listener.)*

£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.)*

£29.95

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.)*

£39.95

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.)*

£49.95

TRI SCAN III

Freq. Range 25-2000MHz
Length 720mm

Desk Top Antenna for indoor use with triple vertical loaded coils. The tripod 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.)*

£34.95

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

£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.)*

DISCONE

Freq. Range 70-700MHz
Length 920mm

Internal or External use. (Classic Antenna Design. Comes complete with mounting hardware and brackets. *(Ideal for the Beginner.)*

£29.95

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)*

£19.95



ADD £6 P&P PER ORDER

... continued from page 13.

R.Norway Int **18.950** (Norw to N/C.America 1700-1730) was 45433 at 1720 in Northampton.

R.New Zealand's broadcasts to Pacific areas in the **17MHz (16m)** band have been reaching the UK quite well during the day. Their 100kW transmission on **17.675** (Eng 1750-1005) was rated 22222 at 0830 by **Clare Pinder** in Appleby, 35553 at 0904 in Wallsend and 35434 at 1840 in Guildford. R.Australia has also been reaching our shores during the morning. Their broadcast to Asia via Shepparton on **17.750** (Eng 0000-0500, 0600-0830, 0830-1100) was rated 44444 at 1005 in Herstmonceux.

Also heard during the morning were the BBC via Skelton & Woofferton, UK **17.640** (Eng to E.Eur, M.East, E.Africa 0700-1500), rated 54444 at 0745 in Morden and 35533 at 1235 in E.Bristol; DW via Rwanda? **17.800** (Eng to Africa 0900-0950) 45544 at 0925 in St.Mary's, IoS; R.Pakistan, Islamabad **17.835** (Ur 0900?-1100, Eng 1100-1105 to Eur) 43324 at 0935 in Stalbridge; Israel R, Jerusalem **17.535** (Fr, Eng to Eur, N.America 1100-1135) 54544 at 1125 in Northampton.

During the afternoon R.Bulgaria, Sofia **17.500** (Eng to Eur 1200-1300) was 33333 at 1200 in Plymouth; Africa No.1, Gabon **17.630** (Fr to W.Africa 0700-1600) 33333 at 1330 in Kilkeel; Voice of Turkey **17.815** (Eng to ? 1330-1425) 44444 at 1330 in Newry; R.Canada Int via Sackville **17.710** (Eng to USA, Mexico, Caribbean 1200-1500 [Sun 1300-1700]) 44444 at 1339 in St.Austell; R.Canada Int via Sackville **17.820** (Eng, Fr to Eur, Africa 1430-1600) 21111 at 1430 in Truro; DW via Rwanda? **17.800** (Eng to Africa 1600-1650) SIO 434 at 1600 in

Co.Fermanagh; WHRI via Maine, USA **17.650** (Eng to Eur, M.East, Africa 1600-2300) 34333 at 1615 by **Vera Brindley** in Woodhall Spa; Channel Africa via Meyerton **17.870** (Eng to W.Africa 1700-1730) 44444 at 1700 by **Gerald Guest** in Dudley.

Later, the BBC via Ascension Is **17.830** (Eng to Africa 7-2100) was 33433 at 1830 in Liverpool; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) SIO 322 at 1930 in Macclesfield; VOA via Greenville, USA **17.725** (Eng to Africa 2000?-2200?) 22222 at 2039 by **Robert Beason** in Nottingham; RCI via Sackville **17.820** (Fr, Eng to Eur, Africa 2000-2200) 24433 at 2144 in Oxted.

Good reception over long distances has been noted in the **15MHz (19m)** band. R.Australia's early morning broadcast to Asia via Shepparton on **15.415** (Eng 0100-0400, 0600-0900) was rated 44433 at 0825 in Herstmonceux. Also noted during the morning were R.Kuwait **15.110** (Eng, Ar to SE.Asia 0500-0930), rated 52534 at 0703 in Guildford; R.Norway Int **15.175** (Norw to E.Asia, New Zealand 0900-0930) 55555 at 0907 in Oxted; Voice of Russia **15.460** (Eng to Australia, New Zealand 0600?-1000) 44333 at 0930 in Morden; V of Armenia, Yerevan **15.270** (Various to Eur [Eng 1000-1030] Sun) 43333 at 1015 in Truro; HCJB Quito, Ecuador **15.115** (Eng to Eur? 1100-?) 44444 at 1135 in Morpeth.

During the afternoon R.Bulgaria **15.700** (Eng to W.Eur 1200-1300) was 45554 at 1213 in Wallsend; R.Romania Int **15.390** (Eng to Eur 1300-1356) SIO 433 at 1300 in Co.Fermanagh; WEWN via Vandiver, USA **15.745** (Eng to Eur 1100?-2200?) 33333 at 1302 in Plymouth and 33333 at 1915 in Nottingham; BBC via Antigua **15.220** (Eng to C.America 1100-1600?) 34443 at 1320 in Kilkeel; V of Greece, Athens **15.630** (Gr, Eng to Eur, N.America 1400-1450?) 45344 at 1410 in Newry; Swiss R.Int via Sottens **15.185** (Eng, Ger, Fr to Asia 1400-1600) 44444 at 1433 in St.Austell; Israel R, Jerusalem **15.650** (Eng to Eur? 1500-1530) 44444 at 1500 in Appleby; Africa No.1, Gabon **15.475** (Fr to W.Africa 1600-1900) 34444 at 1645 in Storrington.

Later, KTBN Salt Lake City, USA **15.590** (Eng to N.America 1600-0000) was 44444 at 1829 in Woodhall Spa; DW via Rwanda? **15.135** (Eng to Africa 1900-1950) 35433 at 1930 in E.Bristol; WCCR Nashville, USA **15.685** (Eng to N.America, Eur 1205?-2200) 45544 at 1930 in Northampton; VOA via Greenville, USA **15.580** (Eng to Africa 1800-2200) 23232 at 2010 in Liverpool; V of Indonesia, Jakarta **15.150** (Eng to Eur, Africa 2000-2100) 44434 at 2035 in St.Mary's, IoS; BBC via Ascension Is **15.400** (Eng to Africa 0800-1130, 1500-2300) 43334 at 2120 in Stalbridge; RCI via Sackville **15.325** (Fr, Eng to Eur, Africa 2000-2300) 44444 at 2142 in

Oxted; WYFR via Okeechobee **15.565** (Eng to Eur?, Africa? 2000?-2245?) 45333 at 2234 by **Tony Hall** in Freshwater Bay, IoW.

Good reception from some areas has also been evident in the **13MHz (22m)** band. The occupants include Swiss R.Int via Sottens **13.685** (Eng, It, Ger, Fr to Australasia 0830-1030), rated 55555 at 0855 in Herstmonceux; VOA via Guam? **13.650** (Eng to ?) 33333 at 0929 in Truro; R.Australia via Shepparton **13.605** (Eng to Pacific 0800-1200) SIO 222 at 0957 in Macclesfield; R.Sweden **13.800** (Eng to Pacific, Asia 1430-1500) 43443 at 1445 in Plymouth; Croatian R, Zargreb **13.830** (Cr to N.America 1230?-?) 44444 at 1635 in Kilkeel; VOA via Selebi-Phikwe, Botswana **13.710** (Eng to Africa 1600-2130?) 45544 at 1825 in Northampton; R.Vlaanderen Int, Belgium **13.600** (Eng to Eur, N.Africa, M.East 1830-1900) 44333 at 1830 in Morden; WHRI via Noblesville, USA **13.760** (Eng to E.USA, Eur 1800-2000) 34333 at 1840 in Woodhall Spa; Nederlands via Flevo **13.700** (Eng to Africa 1830-2025) 34343 at 1915 in Liverpool; WCCR Nashville, USA **13.845** (Eng to Africa 1400-0100) 44434 at 2126 in Freshwater Bay, IoW; R.Havana Cuba **13.750** (Eng to Eur 2030-?) 22222 at 2130 in Nottingham; RCI via Sackville, Canada **13.650** (Fr, Eng to Eur, Africa 2000-2200) 44434 at 2145 in Oxted.

In the **11MHz (25m)** band the Voice of Greece, Athens **11.645** (Gr, Eng to Eur, Australia 0600-0800) was rated SIO 444 at 0614 by **Francis Hearne** in N.Bristol; R.Prague, Czech Rep **11.640** (Eng to N.Eur 1130-1157) 34433 at 1130 in Dudley; Swiss R. Int via Singapore **12.010** (Eng, Ger, Fr



Local Radio Chart

Freq (kHz)	Station	ILR	e.m.r.p (kW)	Listener
558	Spectrum, London	B	0.80	EFHJ
585	R.Solway	B	2.00	A
603	Capital G.Lit'lme	I	0.10	AB* C* EFH* J
630	R.Bedfordshire(GCR)	B	0.20	CD* EFH* J
630	R.Cornwall	B	2.00	AF
657	R.GWyd	B	7.00	A.E.G.H.
657	R.Cornwall	B	0.50	AF
666	CI Gold 566, Exeter	I	0.34	ABEFHJ
666	R.York	B	0.80	A.C.E.H.
729	BBC Essex	B	0.20	C.E.F.G.H.* J
738	Hereford/Worcester	B	0.037	ABEFHJ
756	R.Cumbria	B	1.00	A
756	The Magic 756 Powys	I	0.63	A.E.F.H.J
765	BBC Essex	B	0.50	CD* EFH
774	R.Kent	B	0.70	EFH* J
774	CI Gold 774, Glos	I	0.14	EF
792	CI Gold 792, Bedford	I	0.27	D.E.F.H.* J
792	R.Foyle	B	1.00	A
801	R.Devon & Dorset	B	2.00	ABEFH
828	CI Gold 828, Luton	I	0.20	B.D* EFH* J
828	Magic 828, Leeds	I	0.12	A
828	2CR CG, Bouremouth	I	0.27	F
837	R.Cumbria/Furness	B	1.50	A
837	Asian Netwk Leics	B	0.45	B.E.F.H.* J
855	R.Devon & Dorset	B	1.00	F
855	R.Lancashire	B	1.50	A.H
855	R.Norfolk, Postwick	B	1.50	E.H
855	Sunshine 855 Ludlow	I	0.15	B.E.J
873	R.Norfolk, W.Lynn	B	0.30	E.F.H.J
936	Brunei CG, W.Wilts	I	0.18	E.F.H.J
936	Fresh AM, Hawes	I	1.00	AE
945	CI Gold GEM, Derby	I	0.20	A.E.G
945	Capital G, Bezhil	I	0.75	B* C.E.F.H.* J
954	CI Gold 954, Torquay	I	0.32	F
954	CI Gold 954, H'ford	I	0.16	B.E.J
963	Asian Sd, E.Lancs	I	0.80	A
963	Liberty R, Halcroft	I	1.00	E.F.H.J
972	Liberty R, Southall	I	1.00	E.F.H.J
990	R.Aberdeen	B	1.00	E
990	R.Devon, E.Devon	B	1.00	AE
990	Magic AM, Doncaster	I	0.25	H
990	CI G, Wolverhampton	I	0.09	E.H.J
999	CI Gold GEM Nott'ham	I	0.25	E.H.J
999	Magic 9-99 P'stn	I	0.80	A
999	R.Solent	B	1.00	EF
1017	CI G, Shrewsbury	I	0.70	AEH
1026	R.Cambridgeshire	B	0.50	E.H.* J
1026	Downtown R, Belfast	I	1.70	A.E.G
1026	R. Jersey	B	1.00	A.E.F
1035	RTL, Country 1035	I	1.00	E.F.H.J
1035	R.Sherfield	B	1.00	A
1035	N.Sound 2, Aberdeen	I	0.78	AE*
1116	R.Derby	B	1.20	A.E.H.J
1116	R.Guernsey	B	0.50	A.E.F
1152	CI G Amber, Norwich	I	0.83	H
1152	IBC 1152 AM	I	23.50	E.F.H.J
1152	Pcily 1152 Manchr	I	1.50	A
1152	CI G, Birmingham	I	3.00	J
1161	R.Bedfordshire(GCR)	B	0.10	E.H.* J
1161	Brunei CI G, Swindon	I	0.16	EF
1161	Magic AM, Humber-side	I	0.35	A
1161	Southern Counties R	B	1.00	EF
1161	Tay AM, Dundee	I	1.40	E
1170	CI G Amber, Ipswich	I	0.28	H.*
1170	Magic 1170, Stockton	I	0.32	A.H
1170	Capital G, Portsmouth	I	0.50	EF
1170	Signal 2, Stoke-on-T	I	0.20	A
1170	1170AM High Wycombe	I	0.25	C.E.J
1242	Capital G, Maidstone	I	0.32	EF*
1251	C.G Amber, Bury StEd	I	0.76	E.H.*
1260	Brunei CG, Bristol	I	1.60	F
1260	SabrazSnd, Leicester	I	0.29	E.H.J
1260	R.York	B	0.50	A
1278	CI Gold 1278 W.York	I	0.43	E
1296	Radio XL, Birmingham	I	5.00	AB.E.F.H.J
1306	Magic AM, Barmley	I	0.15	A
1305	Premier via ?	I	0.50	EFH.J
1305	Touch AM, Newport	I	0.20	F
1323	Capital G, Southwick	I	0.50	C* E.F
1323	SomersetSnd, Bristol	B	0.63	AG* H
1332	Premier, Battersea	I	1.00	EF
1332	CI Gold 1332, Pt'bo	I	0.60	A.E.H.J
1332	Wiltshire Sound	B	0.30	EF
1359	Breeze, Chelmsford	I	0.28	E
1359	CI Gold 1359, C'try	I	0.27	E.H
1359	R.Solent	B	0.85	FH
1368	R.Lincolnshire	B	2.00	E.H.J
1368	Southern Counties R	B	0.50	C* E.F
1368	Wiltshire Sound	B	0.10	EF
1377	Asian Sd, Rochdale	I	0.10	A.E.*
1413	R.Gloucester via ?	B	?	H.J
1413	Premier via ?	I	0.50	EFH
1431	Breeze, Southend	I	0.35	B.D* E.F*
1431	CI Gold, Reading	I	0.14	EFJ
1449	R.Peterboro/Cambis	B	0.15	A.E.H.J
1458	R.Cumbria	B	0.50	A
1458	R.Devon & Dorset	B	2.00	AF
1458	1458 Lite AM Manchr	I	5.00	G*
1458	Sunrise, London	I	50.00	EFHJ
1458	Asian Netwk, Langley	B	5.00	H
1476	CountySnd, Guildford	I	0.50	CD* E.F.J
1485	CI Gold, Newbury	I	1.00	B.E.F
1485	R.Humber-side (Hull)	B	1.00	ABH
1485	R.Merseyside	B	1.20	AC* F
1485	Southern Counties R	B	1.00	C* D* E.F
1503	R.Stoke-on-Trent	B	1.00	AB* E.G.H.* J
1521	Breeze, Reigate	I	0.64	B.E.F.G.H.* J
1530	R.Essex, Southend	B	0.15	C.E
1530	CI Gold via ?	I	?	G
1530	CI Gold W.Yorks	I	0.74	A
1530	CI Gold, Worcester	I	0.52	J
1548	R.Bristol	B	5.00	EF
1548	Capital G, London	I	97.50	A.E.F.G.H
1557	R.Lancashire	B	0.25	A
1557	CI Gold 1557, N.hant	I	0.76	E.H.J
1557	Capital G, Sol'ham	I	0.50	EF
1584	London Turkish R	I	0.20	E
1584	R.Northingham	B	1.00	E
1584	R.Shropshire	B	0.50	AE
1584	Tay, Perth	I	0.21	E
1602	R.Kent	B	0.25	EF

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

Listeners:-

- (A) Robert Connolly, Kilkeel.
- (B) Simon Hockenhill, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Rhoderick Illman, Oxted.
- (E) Brian Keyte, Bookham.
- (F) George Millmore, Wootton, IoW.
- (G) Tom Strong, Co.Fermanagh.
- (H) Ernie Strong, Ramsey, Cambs.
- (I) Phil Townsend, E.London.
- (J) Fred Wilmschurst, Northampton.



1400-1600) 44333 at 1400 in-Morden; R.Canada Int via Skelton, UK **11.740** (Eng to Eur 1430-1500) 33333 at 1430 in Truro; R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1100-1730) 54444 at 1435 in Herstmonceux; R.Australia via Shepparton **11.660** (Various to Asia 1430-1700) 44444 at 1502 in Morpeth; BBC via Skelton & Woofferton, UK **12.095** (Eng to Eur, N/W.Africa 0700-1900) 45444 at 1518 in Freshwater Bay, IoW; R.Pakistan, Islamabad **11.570** (Eng to M.East 1600-1630?) SIO 333 at 1600 in Co.Fermanagh; R.Kuwait via Kabd **11.990** (Eng to Eur, N.America 1800-2100) 44444 at 1804 in Woodhall Spa; R.Australia via Shepparton **11.880** (Eng to Pacific areas, N.America 1700-2200) 24333 at 2013 in Storrington; AIR via Bangalore **11.620** (Eng, Hin to Eur 1745-2230) 43343 at 2035 in Liverpool; R.Damascus, Syria **12.085** (Ger, Fr, Eng to Eur 1805-2105) 35322 at 2100 in Newry; R.Nac da Amazonia, Brazil **11.780** (Port 0900-0200) 35543 at 2131 in Wallsend; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1400?-2200) 45444 at 2145 in Northampton; Israel R, Jerusalem **11.585** (Heb to Eur, N.America 1900?-2300?) 24332 at 2230 in Oxted; BBC via Ascension Is **12.095** (Eng to

S.America ?-0200) 35433 at 0150 in E.Bristol; RCI via Sackville **11.865** (Eng to USA, Mexico, Caribbean 0200-0300) 43333 at 0220 in St.Austell.

There is much to interest the listener in the **9MHz (31m)** band. Noted before noon were HCJB Quito, Ecuador **9.780** (Eng to W.America 0500?-0900?), rated 44444 at 0715 in Morpeth; R.Nederlands via Bonaire, Ned.Antilles **9.790** (Eng to Asia, Pacific 0930-1125) 42334 at 0930 in Stalbridge; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 33222 at 0946 in Truro; KTRW Guam **9.865** (Eng to F.East 1000-1100) 34232 at 1015 in Newry; Swiss R.Int via Julich, Germany **9.535** (Eng, Ger, It, Fr to SW.Eur 1100-1330) 43334 at 1100 in Dudley; R.Japan via Woofferton, UK **9.660** (Ger to Eur 1100-1130) 44444 at 1116 in Oxted; R.Korea Int via Sackville, Canada **9.650** (Eng to America 1130-1200) 44444 at 1130 in Appleby.

During the afternoon R.Nederlands via Wertachtal **9.855** (Eng to Eur 1130-1325) was 55555 at 1220 in Herstmonceux; R.Vlaanderen Int, Belgium **9.925** (Eng to Eur 1230-1300) 44444 at 1247 in Plymouth; Voice of Vietnam, Hanoi **9.730** (Eng to SE.Asia? 1330-1400) 33333 at 1330 in Kilkeel; China R.Int **9.700** (Eng to Asia? 1400-1500?) 44454 at 1438 in Larnaca,

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600/300	J*
531	Tonshavn	Faeroe Is	20	E
531	Berg	Germany	10	F*,G*
531	RNE5 via ?	Spain	?	F*,G*
531	Beromunster	Switzerland	500	G*,J,K*,L
540	Wavre	Belgium	150/50	F*,G*,J*,L
540	Sidi Bennour	Morocco	600	F*,G*,J*
549	Les Trembles	Algeria	600	F*,G*,J*
549	Thurnau (DLF)	Germany	200	F*,G*,J*,K*,L
558	Espoo	Finland	50	F*,J
558	RNE5 via ?	Spain	?	F*,G*
567	Tullamore(RTE1)	Eire	500	D*,E*,F*,G*,J*,K*,L,M
567	RNE5 via ?	Spain	?	G*
576	Muhlacker(SDR)	Germany	500	F*,G*,J*
576	Riga	Latvia	500	G*,J*
576	Barcelona(RNE5)	Spain	50	G*,K*
585	Paris(FIP)	France	8	G,J
585	Madrid(RNE1)	Spain	200	F*,G*,J*,K*,L
585	Gafsa	Tunisia	350	F*
594	Frankfurt(HR)	Germany	1000/400	F*,G*,J*,K*,L
594	Dujda-1	Morocco	100	G*,J*
594	Muge	Portugal	100	J
603	Lyon	France	300	B,G,J*,K*
603	Bucharest	Romania	50	F*,G*
603	Sevilla(RNE5)	Spain	50	C*,F*,G*
603	Newcastle(BBC)	UK	2	E,F*,J*
612	Athlone(RTE2)	Eire	100	C,D*,E*,F*,G*,J*,K*,L
612	Sebaa Aïoun	Morocco	300	C*,G*
612	RNE1 via ?	Spain	10	C*,J*
621	Wavre	Belgium	80	C*,D*,F*,G*,K*,L
621	RNE1 via ?	Spain	10	J*
621	Barcelona(OCR)	Spain	50	C*,F*,G*
630	Vigra	Norway	100	J*
630	Tunis-Djedeida	Tunisia	600	D*,G*
639	Praha(Liblice)	Czech	500	C*,F*,K*
639	RNE1 via ?	Spain	?	C*,F*,G*,L
648	Orfordness(BBC)	UK	500	C,E,F*,G*,J*,K*,L
657	Napoli	Italy	120	G*,K*
657	Madrid(RNE5)	Spain	20	D*,F*,G*,J*,L
657	Wrexham(BBC/Wales)	UK	?	C,E,F*,J*
666	Messkirch(Rohrd/SWF)	Germany	150	C*,F*,K*,L
666	Sitkumar(Vilnius)	Lithuania	500	F*
666	Lisboa	Portugal	135	G*
666	Barcelona(SER)	Spain	50	F*
675	Marseille	France	60	F*
675	Lopid(R10 Gold)	Holland	120	B,C,D*,F*,G*,J*,K*,L
684	Sevilla(RNE1)	Spain	500	C*,F*,G*,J*,K*,L
693	Droitwich(BBC)	UK	150	G,J,L
693	Enniskillen(BBC)	UK	1	I
702	Fleensburg(NDR)	Germany	5	F*,K*
702	TWR via Monte Carlo	Monaco	300	J*
711	Rennes 1	France	300	B,F*,G*,J*,K*,L
711	Laayoune	Morocco	600	G*,J*
720	Lots Rd,Ldn(BBC4)	UK	0.5	E,G,J
729	Cork(RTE1)	Eire	10	E,F*,J
729	RNE1 via ?	Spain	?	F*,G*,J*,L
738	Paris	France	4	G,J
738	Barcelona(RNE1)	Spain	500	F*,G*,J*,K*,L
747	Flevo(Hi2)	Holland	400	B,D*,F*,G*,J*,K*,L
756	Braunschweig(DLF)	Germany	800/200	F*,G*,J*,K*,L
756	Bilbao(El)	Spain	5	F*,J*
756	Redruth(BBC)	UK	?	F*,G,J
765	Sottens	Switzerland	500	F*,G*,K*,L
774	Enniskillen(BBC)	N.Ireland	1	F*
774	RNE1 via ?	Spain	?	D*,F*,G*,J*,L
783	Leipzig(MDR)	Germany	100	F*,G*,K*,L
783	Dammam	Saudi Arabia	100	G*
792	Limoges	France	300	F*,G*
792	Lingen(NDR)	Germany	5	F*,G*
792	Sevilla(SER)	Spain	20	G*
792	Londonderry(BBC)	UK	1	I
801	Munchen-Ismaning	Germany	300	F*,G*,J*,K*
801	RNE1 via ?	Spain	?	F*,G*,J*
810	Volgograd	Russia	150	G*
810	Madrid(SER)	Spain	20	D*,G*,J*
810	Westerglen(BBC/Scott)	UK	100	D*,E,G,J,L*
819	Batra	Egypt	400	G*,J*
819	Toulouse	France	50	F*,L*
819	S.Selastiar(El)	Spain	5	G*,J*
828	Rotterdam	Holland	20	F*,K*
837	Nancy	France	200	F*,G*
837	COPE via ?	Spain	?	F*,G*,J*
846	Rome	Italy	1200	B*,F*,G*,J*,K*,L*
855	Berlin	Germany	100	F*
855	RNE1 via ?	Spain	?	F*,G*,J*,K*,L*
864	Santah	Hungary	500	F*,G*,J*
864	Paris	France	300	B,F*,G*,J*,K*
864	St.Petersburg(TWR)	Russia	?	F*
864	Socuellamos(RNE1)	Spain	2	G*,J*
873	Frankfurt(AFN)	Germany	150	F*,G*,K*
873	Zaragoza(SER)	Spain	20	F*,G*
873	Enniskillen(RJ)	UK	1	F*,J
882	COPE via ?	Spain	?	F*
882	Washford(BBC/Wales)	UK	100	C,E,F*,G*,J*,K*,L*
891	Algiers	Algeria	600/300	B*,G*,K*,L*
891	Hilversum	Netherlands	20	B*,F*,J*
891	Antalya	Turkey	600	J*
900	Bmo (Cro2)	Czech Rep.	25	G*
900	Milan	Italy	600	B*,F*,G*,J*,K*
900	COPE via ?	Spain	?	J*
909	B'mans FM(BBC5)	UK	140	G*,J,L
918	Domzale	Slovenia	600/100	F*,G*,J*,L
918	Madrid(R.Int)	Spain	20	B*,G*,J*
927	Wolvertem	Belgium	300	F*,G*,K*,L
936	Bremen	Germany	100	F*,G*,J*
936	Venezia	Italy	20	F*,G*
936	RNE5 via ?	Spain	?	F*,J*
945	Toulouse	France	300	F*,J*
954	Bmo (Cro2)	Czech Rep.	200	F*,G*,J*
954	Madrid(CI)	Spain	20	B*,G*,J*,K*
963	Sofia	Bulgaria	150	G*
963	Pori	Finland	600	B*,G*
963	Tir Chonail	Eire	10	G*,J*
972	Hamburg(NDR)	Germany	300	F*,G*,J*,L
972	RNE1 via ?	Spain	?	F*,J*
981	Alger	Algeria	600/300	F*,G*,K*,L*
990	Berlin	Germany	300	F*,G*,J*,L*
990	R.Bilbao(SER)	Spain	10	F*,G*,J*,K*
990	Redruth(BBC)	UK	?	F*
990	Tyrryn(BBC)	UK	1	E*,J*
999	Schwenn (RIAS)	Germany	20	F*,J*
999	Madrid(COPE)	Spain	50	B*,J*,K*,L*
1008	SER via ?	Carnegie/Spain	?	F*,J*
1008	Flevo(Hiv-5)	Holland	400	F*,G*,J*,L*
1017	Rheinsender(SWF)	Germany	600	F*,G*,J*,K*,L*
1026	Graz-Dobl	Austria	100	F*
1026	SER via ?	Spain	?	G*
1035	Milan	Italy	50	J*
1035	Lisbon(Prog3)	Portugal	120	F*
1044	Dresden(MDR)	Germany	20	F*,G*
1044	Sebaa-Aïoun	Morocco	300	J*
1044	SER via ?	Spain	?	G*,J*
1053	Talk R.UK via ?	UK	?	F*,G,J,L
1062	Kalundborg	Denmark	250	F*,G*,J*,K*,L*
1062	R.Uno via ?	Italy	?	F*,G*
1071	Cairo	Egypt	100	J*
1071	Riga	Latvia	50	G*
1071	Bilbao(El)	Spain	5	B*,G*,J*,K*,L*
1071	Talk Radio UK via ?	UK	?	F*,J,L
1080	SER via ?	Spain	?	G*,J*
1089	Talk Radio UK via ?	UK	?	F*,G,J,L
1098	Nitra(Jarok)	Slovakia	1500	B*,F*,G*,J*,K*,L*
1107	AFN via ?	Germany	10	F*,J*
1107	Talk R.UK via ?	UK	?	F*,G,J
1116	Ban	Italy	150	J*,K*
1125	La Louviere	Belgium	20	F*,G*,J*,L*
1125	Deanovec	Croatia	100	K*
1125	RNE5 via ?	Spain	?	G*,J*
1134	Zadar(Croatian R)	Croatia	600/12008*	F*,G*,J*,K*,L*
1134	COPE via ?	Spain	2	F*,G*
1143	AFN via ?	Germany	1	F*,K*
1143	COPE via ?	Spain	2	G*,J*
1161	Ain-Salah	Algeria	5	G*
1179	Solvelborg	Sweden	600	B,F*,G*,H*,J*,K*,L*
1188	Kuurne	Belgium	5	F*,G*,J*,K*,L*
1188	Reichenbach(MDR)	Germany	5	F*,J*
1188	Szolnok	Hungary	135	G*
1197	Munch(VOA)	Germany	300	F*
1197	Virgin via ?	UK	?	F*,G,J,L
1206	Bordeaux	France	100	B
1215	Virgin via ?	UK	?	F*,G,J,L
1224	Vidin	Bulgaria	500	G*
1224	Lelystad	Holland	50	F*,J
1224	COPE via ?	Spain	?	J*
1233	RFE via ?	Czech Rep.	?	F*
1233	Virgin via ?	UK	?	F*,J,L
1242	Virgin via ?	UK	?	F*,J
1251	Marcali	Hungary	500	F*,J*
1251	Huisberg	Netherlands	10	F*,K*
1260	SER via ?	Spain	?	F*,G*
1269	Neumunster(DLF)	Germany	600	B*,F*,G*,J*,K*,L*
1278	Dublin/Cork(RTE2)	Eire	10	E,F*,G*,J*,K*,L*
1287	RFE via ?	Czech Rep.	?	F*,G*,K*,L*
1287	Lendia(SER)	Spain	10	F*,G*,J
1296	Valencia(COPE)	Spain	10	G*,J*
1296	Orfordness(BBC)	UK	500	E*,F*,K*
1305	RNE5 via ?	Spain	?	F*,G*
1314	Kvitsoy	Norway	1200	B*,F*,G*,J,L
1323	W'brunn (V.Russia)	Germany	1000/150	F*,K*,L*
1332	Rome	Italy	300	F*,G*
1341	Lakhegy	Hungary	300	G*
1341	Lisnagarvey(BBC)	N.Ireland	100	B,E,I,J,K*,L*
1341	Magwa	Kuwait	200	G*,J*
1341	Tarrazola(SER)	Spain	2	G*,J*
1350	Cesvaine/Kuldiga	Latvia	50	G*,J*
1368	Foxdale(Manx R)	Is of Man	20	B*,E*,F*,G*,J
1377	Lille	France	300	B,G,J*,K*
1386	Bolshakovo	Russia	2500	B*,G*,F*,G*,J*,K*,L*
1395	Filake	Albania	1000	J*
1395	Lopic	Netherlands	120/40	F*,G*,J*,K*,L*
1404	Brest	France	20	F*,G,L*
1422	Alger	Algeria	50/25	F*
1422	Heusweiler(DLF)	Germany	1200/600	D*,F*,G*,J*,K*,L*
1440	Marnach(RTL)	Luxembourg	1200	C*,F*,G*,J*,K*,L*
1440	Dammam	Saudi Arabia	1600	B*,J*
1449	Squinzano (RAI)	Italy	50	G*
1449	Redruth(BBC)	UK	2	F*,J*
1458	Filake	Albania	500	J*
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,F*,G*,J*,K*,L*
1476	Wien-Bismberg	Austria	600	F*,J*
1476	Lviv	Ukraine	120	D*
1485	SER via ?	Spain	?	C*,D*,J*,L*
1494	Clemont-Ferrand	France	20	F*,J*,K*
1494	St.Petersburg	Russia	1200	B*,C*,D*,F*,G*,J*,L*
1512	Wolvertem	Belgium	300	A*,C*,G*,H*,J*,K*,L*
1512	Jeddah	Saudi Arabia	1000	F*,L*
1521	Kosice(Cizakite)	Slovakia	600	G*
1521	Duba	Saudi Arabia	2000	B*,J*
1521	R.Manresa(SER)	Spain	2	G*
1530	Vatican R	Italy	150/4500	D*,E*,F*,G*,J*,K*,L*
1539	Mainflinger(ERF)	Germany	350(700)	D*,F*,G*,J*,K*,L*
1557	Nice	France	300	K*
1575	Genova	Italy	50	G*,J*
1575	SER via ?	Spain	5	D*,F*,G*,J*,L*
1584	SER via ?	Spain	2	J*
1593	Holzkirchen(VOA)	Germany	150	F*,G*,L*
1602	SER via ?	Spain	?	F*,G*,L*
1602	Victoria(E)	Spain	10	F*,G*,J*,K*,L*
1611	Vatican R	Italy	15	E*,F*,G*,J*,K*

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

Listeners:-

- (A) Robert Beason, Nottingham.
- (B) Simon Hockenbult, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Rhoderick Illman, Oxted.
- (E) Brian Keyte, Gt. Bookham.
- (F) Eddie McKeown, Newry.
- (G) George Millmore, Wooton IoW
- (H) Clare Pinder, while in Appleby.
- (I) Tom Smyth, Co.Fermanagh
- (J) Emie Strong, Ramsey, Cambs.
- (K) Phil Townsend, E.London.
- (L) Fred Wilmshurst, Northampton.
- (M) Tom Winzor, Plymouth.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
3.200	TWR Manzini	Swaziland	0305	E
3.240	TWR Shona	Swaziland	0315	E
3.250	SABC Radio 5	S. Africa	1934	H
3.255	BBC via Meyerton	S. Africa	1818	E, LK
3.270	Namibian BC, Windhoek	Namibia	1917	E, H
3.280	R Beira	Mozambique	0325	E
3.290	Namibian BC, Windhoek	Namibia	1934	B, H
3.306	ZBC Prog 2	Zimbabwe	1733	H
3.315	AIR Bhopal	India	1459	B, I
3.320	SABC (RSG) Meyerton	S. Africa	1950	B, E, H, P
3.335	CBS Taipei	Taiwan	2032	H, P
3.345	AIR Jaipur	India	0045	B, H
3.365	GBC R-2	Ghana	2107	B, H
3.365	AIR Delhi	India	1817	LK
3.915	BBC via Kranji	Singapore	2245	F
3.950	Qinghai PBS, Xining	China	1425	I
3.955	BBC via Skelton	England	1815	A, E, G, L, M, N, P
3.965	R. Taipei via Skelton	England	1800	J, L, M
3.965	RFI Paris	France	1915	F
3.975	R. Budapest	Hungary	2100	G, L, P
3.980	R. Korea via Skelton	England	2015	G, J, M, P
3.985	Nexus, Milan	Italy	1830	M, P
3.995	DW via Julich	Germany	2003	G, M, P
3.995	DW via Meyerton	S. Africa	2308	B, O
4.755	R. Educ CP Grande	Brazil	0200	B
4.760	AIR Port Blair	India	1616	B, K
4.770	Centinela del Sur	Ecuador	0120	B
4.770	FRCN Kaduna	Nigeria	1845	K
4.783	RTM Bamako	Mali	2028	H, K
4.785	Zhejiang PBS, H'gzhou	China	2214	K
4.790	Azad Kashmir R.	Pakistan	0109	B, K
4.800	AIR Hyderabad	India	0111	B, K
4.800	LNBS Maseru	Lesotho	1847	K
4.805	R. Nac. Amazonas	Brazil	0120	B
4.820	R. Botswana, Gaborone	Botswana	1852	K
4.820	La Voz Evangelica	Honduras	0638	K
4.820	AIR Calcutta	India	1606	K
4.825	R. Cancao Nova	Brazil	0643	K
4.828	ZBC R-4	Zimbabwe	1700	H, L, K
4.830	R. Tachira	Venezuela	0204	A, B, E, K
4.835	R. Tezulutlan, Coban	Guatemala	0023	B, K
4.835	RTM Bamako	Mali	2039	D, G, H, K, M, P
4.840	AIR Bombay	India	0115	B, H, K
4.845	R. Meteorologia	Brazil	0714	K
4.845	RTM Kuala Lumpur	Malaysia	1729	H
4.845	ORTM Nouakchott	Mauritania	2026	D, H, K
4.850	R. Yaounde	Cameroon	2009	K, P
4.850	AIR Kohima	India	1608	B, C, K
4.860	AIR Delhi	India	1725	F, H, K
4.865	R. Missoes, Amazonia	Brazil	0646	K
4.879	B. Bangladesh	Bangladesh	0100	B
4.880	AIR Lucknow	India	0027	K
4.885	R. Clube do Para	Brazil	0342	E, K
4.885	R. Difusora Acreana	Brazil	0105	B
4.885	KBC East Sce Nairobi	Kenya	1723	B, H, K
4.890	R. Port Moresby	New Guinea	2000	H
4.895	R. IPB AM C'po Grande	Brazil	0716	K
4.915	GBC-1, Accra	Ghana	2045	D, H, K, P
4.915	KBC Cent Sce Nairobi	Kenya	1623	H
4.920	R. Quito, Quito	Ecuador	0345	E, K
4.920	AIR Chennai	India	1727	B, H, K
4.930	R. Internacional	Honduras	0333	K
4.930	Namibian BC, Windhoek	Namibia	1747	E
4.935	KBC Gen Sce Nairobi	Kenya	1800	H
4.940	AIR Guwahati	India	1711	H, J
4.950	AIR Srinagar, Kashmir	India	0122	B, H, K
4.950	VDA via Sao Tome	Sao Tome	2030	G, H, J, K, M, N, P
4.955	R. Nac. de Colombia	Colombia	0110	F
4.960	R. Cima	Dominion Rep.	0340	E
4.960	R. Federacion, Sucua	Ecuador	0115	B
4.960	VDA via Sao Tome	Sao Tome	0335	B
4.965	Christian Voice	Zambia	1734	H, K
4.975	R. Uganda, Kampala	Uganda	2041	A, B, G, H, K, P
4.980	PBS Xinjiang, Urumqi	China	1550	B, H
4.980	Ecos del Torbes	Venezuela	0123	A, B, E, K
4.985	R. Brazil Central	Brazil	2224	H, K
5.005	R. Nepal, Kathmandu	Nepal	0033	B, K
5.010	AIR Thiru'puram	India	0130	B
5.020	La V du Sahel, Niamey	Niger	1851	K
5.025	R. Parakou	Benin	2053	H
5.025	R. Rebelde, Habana	Cuba	0035	B, K
5.025	R. Uganda, Kampala	Uganda	1924	H, K
5.030	AWR Latin America	Costa Rica	0135	B
5.035	R. Aparecida	Brazil	0654	K
5.035	R. Bangui	C. Africa	1905	K
5.047	R. Togo, Lome	Togo	2054	H, K
5.050	Haixia 1, V of Strait	China	1757	K
5.050	R. Tanzania	Tanzania	1852	H, K, P
5.055	RFD Cayenne(Matoury)	French Guiana	0120	B, K
5.060	PBS Xinjiang, Urumqi	China	0017	B, K, P
5.100	R. Liberia, Totota	Liberia	2040	P

DXers:-

- (A) Robert Beason, Nottingham.
 (B) Robert Connolly, Kilkeel.
 (C) Bernard Curtis, Stalbridge.
 (D) David Edwardson, Wallsend.
 (E) David Hall, Morpeth.
 (F) Robert Hughes, Liverpool.
 (G) Rhoderick Illman, Oxted.
 (H) Fred Pallant, Storrington.
 (I) John Parry, Larnaca, Cyprus.
 (J) Clare Pinder, while in Appleby.
 (K) Richard Reynolds, Guildford.
 (L) Tom Smyth, Co. Fermanagh.
 (M) Phil Townsend, E. London.
 (N) Martin Venner, St. Austell.
 (O) Thomas Williams, Truro.
 (P) Fred Wilmshurst, Northampton.

Cyprus; Swiss R. Int via Julich **9.620** (It, Ar to M. East, Africa 1630-1800) 43343 at 1730 in Liverpool.

In the evening AIR via Delhi **9.950** (Eng to Eur 1745-1945) was SIO 544 at 1810 in Macclesfield; VOA via ? **9.645** (Eng to ? 1800?-1900?) 44444 at 1823 in Woodhall Spa; VOIRI Tehran, Iran **9.022** (Ger, Fr, Eng to Eur 1730-2030) SIO 323 at 1930 in Co. Fermanagh; V of Turkey, Ankara **9.630** (Eng to Eur, N. America 1930-2020) 45434 at 1943 in Storrington; VOA via Morocco? **9.760** (Eng to Eur, M. East, N. Africa 1700-2100) 55544 at 2012 in Liverpool; R. Australia via Shepparton **9.500** (Eng to Asia 1430-2130) 22222 at 2030 in Nottingham; R. Thailand via Udon Thani **9.535** (Eng to Eur 2030-2045) 55444 at 2030 in Freshwater Bay, IoW.

Later, R. Cairo, Egypt **9.990** (Eng to Eur 2115-2245) was 33223 at 2201 in St. Austell; RCI via Sackville **9.755** (Fr, Eng [CBC progs] to USA, Caribbean 2230-0400) SIO 333 at 2329 in N. Bristol; R. Bulgaria, Sofia **9.400** (Eng to N. America 0000?-0100?) 55545 at 0050 in E. Bristol.

The **7MHz (41m)** band carries quite a few broadcasts for listeners in Europe. Some come from R. Japan via Woofferton, UK **7.230** (Jap, Eng 0500-0700), rated 43443 at 0655 in Herstonconceux; R. Minsk, Belarus **7.210** Rus) 24332 at 1112 in Oxted; Voice of Greece, Athens **7.450** (Eng, Gr 1800-1830) 45243 at 1805 in Newry; R. Polonia (Polish R), Warsaw **7.285** (Eng 1800-1900) 54444 at 1807 in Plymouth; Voice of Greece, Athens **7.475** (Eng, Gr 1900-1930) 44444 at 1905 in Newry; R. Norway Int **7.485** (Norw 1900-1930) 22222 at 1912 in Nottingham; V of the Mediterranean, Malta via Russia **7.440** (Eng 2000-2100) SIO 555 at 2000 in Co. Fermanagh; R. Polonia (Polish R), Warsaw **7.285** (Eng 2030-2130) 44444 at 2100 in Morden; Vatican R, Italy **7.250** (Various, Eng 2050-2110) 54343 at 2106 by Martin Cowin in Kirkby Stephen; V of Russia, Moscow **7.300** (Eng) 55544 at 2107 in Northampton; RCI via Skelton, UK **7.235** (Fr, Eng 2000-2300) 33232 at 2110 in Storrington; R. Bulgaria, Sofia **7.535** (Eng 2200-2300) 55555 at 2200 in Dudley; All India Radio (AIR) via Bangalore **7.410** (Hi, Eng 1745-2230) 43333

at 2216 in St. Austell; WYFR via Okoeechobee, USA **7.355** (Eng 2100?-2200, Sp 2200-2245) 33333 at 2240 in Stalbridge.

Some to other areas have also been received here. They include the Voice of Nigeria **7.255** (? to W. Africa), rated 34343 at 2100 in Storrington; VOA via Botswana **7.415** (Eng to Africa 1900-2230) 32232 at 2110 in Liverpool; WJCR Upton, USA **7.490** (Eng to E. USA 24hrs) 23332 at 0150 in Kilkeel; KTBN via Salt Lake City, USA **7.510** (Eng to N. America 0000?-1600?) 43344 at 0605 in Morpeth.

Many more broadcasts to Europe may be heard in the **6MHz (49m)** band. Some originate from Deutsche Welle (DW) via Julich? **6.140** (Eng Service), rated 44444 at 1104 in Oxted; R. Netherlands via Julich, Germany **6.045** (Eng 1130-1325) 35433 at 1130 in E. Bristol; R. Slovakia Int **5.915** (Eng 1730-1757) 55555 at 1730 in Dudley; R. Prague, Czech Rep. **5.930** (Eng 1800-1827) 44444 at 1800 in Woodhall Spa; R. Korea Int via Kimjae **6.480** (Various) 43343 at 1900 in Liverpool; R. Yugoslavia, Belgrade **6.100** (Eng 1930-2000) 44333 at 1930 in Co. Fermanagh; R. Slovakia Int **6.055** (Eng 1930-2000) 33333 at 1940 in Nottingham; R. Finland via Pori **6.135** (Eng 2000-2030) 54444 at 2005 in Herstonconceux; R. Polonia [Polish R], Warsaw **6.095** (Eng 2030-2125?) 33333 at 2050 in Stalbridge; V of Russia **5.965** (Eng) 55544 at 2047 in Northampton; BBC via Rampisham & Skelton, UK **6.195** (Eng 0500-0700, 1800-0000) 53333 at 2053 in Kirkby Stephen; R. Prague, Czech Rep. **5.930** (Eng 2100-2127) SIO 333 at 2109 in N. Bristol; R. Canada Int via Skelton, UK **5.995** (Fr, Eng 2000-2200) 43333 at 2140 in St. Austell; R. Taipei Int via WYFR **5.810** (Eng 2200-2300) 43333 at 2200 in Appleby; R. Budapest, Hungary **6.025** (Eng 2200-2230) 44333 at 2200 in Morden.

Whilst beaming to other areas R. Ext Espana via Noblejas? **6.055** (Eng to America 0000-0200 Sat/Sun) rated 54344 at 0000 in Newry; KAIJ Denton, USA **5.810** (Eng to W. USA 0000-1400) was 33322 at 0150 in Kilkeel; WHRI South Bend, USA **5.745** (Eng to N. America 2100?-1000) was peaking 55555 at 0515 in Morpeth.



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

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Bandscan America

WTJC, Newport, North Carolina, became the newest short wave station in the United States when it signed on last fall (at the rate new stations come on the air, though, that claim is easily lost). WTJC is using 9.370 with 50kW and relays the programs of its sister domestic stations, airing an all religious format, plus news from the USA Network. The address for reception reports is **WTJC, 520 Roberts Road, Newport, NC 28570.**

Adventist World Radio (AWR) surprised s.w.l.s when it announced the sale of its Costa Rica station last fall. The Costa Rica broadcasts were always heard extremely well. The Guatemala station - Union Radio on 5.981 - has never been heard well in North America and we don't expect that even the new 5kW unit, which is supposed to take over the job (along with satellite feeds to domestic stations throughout Latin America) will make much difference. Of course, North America is not the intended target.

Suspiciously, AWR did not say who bought the station, but a day or two after AWR's final broadcasts from Costa Rica, its 5.030, 6.150, 9.725, 13.750 and 15.460 began carrying Dr. Gene Scott's University Network - another not-so-pleasant surprise.

Radio Nacional, Venezuela, isn't reported very often, but the station is currently active on its normal frequency of 9.540. At one time, it was airing some English language programming, but currently all of the broadcasts are in Spanish. The station is on the air from 0100-0200, 0300-0400, 1100-1200, 1400-1500, 1800-1900 and 2100-2200. Reception reports can be sent to **Sr. Miguel Angel Cariel, Apartado Postal 3979, Caracas 1010-A, Venezuela.**

New Station

There's a fairly new station in Bolivia serving the Quechua Indians in the southern and central highlands of the country. Radio Mosoj Chaski broadcasts only in the Quechua language. It uses a 10kW transmitter on 3.310 from 2200 to 0100 and 0900 to 1200. Reception reports can be sent to **Radio Mosoj Chaski, Casilla 4493, Cochabamba, Bolivia.** You can E-mail them at chaski@bo.net

Another new Bolivian is Radio Victoria, in Villa Abecia, on 7.053. Not much is known about this one yet, but one might suspect very low power and a late afternoon or early evening closing, which would make North American reception difficult.

The Bolivian Radio Andes is now called Radio Mallku, located in the town of Uyuni, in Potosi province. It's using 4.7965, running from 1030 to 2400.

A new one from the Dominican Republic is HIAH - Radio Vila - on 4.960 from Santo Domingo. Although listed at just 1kW, the station is being heard at quite strong levels, on average during North American evenings (0000 and on). The address for this one is **Apartado 804, Santo Domingo.**

Recent receptions from Brazil include:

MHz	Station
2.460	Radio Alvorada, Rio Branco
3.245	Radio Clube, Varginha
3.355	Radio Educadora 6 de Agosto, Xapuri
3.365	Radio Cultura, Araraquara
3.375	Radio Clube, Dourados
4.701	Radio Voz de Castrovirreyra, Castrovirreyra
4.755	Radio Educacao Rural, Campo Grande
4.765	Radio Integracao, Cruzeiro do Sol
4.765	Radio Rural, Santarem
4.775	Radio Liberal, Belem
4.775	Radio Congohas, Congohas
4.785	Radio Brazil, Campinas
4.785	Radio Caiari, Porto Velho
4.795	Rádiodifusora Aquidauana
4.845	Radio Cultural Ondas Tropicais, Manaus
4.865	Radio Missoes da Amazonia, Obidos
4.875	Rádiodifusora Roriana, Boa Vista
4.885	Radio Clube do Para, Belem
4.935	Radio Capixaba, Vitoria
4.975	Radio Mundial, Sao Paulo
5.012	Radio Integracao, Cruzeiro do Sol
5.035	Radio Aparecida, Aparecida
5.955	Radio Gazeta, Sao Paulo
5.970	Radio Itatiaia, Belo Horizonte
6.040	Radio Clube Paranaense, Curitiba
6.150	Radio Record, Sao Paulo
6.160	Radio Rio Mar, Manaus
5.965	Radio Transmundial, Sao Paulo
9.505	Radio Record, Sao Paulo
9.515	Radio Nova de Paz, Curitiba
9.545	Radio Bandeirantes, Sao Paulo
9.530	Radio Transmundial, Sao Paulo
9.645	Radio Bandeirantes, Sao Paulo
9.695	Radio Rio Mar, Manaus
11.705	Radio Transmundial, Sao Paulo
11.715	Radio Novas de Paz, Curitiba
11.805	Radio Globo, Rio de Janeiro
11.815	Radio Brazil Central, Goiania
11.830	Radio CBN, Anhanguera
11.855	Radio Aparecida, Aparecida
11.925	Radio Bandeirantes, Sao Paulo
15.325	Radio Gazeta, Sao Paulo
17.815	Radio Cultura, Sao Paulo

Canadian CHNX, which relays CHNS medium wave in Halifax, Nova Scotia, is only operating with about 50W on its 6.130 spot. You can send E-mail reports to Scott Snailham at chnx@post.com The 15.820 channel, on which many have heard a number of domestic Argentina outlets relayed on sideband, has recently also carried the Uruguayan station Radio Sarandi. Radio Sarandi was active on short wave many years ago.

In Mexico, XERTA - 4.800 has been off the air since last fall. It may have returned by now or it may be gone for good. There were indications that the station was having financial problems.

Others still active and still being heard are Radio Mil on 6.010, Radio Educacion on 6.185, Radio UNAM (the national university station) on 9.600, which is suffering from technical problems. And Radio Mexico International, 9.705. This is a long way from the number of active stations many years ago, but better than it was at one time.

Ever-Changing Scene

Peru, with its ever-changing short wave scene, always provides plenty of challenging DX targets.

Here's a summary of what's been coming through recently (right).

Unusual Broadcast

Some years ago, DXers discovered an unusual broadcast in the Fiji Islands. The University of the South Pacific was relaying lectures on short wave to listeners in the outer islands. Then the service was either discontinued or DXers quit trying to take additional loggings because several years went by without a mention in the DX columns.

But we learn now that the service is still active, although the transmissions are at powers even lower than they were when DXers first heard the station (perhaps as little as 50W!). The broadcasts are on the air Monday through Friday from 2200 to 0700 on 9.070 and 12.140, both using upper sideband.

The address, should you get very, very, lucky is: **University of the South Pacific, Extension Services, P.O. Box 1168, Suva, Fiji Islands.**

That will cover things from the Americas until three months hence. Until then, good listening!

Note: Frequencies mentioned in this column should be considered variable.



Radio Nacional Venezuela is being heard on 9.540 again. Perhaps today's QSLs are more attractive than the one issued in 1983.

MHz	Station
3.235	Radio Luz y Sonido, Huanuco
3.330	Ondas del Huallaga, Huanuco
3.340	Radio Altura, Cerro de Pasco
4.460	Radio Nor Andina, Celendin
4.535	Radio Horizonte, Chiclayo
4.748	Radio Huanta 2000, Huanta
4.775	Radio Tarma, Tarma
4.782	Radio Satelite, Santa aCruz
4.790	Radio Atlantida, Iquitos
4.825	La Voz de la Selva, Iquitos
4.826	Radio Sicuani, Sicuani
4.840	Radio Andahuaylas, Andahuaylas
4.856	Radio La Hora, Cusco
4.886	Radio Virgen del Carmen, Huancavelica
4.890	Radio Chota, Chota
4.905	Radio La Oroya, La Oroya
4.915	Radio Cora, Lima
4.940	Radio San Antonio, Villa Atalaya
4.950	Radio Madre de Dios, Puerto Maldonado
4.955	Radio Cultural Amuata
4.970	Radio Imagen, Tarapoto
4.975	Radio del Pacifico, Lima
4.996	Radio Andina, Huancayo
5.025	Radio Quillabamba, Quillabamba
5.039	Radio Libertad, Junin
5.067	Radio Ondas del Suroriente, Quillabamba
5.084	Radio Mundo, Cusco
5.522	Radio Sudamerica, Cutervo
5.637	Radio Peru, San Ignacio
5.700	Radio Frecuencia San Ignacio, San Ignacio
5.678	Radio Illucan, Cutervo
5.858	Radio Nueva Cajamarca
5.949	Radio Arequipa, Arequipa
5.995	Radio Melodia, Arequipa
6.046	Radio Santa Rosa, Lima
6.115	Radio Union, Lima
6.196	Radio Cusco, Cusco
6.480	Radio Altura, Huarmaca
6.520	Radio Paucaratambo, Paucaratambo
6.536	Rádiodifusora Huancabamba, Huancabamba
6.674	Radio Super Nueva Sensacion, Huancabamba
6.798	Radio Ondas del Rio Mayo, Nueva Cajamarca
6.895	Radio San Miguel, Pampa Alegre
6.955	Radio Paraton, Huarmaca
7.003	La Voz de las Huarinas, Huancabamba
9.505	Radio Tacna, Tacna



A QSL from Canadian time station CHU pays tribute to Stanford Fleming and his idea of setting up standard time zones.

HAYDON COMMUNICATIONS



★ ★ MAIL ORDER: 01708 862524 ★ ★



NEXT DAY DELIVERY TO MOST AREAS, £10.00.



MVT-7100EU

Wideband hand-held scanner covers 500kHz-1650MHz. (All mode). Includes nicad/car charger/charger/antenna.

SPECIAL OFFER **£189.00**

MVT-9000MkII Flagship h/h scanner£319.95
Soft case for 7100EU/9000 - specify.....£19.99



AOR AR8200

The latest all mode innovation in handies. There's too many features to list (.2-2GHz, all mode). (Incl's SSB). Supplied with nicads/charger ready to go.

SALE PRICE **£339.00**

Soft case for AR8200/8000.....£19.99

AOR AR8000

All mode hand portable receiver 500Hz - 1900MHz. Dot matrix display, a real trendsetter. Computer/reaction tune port and many other features. (Incl's SSB) Supplied with nicads/charger ready to go. STILL OUR No1 BEST SELLER!

£279.95



YAESU VR-500

All mode scanning receiver covers 100kHz-1300MHz. Huge memory capacity; 1091 channels. A simple to operate yet fully featured all mode communications receiver. (Incl's SSB).

WE SIMPLY SELL FOR LESS ONLY **£269.00**



AR108

Palm sized dedicated airband scanning receiver. Covers airband 108-136.975MHz VHF 136-180MHz with 99 memories.

ONLY **£59.95**

Optional batteries + charger £13.99.



ICOM IC-R2

Miniature wideband hand-held scanner covers 0.5-1300MHz (AM, FM/WFM).

£129.00

MOTOROLA TA-200

Licence free PMR-446. Now you can use a 446MHz hand-held without a licence.

SALE PRICE **£69.95** or 2 for **£129.00**

TA-288 NOW IN STOCK.....Sale price £99.00



MOTOROLA HANDIE PRO

Professional quality licence free PMR-446 hand-held with nicads + charger. *Offer ends Feb 2000.

ONLY **£169.00** or 2 for **£319.00**



REALISTIC DX-394

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Clock/timer ★ Noise blanker ★ Limit scan ★ Tape output Was ~~£199.00~~

Send SAE for review SPECIAL OFFER **£149.95**



YAESU FRG-100

Brilliant short wave receiver. Outperforms any other receiver in its price bracket.

SALE PRICE **£369.00**



ICOM IC-R75

The short wave receiver for the true enthusiast. ● 0.03-60MHz (all mode). ● Synchronous AM detection ● PC control capability ● The Dxr's choice

OUR PRICE **£609.00**



AR-7030

The most highly acclaimed receiver on the market. In our opinion it outperforms the NRD receiver.

ONLY **£679.00**



SONY SW-55E

Superb quality portable SW receiver with 125 presets. 50Hz step tuning for shortwave. Includes compact antenna, stereo headphones and carry case. RRP £299.95.

SALE PRICE **£239.00**



SONY SW-100E

Award winning miniature portable SW receiver. Its performance is brilliant for its size. The best short wave receiver for under £250. RRP £220.00.

SALE PRICE **£149.95**

Sony SW-55 Superb quality short wave receiver.....£239.00



SANGEAN ATS-909

Synthesized world receiver with RDS and 306 memories. Covers SW/MW/LW & FM stereo.

SPECIAL ... ONLY **£129.95**

FREE PSU INCLUDED



ICOM PCR-1000

Bring another world to your computer. It covers a wide frequency range from 0.01-1300MHz (all mode). Incl's SSB. RRP £349.00. Amazing front end performance

OUR PRICE **£249.00**

UT-106 DSP filter for PCR-1000.....£69.95



ICOM IC-8500

"Next generation" technology brings you super wide band, all mode coverage from 0.1-2GHz. It's a professional quality communications receiver with versatile features from high speed scanning to computer control.

SALE PRICE **£1295.00**



AR5000

The AR-5000 advances the frontiers of performance providing excellent strong signal handling, high sensitivity and wide band coverage. Covers 10kHz-2600MHz.

SPECIAL OFFER **£1199.00**



AR3000A

This highly acclaimed receiver has set its own place in today's demanding market. Your listening horizons are truly extended by its Rx range of 100kHz to over 2GHz and high level performance is achieved by its electronically switched 15 band pass filter system.

ONLY **£679.00**

AOR ARD2 ACARS Navtex Decoder£269.00

AOR SDU5000 Spectrum display unit (last one).....£499.00



FAIRHAVEN RD-500VX+

0-1750MHz, all mode, fully featured. We have had this unit independently tested & compared to other radios priced at around £1500 and in our opinion this is the best there is. Buy yours before the price increases. New RRP £899.00

OUR PRICE **£799.00**

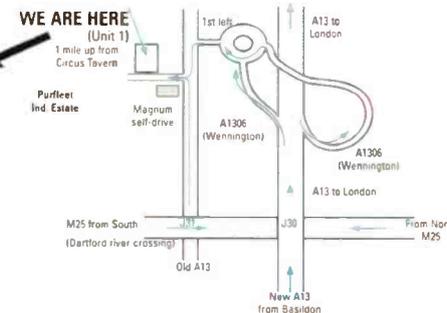


BEARCAT BC-9000XLT

We have just secured a small quantity of this amazingly high performance desk-top scanner. The unit covers from 25-1300MHz and has nearly every facility available including 500 memories, alphanumeric display, switchable modes and even a scan rate of 100 channels per second. WHAT'S EVEN BETTER IS THE PRICE. Was £299.00. WHILE STOCKS LAST NOW ONLY

£219.00

SHOWROOM & MAIL ORDER:
Unit 1, Thurrock Commercial Park, Purfleet Industrial Estate, London Rd, Nr. Aveley, Essex RM15 4YD
TEL: 01708 862524
FAX: 01708 868441
Open Mon - Fri 8am - 4.30pm.
Sat 8am - 1.00pm



W. MIDLANDS SHOWROOM
Unit 1, Canal View Ind. Est., Brettel Lane, Brierley Hill, W. Mids. DY5 3LQ
Open Mon-Fri 9.30-5pm. Sat 9.30-2pm
NO MAIL ORDER TO MIDLANDS BRANCH

HAYDON COMMUNICATIONS



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NEXT DAY DELIVERY TO MOST AREAS, £10.00.

NEW CLOCKS/WEATHER STATIONS FOR THE 21st CENTURY FROM OREGON SCIENTIFIC



RM-913 RADIO CONTROLLED CLOCK. ● 12/24hr function ● Auto clock from "Rugby" RF signal ● Alarm function ● Backlight & more ● Incl's batteries
£11.99 P&P £2



BA-312E WEATHER CLOCK. ● 5 weather forecast ● Temp (Min/max) ● "Higlo" illumination ● Alarm/calender ● Much more ● Incl's batteries
£27.99 P&P £2



BA-888 ELECTRONIC BAROMETER/CLOCK. ● Temp/weather/forecast/pressure barometric trend ● 24hr bargraph ● 12/24hr clock & alarm ● Humidity ● Table/wall mount
£69.95 P&P £4



RM-338 EXECUTIVE CLOCK. ● Jumbo LCD ● 12/24hr clock ● 100yr calender ● Temp (°C/°F) ● Wall or desk mount ● Backlight ● Incl's batteries
£24.99 P&P £2



BAR-888U WEATHER/RADIO CONTROLLED CLOCK. ● Supplied with one remote (wireless) sensor ● Weather forecast ● Barometer ● 24 hr "radio" clock ● Thermometer
£69.95 P&P £4



JM-838 JUMBO WALL/DESK CLOCK. ● Wide screen/2" digit time display ● Barometer ● Calender ● Temp ● Auto RF synch clock from Rugby
£59.95 P&P £4

GARMIN PRODUCTS



GARMIN GPS-III PLUS

Upgradable GPS system supplied with data lead and free on-board maps. Shows cities, airports and much, much more.

SALE PRICE **£315.00**

- Soft case for GPS-III Plus.....£20.00
- GPS-III UK version with moving map£249.95
- UK Map Source CDROM.....£69.95
- Cigar power lead.....£20.00
- Active magmount antenna.....£39.95
- In-car dashmount holder.....£9.99
- Magmount antenna.....£22.95



NEW GPS-12 NAVIGATOR

(now with 24 hour battery life) 12 channel receiver. Includes: UTM, ordnance survey, waterproof to IPX-7 standard.

SALE PRICE **£129.95**

- GPS-12XL (Includes Europe C.P.D.).....£209.95
- GPS-II New version.....£245.00
- Cigar power lead.....£20.00
- Optional active magmount antenna.....£39.95

The UK Scanning Directory

NEW 7th EDITION UK SCANNING DIRECTORY

ONLY **£19.50** P&P £3.50

SHOWROOM & MAIL ORDER:
Unit 1, Thurrock Commercial Park, Purfleet Industrial Estate, London Rd, Nr. Aveley, Essex RM15 4YD
TEL: 01708 862524
FAX: 01708 868441
Open Mon - Fri 8am - 4.30pm.
Sat 8am - 1.00pm

NEW OPENING TIMES

RECHARGEABLE ALKALINE CELLS

Starter kit includes charger & 4 x AA cells.
£13.99 + £2.50 P&P.
Please note that only the special cells can be recharged with this charger.

Extra cells available @ Rechargeable Alkaline. No memory effects. 1.5V cells. 3 x 8 x AA pack £10.99 £1 P&P 4 x AA pack £5.99 £1 P&P 4 x AAA £6.25 £1 P&P
NO QUIBBLE WARRANTY

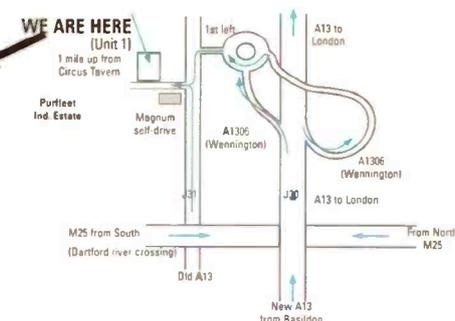
Data Interface for receiving CW/Baudot/ASCII/Amtor/ARQ/FEC/Sitor A/B/Navtex, Weather Fax, and Slowscan TV.
£39.95 P&P £2. Including: interface and software connects to RS-232/3.5mm lead connects to receiver (no external power needed).

NISSEI HS-8000
Miniature wideband scanning antenna with magmount (25-2GHz) BNC fitted.
RRP £24.99.
ONLY **£14.99** P&P £3.

DB-32 A miniature wideband antenna. Receives 30 - 1200MHz. BNC fitting only 1.5" long. It's superb (for its size). RRP £29.95.
SAVE £10
SALE PRICE **£19.95** P & P £1.
TSA-6671 BNC magmount£22.95

REGULAR-GAINER RH-770
BNC 21cm flexible whip that is ideal as replacement
OUR PRICE **£14.95** P&P £1

SUPER-GAINER RH-9000
BNC 40cm flexible model for the ultimate in gain.
OUR PRICE **£19.95** P&P £1



POLICE STYLE HOLSTER "HHC-2"

Matches all hand-helds can be worn on the belt or attached to the quick release body holster.

£22.95 P&P £1



MA-339

Mobile holder for hand-helds.

ONLY **£9.99** + P&P £2



QS-200 Air vent holder£9.99 P&P £2



QS-300

A fully adjustable desk top stand for use with all hand-helds. Fitted coaxial fly (FAI) with BNC & SO239 connectors.

ONLY **£14.95** P&P £2

Q-TEK HF INDUCTIVE INTERFACE

Allows the connection of any HF antenna to any scanner that has a BNC connector. Simply connect the long wire antenna to the push terminal on the top of the interface and attach to your scanner in place of your existing antenna.

ONLY **£19.95** P&P £1

INTERFERENCE - STOP IT!

Rectangular snap-fixing ferrite cores suitable for :- Radio coax/TV/mains/telephone/PC & data cables. Plastic teeth prevent it from sliding on cable. Simply snap close onto cable and job is done!

BULK PURCHASE hence **2 for £7** (P&P £2.50). HURRY - LIMITED STOCK

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NO MAIL ORDER TO MIDLANDS BRANCH

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COMMENTS SUCH AS:- WE'LL BEAT ANY ADVERTISED PRICE BY £10, £100, £1000 IN OUR OPINION ARE RIDICULOUS. WHAT DOES THIS MEAN? WE BELIEVE EVERY CUSTOMER SHOULD GET THE BEST DEAL FROM THE START. WE OFFER THE KEENEST PRICES AROUND. HOWEVER, SHOULD YOU SEE A LIKE FOR LIKE PRODUCT ADVERTISED CHEAPER, WE'LL BEAT IT! WE SIMPLY SELL FOR LESS.

CRAZY PRICED SALE ITEMS



PROFESSIONAL MOBILE/HOME BASE EXT

SPEAKER

£29.99 **£14.99** P&P £4.50



DO IT YOURSELF UNIVERSAL CASE

180 x 56 x 130mm

ONLY **£3.50** P&P £1.50

WATERPROOF CASE FITS MOST HAND-HELDS £19.99 ONLY £4.99 P&P £2



OPTO TRACKER
£299.00

SALE £179.00



OPTO R11
£349.00.

SALE £199.00

OPTO DC-440
CTCSS decoder. £199.00.
ONE ONLY £49.99



OPTO TECHTOYZ
Micro frequency counter.
10MHz- 1.2GHz. RRP £89.99.

ONLY £49.99



WATSON HUNTER
Frequency counter 10MHz- 3GHz.

ONLY £54.95
+ free case worth £15.00

REACTION TUNE COMBOS



Mini Scout + AR8200
Complete with lead
ALL FOR
£519.00

Mini Scout + AR8000 (all leads/mods included).....£449.00



Scout MkII + AR8200
Full Scout with
reaction lead
£689.00

Scout MkII + AR8000 (lead modification included).....£599.00

Short Wave Magazine, February 2000

Q-TEK HF-30

An amazing new design concept in compact HF antennas. Thanks to its six-stage multi-resonant coil system stacked vertically utilising a magnetic balun at the base you can obtain better results than ever experienced from a compact-vertical HF antenna. (SO-239 fitting- 4' high - clamps to any mast up to 2" dia). 0-30MHz.



£84.95 (DEL £10.00)
SUPERB HF SHORTWAVE ANTENNA

"Mario Gongolsky" - Freelance journalist for German magazines - brief comments after testing HF-30... your HF-30 kept all the promises you have made. Smooth reception on a surprisingly low noise level. The HF-30 supplied a very clear signal to the receiver. Continuous good performance throughout the whole frequency range.

NEW SP-1 SPYWIRE

Ideal for any receiver. Receives all short wave bands. All mode, no ATU required. Built in balun. SO239 connection.

£29.95 + £3 P&P



Q-TEK APOLLO 2000MkII

A brilliant new compact indoor antenna that covers 0-1650MHz and is just 20" tall (collapsed). Supplied with coax and BNC plug fitted.

ONLY £49.95 P&P £5



I have to say that I'm not a fan of indoor antennas like this as earlier desk mounted antennas tended to look like a mad scientist invention. However, I was surprised by the quality of construction of this piece of equipment and it appears to be up to the job it is designed to do. Without getting technical, the Apollo 2000 claims to be able to cover 0-1650MHz. I used it between 108-400MHz approx and was surprised by what it was able to do. It produced clean copy and there was good reproduction with very little breakthrough.

Q-TEK D.C. 2000

A high performance wideband disccone offering superb performance from 25-2000MHz. Transmit range- 6m, 2m, 70cm, 32cm & 23cm (power handling 200W). Fitted with low loss 'N' type connector. Supplied with mounting brackets.

OUR PRICE £54.95 P&P £8.50



Putting the DC-2000 up gave me a tremendous boost to all signals with the ancient AR-2000 coming alive! Signals were well received and I found that I wandered out of airband - my usual haunt - into all manner of areas that previously have been less than good here due to my location!

Q-TEK INTRUDER

Superb quality wideband receiving antenna. Covers 100kHz-2GHz (all mode). Wall mounting. RRP £99.95.

SPECIAL OFFER £59.95
P&P £6.00



AIR-44 (Airband base)

Prof quality base antenna for AIRBAND. (Civil & military). With SO-239 fitting (1.7m long). Gain 4.5/7dB.

£69.95 P&P £8.50

AIR-33 (As above) 1m long. Gain 3/6dB.
£44.95 P&P £5



Q-TEK WSK-2000

SAVE OVER £50

● Professional 137MHz 2 element crossed dipole kit for receiving weather satellite pictures.
● Due to unwanted commercial order we have 100 pieces to sell off at a silly price.
Includes: ● Reflectors ● Baluns ● Phasing harness ● Dual polarisation (circular) ● Incl's N-plug & mast clamps ● Assembles in seconds &

incl's free s/ware ● Instant free reception of live colour pictures from orbit
£89.95 ONLY £34.95 Del £8.50



NEW Q-TEK CYCLOPSE

Your eye-in-the-sky. The ultimate short wave receiving antenna. Doesn't your short wave receiver deserve something better than just a simple long wire? Well, here it is - the Cyclops. A unique ready to go antenna system that works from 0-30MHz. The antenna is centre fed with coax (supplied) and incorporates six tuned coils for optimum reception. The system also incorporates an anti-interference balun and comes ready assembled for immediate use. At only 15.5mtrs (51ft) long it will certainly fit most gardens.

INTRO PRICE £59.95 P&P £8.50
(Coax has PL-259 fitted)

Q-TEK LW-2 The ultimate in high quality long wire antenna kits. Complete ready to go wire antenna that should last forever - don't forget you get what you pay for! (0-30MHz) length - adjustable up to 150ft.



£39.95 P&P £5.

(All parts - high quality and replaceable)



GLOBAL AT-2000

Deluxe SW ATU 0-30MHz. SO239 fittings.

ONLY £85.00 P&P £4 (Probably the best ATU around)



Vectronics AT100

Active SW antenna
Covers 0.3-30MHz with adjustable sensitivity. Simply connect to a receiver and away you go.

SUPERB VALUE £69.95 P&P £4
(includes pre-selector)

NEW Q-TEK BALUN

Short wave magnetic long wire adaptor for any short wave receiver. Simply screw onto receiver & connect the wire via supplied screw terminal. (It's brilliant!)

PL-259 ONLY £22.95 P&P £1



COPPER ANTENNA WIRE (All 50mtr rolls)

Enamelled.....	£12.95 P&P £5
Hard drawn.....	£13.95 P&P £5
Multi-Stranded (Grey PVC).....	£9.95 P&P £5
Extra H/duty (Clear coated).....	£30.00 P&P £5
Flexweave (H/duty).....	£30.00 P&P £5
Flexweave H/duty (20 mtrs).....	£15.95 P&P £5
Flexweave (PVC coated 20 mtrs).....	£18.95 P&P £5
Flexweave (PVC coated 50 mtrs).....	£40.00 P&P £5

SHORT WAVE (continued)

Time (UTC)	Station	Country	Day	Frequency (MHz)
0600-0700	R.Japan	Japan	-	7.230
0600-0700	Voice of America	USA	-	5.995
0600-0700	Voice of America	USA	-	7.170
0600-0700	Voice of America	USA	-	11.825
0600-0700	Voice of America	USA	-	11.930
0600-0700	Voice of America	USA	-	15.205
0600-1400	Deutsche Welle	Germany	-	6.140
0610-0615	V.of Greece	Greece	-	7.475
0610-0615	V.of Greece	Greece	-	15.630
0630-0700	R.Georgia	Georgia	-	11.805
0641-0656	R.Romania Int.	Romania	-	7.105
0641-0656	R.Romania Int.	Romania	-	9.510
0641-0656	R.Romania Int.	Romania	-	11.775
0641-0656	R.Romania Int.	Romania	-	15.105
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	4.005
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	5.880
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	6.185
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	7.250
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	9.645
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	11.740
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	15.595
0700-0730	V.of Mediterranean	Malta	Mon-Sat	7.150
0700-0800	BBC World Service	UK	-	6.195
0700-0800	BBC World Service	UK	-	9.410
0700-0800	BBC World Service	UK	-	12.095
0700-0800	BBC World Service	UK	-	15.485
0700-0800	BBC World Service	UK	-	15.565
0700-0800	BBC World Service	UK	-	17.640
0700-0800	WYFR Family R.	USA	-	7.355
0700-0800	WYFR Family R.	USA	-	7.520
0700-0800	WYFR Family R.	USA	-	9.985
0700-0815	IRRS-Shortwave	Italy	-	7.120
0700-0900	HCJB	Ecuador	-	9.780
0700-0900	HCJB	Ecuador	-	21.455
0700-1100	KVOH - Voice of Hope	USA	-	5.975
0700-2100	Sunrise Radio	UK	-	5.850
0703-0708	Croatian Radio	Croatia	Mon-Fri	6.165
0703-0708	Croatian Radio	Croatia	Mon-Fri	7.365
0703-0708	Croatian Radio	Croatia	Mon-Fri	9.830
0720-0725	Kyrgyz Radio	Kyrgyzstan	-	4.010
0730-0740	V.of Greece	Greece	-	9.420
0730-0740	V.of Greece	Greece	-	11.645
0730-0800	R.Finland	Finland	-	9.840
0744-0755	Trans World Radio	Monaco	Sat-Sun	9.870
0744-0755	Trans World Radio	Monaco	Sat-Sun	12.070
0754-0920	Trans World Radio	Monaco	-	9.870
0754-0920	Trans World Radio	Monaco	-	12.070
0800-0827	R.Prague	Czech Republic	-	11.600
0800-0827	R.Prague	Czech Republic	-	15.255
0800-0830	R.Vlaanderen Int.	Belgium	-	5.985
0800-0900	BBC World Service	UK	-	9.410
0800-0900	BBC World Service	UK	-	12.095
0800-0900	BBC World Service	UK	-	15.485
0800-0900	BBC World Service	UK	-	15.565
0800-0900	BBC World Service	UK	-	17.640
0800-0900	R.Korea Int.	Korea(Rep.)	-	13.670
0800-0900	WSHB	USA	Sat-Sun	7.535
0800-1200	RFPI	Costa Rica	-	6.975
0800-1200	RFPI	Costa Rica	-	15.050
0803-0808	Croatian Radio	Croatia	Sat-Sun	6.165
0803-0808	Croatian Radio	Croatia	Sat-Sun	7.365
0803-0808	Croatian Radio	Croatia	Sat-Sun	9.830
0815-1300	IRRS-Shortwave	Italy	Sat-Sun	7.120
0830-0900	R.Georgia	Georgia	-	11.910
0900-0930	V.of Mediterranean	Malta	Sun	11.770
0900-1000	WSHB	USA	Tue-Thu	7.535
0900-1500	BBC World Service	UK	-	12.095
0900-1500	BBC World Service	UK	-	15.485
0900-1500	BBC World Service	UK	-	15.565
0900-1500	BBC World Service	UK	-	17.640
0900-1630	HCJB	Ecuador	-	21.455
0920-0950	Trans World Radio	Monaco	Sun	9.870
0920-0950	Trans World Radio	Monaco	Sun	12.070
0930-1000	Adventist World Radio	USA	-	7.230
0930-1000	R.Vilnius	Lithuania	-	9.710
1000-1030	V.of Armenia	Armenia	Sun	4.810
1000-1030	V.of Armenia	Armenia	Sun	15.270
1000-1100	WEWN	USA	-	7.465
1000-1100	WWCR-1	USA	-	7.435
1000-1600	WHRI-2	USA	-	6.040
1030-1045	U.A.E.Radio	United Arab Emirates	-	15.255
1030-1045	U.A.E.Radio	United Arab Emirates	-	15.310
1030-1045	U.A.E.Radio	United Arab Emirates	-	17.760
1030-1045	U.A.E.Radio	United Arab Emirates	-	21.735
1100-1105	R.Pakistan	Pakistan	-	17.835
1100-1105	R.Pakistan	Pakistan	-	21.455
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	5.880
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	9.645

Time (UTC)	Station	Country	Day	Frequency (MHz)
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	11.740
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	15.595
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	21.850
1100-1130	Swiss Radio Int.	Switzerland	-	9.535
1100-1300	WWCR-1	USA	-	12.160
1100-1730	R.Jordan	Jordan	-	11.690
1100-2100	WEWN	USA	-	15.745
1130-1135	Israel Radio Int.	Israel	-	15.650
1130-1135	Israel Radio Int.	Israel	-	17.535
1130-1157	R.Prague	Czech Republic	-	11.640
1130-1200	Merlin Network 1	UK	Sat	17.650
1130-1200	V.of Africa	Libya	-	15.235
1130-1200	V.of Africa	Libya	-	15.415
1130-1200	V.of Africa	Libya	-	15.435
1130-1325	R.Netherlands	Netherlands	-	6.045
1130-1325	R.Netherlands	Netherlands	-	9.855
1200-1257	R.France Int.	France	-	11.670
1200-1257	R.France Int.	France	-	15.155
1200-1257	R.France Int.	France	-	15.195
1200-1300	R.Bulgaria	Bulgaria	-	15.700
1200-1300	R.Bulgaria	Bulgaria	-	17.500
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	3.560
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	9.640
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	9.850
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	9.975
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	11.335
1200-1300	R.Pyongyang	Korea (DP.Rep.)	-	13.650
1200-1300	R.Ukraine Int.	Ukraine	-	9.870
1200-1300	R.Ukraine Int.	Ukraine	-	15.520
1200-1400	WWCR-4	USA	-	7.435
1200-2400	RFPI	Costa Rica	-	15.050
1200-2400	RFPI	Costa Rica	-	21.460
1230-1257	R.Prague	Czech Republic	-	6.055
1230-1300	Adventist World Radio	USA	-	7.230
1230-1300	R.Vlaanderen Int.	Belgium	-	9.925
1300-1330	Swiss Radio Int.	Switzerland	-	9.535
1300-1359	R.Polonia	Poland	-	6.095
1300-1359	R.Polonia	Poland	-	7.270
1300-1359	R.Polonia	Poland	-	9.525
1300-1359	R.Polonia	Poland	-	11.820
1300-1400	R.Korea Int.	Korea(Rep.)	-	9.640
1300-1400	R.Romania Int.	Romania	-	11.940
1300-1400	R.Romania Int.	Romania	-	15.390
1300-2100	WWCR-1	USA	-	15.685
1303-1308	Croatian Radio	Croatia	-	6.165
1303-1308	Croatian Radio	Croatia	-	7.365
1303-1308	Croatian Radio	Croatia	-	9.830
1330-1400	R.Austria Int.	Austria	-	6.155
1330-1400	R.Austria Int.	Austria	-	13.730
330-1400	U.A.E.Radio	United Arab Emirates	-	9.605
1330-1400	U.A.E.Radio	United Arab Emirates	-	15.255
1330-1400	U.A.E.Radio	United Arab Emirates	-	15.315
1330-1400	U.A.E.Radio	United Arab Emirates	-	21.735
1330-1400	V.of Vietnam	Vietnam	-	7.145
1330-1400	V.of Vietnam	Vietnam	-	9.730
1330-1430	V.of Turkey	Turkey	-	17.815
1335-1350	V.of Greece	Greece	-	9.420
1335-1350	V.of Greece	Greece	-	9.690
1335-1350	V.of Greece	Greece	-	12.105
1335-1350	V.of Greece	Greece	-	15.530
1400-1430	R.Santec	Germany	Sun	9.710
1400-1500	Voice of America	USA	-	15.205
1400-1600	Merlin Network 1	UK	Sat	9.605
1400-1600	Merlin Network 1	UK	Sat	13.640
1400-1600	Merlin Network 1	UK	Sat	15.510
1400-1600	Overcomer Ministry	USA	Mon-Fri	6.010
1400-2100	WWCR-4	USA	-	9.475
1400-2200	WWCR-3	USA	-	12.160
1400-2400	WWCR-2	USA	-	13.845
1430-1459	R.Canada Int.	Canada	-	11.980
1430-1500	R.Sweden	Sweden	-	13.800
1500-1530	Israel Radio Int.	Israel	-	15.650
1500-1530	Israel Radio Int.	Israel	-	17.535
1500-1600	BBC World Service	UK	-	9.410
1500-1600	BBC World Service	UK	-	12.095
1500-1600	BBC World Service	UK	-	15.485
1500-1600	BBC World Service	UK	-	15.565
1500-1600	R.Pyongyang	Korea (DP.Rep.)	-	4.405
1500-1600	R.Pyongyang	Korea (DP.Rep.)	-	6.575
1500-1600	R.Pyongyang	Korea (DP.Rep.)	-	9.335
1500-1600	R.Pyongyang	Korea (DP.Rep.)	-	11.710
1500-1600	R.Pyongyang	Korea (DP.Rep.)	-	13.760
1500-1600	Voice of America	USA	-	9.575
1500-1600	Voice of America	USA	-	15.205
1500-2000	WRNO Worldwide	USA	-	13.800
1600-1615	R.Pakistan	Pakistan	-	11.570
1600-1615	R.Pakistan	Pakistan	-	15.100
1600-1615	R.Pakistan	Pakistan	-	17.510

SHORT WAVE (continued)

Time (UTC)	Station	Country	Day	Frequency (MHz)
1600-1630	Voice of America	USA	-	9.575
1600-1630	Voice of America	USA	-	15.205
1600-1645	U.A.E.Radio	United Arab Emirates-	-	9.605
1600-1645	U.A.E.Radio	United Arab Emirates-	-	13.755
1600-1645	U.A.E.Radio	United Arab Emirates-	-	15.255
1600-1700	BBC World Service	UK	-	9.410
1600-1700	BBC World Service	UK	-	12.095
1600-1700	BBC World Service	UK	-	15.565
1600-1700	Merlin Network 1	UK	Sat	3.965
1600-1700	Merlin Network 1	UK	Sat	9.655
1600-1700	Merlin Network 1	UK	Sat	13.640
1600-1700	R.Algiers Int.	Algeria	-	11.715
1600-1700	R.Algiers Int.	Algeria	-	15.160
1600-1700	R.Korea Int.	Korea(Rep.)	-	5.975
1600-1700	R.Pyongyang	Korea (DP.Rep.)	-	3.560
1600-1700	R.Pyongyang	Korea (DP.Rep.)	-	6.520
1600-1700	R.Pyongyang	Korea (DP.Rep.)	-	9.600
1600-1700	R.Pyongyang	Korea (DP.Rep.)	-	9.975
1600-1700	WYFR Family R.	USA	-	15.695
1600-1700	WYFR Family R.	USA	-	17.510
1600-1700	WYFR Family R.	USA	-	21.525
1600-1900	Deutsche Welle	Germany	-	6.140
1600-2000	WHRI-2	USA	-	13.760
1600-2400	KTBN	USA	-	15.590
1630-1700	Voice of America	USA	-	9.575
1630-1700	Voice of America	USA	-	15.205
1630-1700	V.of Vietnam	Vietnam	-	7.145
1630-1700	V.of Vietnam	Vietnam	-	9.730
1700-1727	R.Prague	Czech Republic	-	5.930
1700-1730	Vatican Radio 1	Vatican City State	-	4.005
1700-1730	Vatican Radio 1	Vatican City State	-	5.880
1700-1730	Vatican Radio 1	Vatican City State	-	7.250
1700-1730	Vatican Radio 1	Vatican City State	-	9.645
1700-1730	Vatican Radio 1	Vatican City State	-	15.595

Time (UTC)	Station	Country	Day	Frequency (MHz)
1700-1800	BBC World Service	UK	-	6.195
1700-1800	BBC World Service	UK	-	9.410
1700-1800	BBC World Service	UK	-	12.095
1700-1800	Merlin Network 1	UK	-	3.965
1700-1800	Merlin Network 1	UK	-	6.185
1700-1800	Merlin Network 1	UK	-	9.655
1700-1800	Merlin Network 1	UK	-	13.640
1700-1800	R.Japan	Japan	-	12.000
1700-1800	R.Romania Int.	Romania	-	9.625
1700-1800	R.Romania Int.	Romania	-	11.740
1700-1800	R.Romania Int.	Romania	-	11.940
1700-1800	R.Romania Int.	Romania	-	15.365
1700-1800	Voice of America	USA	-	6.040
1700-1800	Voice of America	USA	-	9.760
1700-1800	Voice of America	USA	-	15.205
1700-1800	WYFR Family R.	USA	-	15.695
1700-1800	WYFR Family R.	USA	-	17.510
1700-2100	Overcomer Ministry	USA	Mon-Fri	3.965
1700-2200	WMLK	USA	Sun-Fri	9.465
171Fri-1800	V.of Africa	Libya	-	15.235
171Fri-1800	V.of Africa	Libya	-	15.415
171Fri-1800	V.of Africa	Libya	-	15.435
1730-1800	R.Austria Int.	Austria	-	6.155
1730-1800	R.Austria Int.	Austria	-	13.730
1730-1830	R.Slovakia Int.	Slovakia	-	5.915
1730-1830	R.Slovakia Int.	Slovakia	-	6.055
1730-1830	R.Slovakia Int.	Slovakia	-	7.345
1745-1800	R.Tirana	Albania	-	7.210
1745-1800	R.Tirana	Albania	-	9.755
1745-1900	R.Bangladesh	Bangladesh	-	7.185
1745-1900	R.Bangladesh	Bangladesh	-	9.550
1745-1945	All India Radio	India	-	7.410
1745-1945	All India Radio	India	-	9.950
1745-1945	All India Radio	India	-	11.620

MEDIUM WAVE

Time (UTC)	Station	Country	Day	Frequency (kHz)
0000-0300	BBC World Service	UK	-	648
0100-0300	Voice of America	USA	-	1548
0100-0300	Voice of America	USA	-	1548
0300-0330	R.Belarus Int.	Belarus	Fri-Mon	1170
0300-0330	R.Finland	Finland	-	558
0300-0400	BBC World Service	UK	-	648
0400-0500	BBC World Service	UK	-	648
0400-0600	V.of Russia	Russia	-	693
0500-0515	Voice of America	USA	-	792
0500-0700	BBC World Service	UK	-	648
0515-0530	Voice of America	USA	-	1197
0515-0530	Voice of America	USA	-	792
0600-0620	Vatican Radio 1	Vatican City State	-	1530
0600-0700	Voice of America	USA	-	1197
0600-0700	Voice of America	USA	-	1260
0600-0700	Voice of America	USA	-	792
0600-0700	WYFR Family R.	USA	-	7355
0600-1000	V.of Russia	Russia	-	1323
0600-1000	V.of Russia	Russia	-	693
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	1530
0700-0710	Vatican Radio 1	Vatican City State	Mon-Fri	527
0700-0800	BBC World Service	UK	-	648
0700-1200	Voice of America	USA	-	1197
0730-0800	R.Finland	Finland	-	558
0800-0830	R.Vlaanderen Int.	Belgium	-	1512
0800-0900	BBC World Service	UK	-	648
0900-1500	BBC World Service	UK	-	648
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	1530
1100-1115	Vatican Radio 1	Vatican City State	Mon-Fri	527
1200-1400	Voice of America	USA	Mon-Fri	1197
1230-1300	R.Vlaanderen Int.	Belgium	-	1512
1400-1500	Voice of America	USA	-	1197
1400-1500	Voice of America	USA	-	1548
1500-1600	BBC World Service	UK	-	648
1500-1600	Voice of America	USA	-	1197
1500-1600	Voice of America	USA	-	1260
1500-1600	Voice of America	USA	-	1548
1500-1600	V.of Russia	Russia	-	1215
1500-1600	V.of Russia	Russia	-	1323
1500-1600	V.of Russia	Russia	-	1386
1500-1600	V.of Russia	Russia	-	693
1600-1630	Voice of America	USA	-	1260
1600-1630	Voice of America	USA	-	1548
1600-1700	BBC World Service	UK	-	648
1630-1700	Voice of America	USA	-	1197
1630-1700	Voice of America	USA	-	1260

Time (UTC)	Station	Country	Day	Frequency (kHz)
1630-1700	Voice of America	USA	-	1548
1700-1730	Vatican Radio 1	Vatican City State	-	1530
1700-1730	Vatican Radio 1	Vatican City State	-	527
1700-1800	BBC World Service	UK	-	648
1800-1830	V.of Azerbaijan	Azerbaijan	-	1296
1800-1900	BBC World Service	UK	-	648
1800-1900	V.of Russia	Russia	-	1494
1830-1900	R.Sweden	Sweden	-	1179
1830-1900	R.Sweden	Sweden	-	1179
1830-1900	R.Vlaanderen Int.	Belgium	-	1512
1900-1930	R.Vilnius	Lithuania	-	666
1900-2000	BBC World Service	UK	-	648
1900-2000	Voice of America	USA	-	1197
1900-2000	V.of Russia	Russia	-	1143
1900-2000	V.of Russia	Russia	-	1494
2000-2030	R.Finland	Finland	-	558
2000-2030	R.Finland	Finland	-	963
2000-2100	BBC World Service	UK	-	1296
2000-2100	BBC World Service	UK	-	648
2000-2100	V.of Russia	Russia	-	1386
2000-2100	V.of Russia	Russia	-	1494
2030-2045	Voice of America	USA	-	1197
2030-2100	R.Belarus Int.	Belarus	Tue-Thu	1170
2030-2100	R.Vlaanderen Int.	Belgium	-	1512
2050-2110	Vatican Radio 1	Vatican City State	-	1530
2050-2110	Vatican Radio 1	Vatican City State	-	527
2100-2200	BBC World Service	UK	-	648
2100-2200	Voice of America	USA	-	1260
2100-2200	Voice of America	USA	-	1548
2100-2200	V.of Russia	Russia	-	1323
2100-2200	V.of Russia	Russia	-	1386
2100-2200	V.of Russia	Russia	-	1494
2130-2200	R.Belarus Int.	Belarus	Tue-Thu	1170
2130-2330	R.Netherlands	Netherlands	-	1512
2200-2230	R.Santec	Germany	Tue	1323
2200-2230	R.Santec	Germany	Tue	1386
2200-2230	Voice of America	USA	-	1548
2200-2300	BBC World Service	UK	-	648
2230-0030	Voice of America	USA	-	1260
2230-0030	Voice of America	USA	-	1548
2230-2300	R.Sweden	Sweden	-	1179
2230-2300	R.Tirana	Albania	-	1215
2300-2315	Trans World Radio	Monaco	-	1467
2300-2400	BBC World Service	UK	-	648
2315-2345	Trans World Radio	Monaco	Sun-Mon	1467

Innovative products - cr



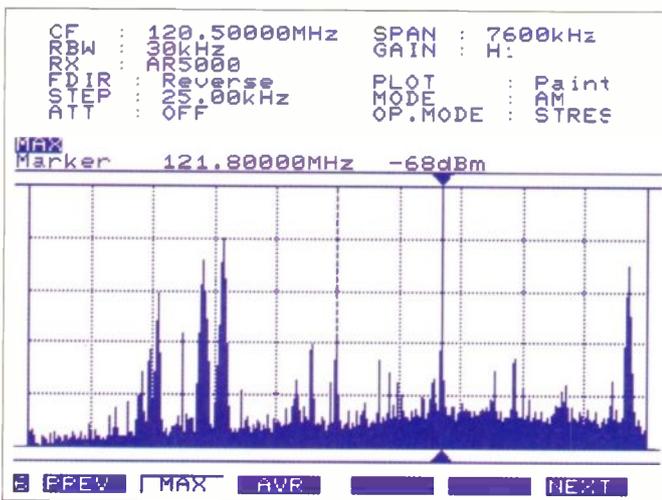
AOR receivers and major items are capable of full computer control

Setting new standards, SDU5500 Spectrum Display Unit

The SDU5500 is an 'all new' Spectrum Display Unit and a worthy successor to the SDU5000 (which offered practical and cost effective monitoring). Coupled to the AR5000 receiver, it provides a spectrum display of 10 MHz bandwidth anywhere between 10 kHz and 2600 MHz. Already pressed into commercial usage by the government, the professionalism of the unit has truly been grasped. The SDU5500 has a high resolution monochrome (white/blue) LCD with improved status read-out on the top-half of the display with a spin wheel tuner controlling the marker position, similar to a dedicated high-priced spectrum analyser.

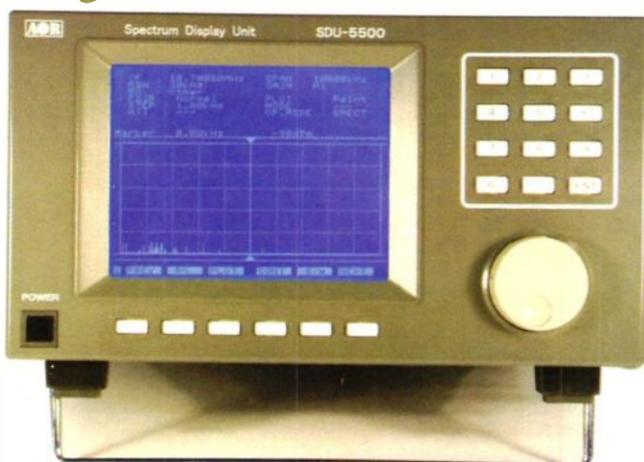
Receiver

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AR5000 IC-R8500
AR3000A IC-R9000
IC-R7100 Other
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The SDU5500 supports a number of AOR and ICOM receivers, see above. In addition, the SDU5500 may be used with other receivers which offer a 10.7 MHz I.F. output with suitably wide bandwidth, please refer to the colour leaflet for details. Various enhancements have been implemented over the earlier SDU to provide even greater functionality and professionalism. **Free internet download software** for the PC Windows operating system is available from our UK web site <<http://www.aoruk.com/firm5500.htm>> **£369**

Commercial and government organisations are selecting the AR5000 and SDU5500 every month. The combination is so successful that in many cases it is being singled out for implementation or consideration as their 'standard kit'!



★★★☆☆ AR5000+3 awarded four stars by both the authoritative Passport To World Band Radio and World Radio & TV Handbook

AR5000

True base receivers are few and far between, some have simply evolved from the hand held equivalents with little tangible improvement in performance or facilities over their smaller counterparts - *the AR5000 is not like this!*

High performance, top quality build and true wide coverage all mode receive. The "+3" version offers even more with synchronous AM, AFC and Noise Blanker. Popular with government agencies throughout the world. **£1445**

AR5000c

When making critical measurements, the frequency coherence is very important whether a single or multiple unit is employed. This involves the use of a single reference for all oscillators employed throughout the receiver. The AR5000C now provides this commercially required capability. The "C" version may be provided to order in either the standard AR5000 format or with two of the +3 additions of AFC and NB. If you are a commercial operator with this application in mind, please request the separate specification leaflet for the AR5000C. **£1825**

AR5000+3 - Sync AM, AFC, NB

The "+3" version offers even more with synchronous AM (upper side band, lower side band and double side band with excellent lock range), AFC (Automatic Frequency Control for accurately tracking moving transmissions or unusual band plans) and Noise Blanker. **£1699**

Passport to World Band Radio'99.

"Front-end selectivity, image rejection, IF rejection, weak-signal sensitivity, AGC threshold and frequency stability all superior".
 "Unlike virtually every other receiver we have tested over the past 21 years, the frequency readout is unfailingly accurate to the nearest Hertz. This should make the AR5000+3 of exceptional interest to broadcast engineers".

World Radio TV Handbook'99.

Speaking of the AR5000+3 in conclusion... "Compared with the ICOM ICR-8500 it offers considerably more features, better strong-signal handling, wider coverage and decidedly superior filters".

AR5000+3

- ✓ Wide frequency coverage 10 kHz - 2600 MHz
- ✓ All mode reception: USB, LSB, CW, AM, Synchronous AM, NFM, WFM with automode tuning (any mode and bandwidth on any frequency is possible)
- ✓ Automatic Frequency Control
- ✓ Noise blanker
- ✓ High stability TCXO reference, 1 Hz NCO tuning
- ✓ 1,000 memories, 10 memory banks, 20 search banks, 5 VFOs (all twice!), alpha tag, EEPROM chip storage
- ✓ Multiple IF bandwidth 3 kHz, 6 kHz, 15 kHz, 30 kHz, 110 kHz, 220 kHz with an option position for 500 Hz CW. (30 kHz is ideal for WEFAX).
- ✓ High sensitivity and excellent strong signal handling assisted by a preselected front end from 500 kHz - 1 GHz
- ✓ Extensive RS232 control list
- ✓ SDU ready with IF output for spectrum display unit

edible technical support

ontrol, many have software available as a free internet download



Every AOR radio receiver has one special feature in common- technical support!



With every new model, equipment is getting more and more complex, while the latest AOR models have well thought out comprehensive 'English' language operating manuals, it is comforting for many operators to know that technical support is on hand to answer queries and provide support when required. There are many 'so-called high-tech' products in the radio market but few offer the same high technical standards of support, those who do are deserving of great success.



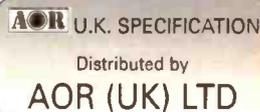
Here at AOR UK, great emphasis is placed on technical support, both with pre-delivery inspection of product (to dealers, the government and public) and with after-sales support. A meaningful 12 month warranty is provided with support stretching back to the factory in Japan, we have four fully equipped benches in our workshop with full-time staff capable of repair to component level. Most regular spare parts are carried in UK stock (held on a computer data-base) along with service manuals, replacement operating manuals and other associated items ready for supply. We truly carry out factory level repair here in the UK with a speedy turn-around, our technical competence and service facility is ranked with the very best in the business.

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The **AR8200** has been the first hand portable wide band all mode production unit to arrive on the market place with the new airband channel step of 8.33kHz correctly implemented. Add to this memory bank re-sizing, extensive step adjust capabilities to trace unusual band plans, an editable (via PC) meaningful auto mode bandplan, **free internet download** PC Windows software, optional SLOT CARDS and you have just the tip of the iceberg. The facilities offered by the AR8200 are stunning... take the 'step-adjust' feature for example. If you have a frequency of say 151.010MHz and wish to step in 15kHz increments, most receivers would simply assume 151.000 MHz then step 151.015, 151.030 etc. However, the AR8200 may be programmed to step in the desired manner of 151.010, 151.025, 151.040, 151.055MHz etc. Other real life examples would be the 27.60125MHz CB frequency incremented in 10 kHz steps, no problem... also the 900MHz band which implements 25 kHz steps but a 12.5kHz offset. Add to this the foresight of 8.33kHz airband steps and you have a very flexible unit!

AR8200 £399



Shown here with optional slot cards

Full computer control is provided by the AR8200 receiver (via the optional CC8200 interface or equivalent), *not just clone of data*. You can set frequencies, edit memory channels, add text comments, customise search banks, edit the auto-bandplan data etc etc. The '**8200 toolkit**' software is available as a **free download from the AOR web site** and is provided with the optional CC8200 computer control interface.



When comparing the AR8200 with other models ask the following important questions:

- ✓ Is **FULL computer control** available and can you set frequencies from the PC?
- ✓ Is 'official' **software** provided by the manufacturer as a **free download** from the internet?
- ✓ Are **NiCad rechargeable batteries** and charger provided and can you charge them inside the radio?
- ✓ Can the radio be connected to an **external 12V** supply (such as the car cigar lighter socket) using the standard supplied lead?
- ✓ Are both search AND **SCAN speeds** fast?
- ✓ Has it correct implementation of programmable scan delay from when the squelch closes?
- ✓ Does it have EEPROM memory storage with alpha text comments and memory bank re-sizing?
- ✓ Does the receiver support the new **8.33kHz airband steps** (correctly implemented)?
- ✓ Are optional **slot cards** available to further enhance capabilities, can it '**reaction tune**' with the Opto Scout?



AR8200: The answer to all the above is YES



Many other products available:
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Table 2: Area Situation Example.

Weapons Controller

Picture
Bogey groups
First group north bull 45 single 5000

Second group 050 17 8000
Third group 040 55 1000 heavy pair

Meaning

Area situation
Unidentified contacts
First contacts is a single aircraft north of the bullseye (pre-briefed reference point) by 45 miles at 5000 feet
Second contact bearing 050° from the bullseye, 17 nautical miles at 8000 feet
Third contact bearing 040°, 55 miles at 1000 feet, two groups with at least three aircraft in each group

(Crown Copyright)



Right, RAF Waddington-based E-3D Sentry (Crown Copyright)

Below, Geilenkirchen-based NATO E-3A (Keith Elgin G17SOB)

operating frequencies and specific tasks.

The make-up is as follows: Airborne Technicians, Communications Operator, Surveillance Team, Weapons Team and the Tactical Director who is in overall control of

the mission crew.

The two crew members who make up the Airborne Technicians team are unlikely to be heard on any of the voice circuits in use. The DT (Display Technician) is responsible for the on-board computer system and the RT (Radar Technician) is responsible for the mission radar.

Looking after the on-board communications devices and allocating access to radios for voice or data links is the CO (Communications Operator). Helping the CO with the various communications systems and providing basic airborne

maintenance is the CT (Communications Technician).

From a monitoring perspective, the Weapons team generates more interest among airbanders than any other team on the E-3, although to the uninitiated many of the broadcasts can be somewhat confusing at first. The 'Area Situation' is one such example and in **Table 2** is a typical broadcast along with the actual meaning.

To highlight the importance of understanding these messages, during the Kosovo crisis the area situation and subsequent threat broadcasts were



Table 3: Relevant Tactical Air Designators.

230.650, 233.000, 233.125, 233.675, 234.650, 240.300, 241.275, 242.275, 244.325, 244.925, 247.100, 248.700, 249.575, 250.125, 250.175, 251.175, 251.650, 251.700, 251.750, 252.000, 252.400, 254.425, 256.450, 258.950, 259.675, 260.150, 260.275, 260.975, 263.175, 263.450, 264.400, 265.850, 265.900, 267.475, 267.800, 268.500, 268.600, 268.950, 269.800, 270.025, 275.575, 275.700, 275.750, 276.025, 276.175, 276.200, 276.975, 277.200, 277.400, 277.750, 279.225, 279.250, 279.400, 279.525, 279.725, 281.100, 281.175, 282.200, 282.450, 282.975, 283.650, 284.975, 285.000, 290.675, 292.450, 292.550, 293.000, 293.700, 294.700, 296.775, 296.825, 298.650, 299.500, 299.925, 300.100, 300.125, 300.300, 300.550, 300.700, 301.075, 307.600, 309.525, 310.125, 311.300, 311.500, 311.750, 311.925, 312.050, 312.825, 314.025, 314.325, 314.575, 315.275, 315.300, 316.150, 316.725, 317.550, 317.850, 318.050, 336.175, 336.200, 337.850, 338.200, 340.900, 341.425, 341.975, 343.400, 344.850, 354.500, 355.725, 356.175, 357.700, 359.625, 359.700, 359.800, 362.475, 363.025, 363.675, 364.200, 364.275, 364.450, 364.900, 367.250, 367.325, 367.475, 369.025, 369.125, 370.250, 370.900, 371.600, 373.100, 373.350, 374.750, 376.075, 378.100, 378.675, 380.925, 380.975, 383.150, 387.125, 388.300, 388.775, 389.875, 397.750, 397.850, 399.100



passed using the same format which is routinely heard day after day. Sitting in the comfort of the shack, it was hard to imagine that the vectoring of friendly aircraft towards hostile targets was for real and not just another training flight.

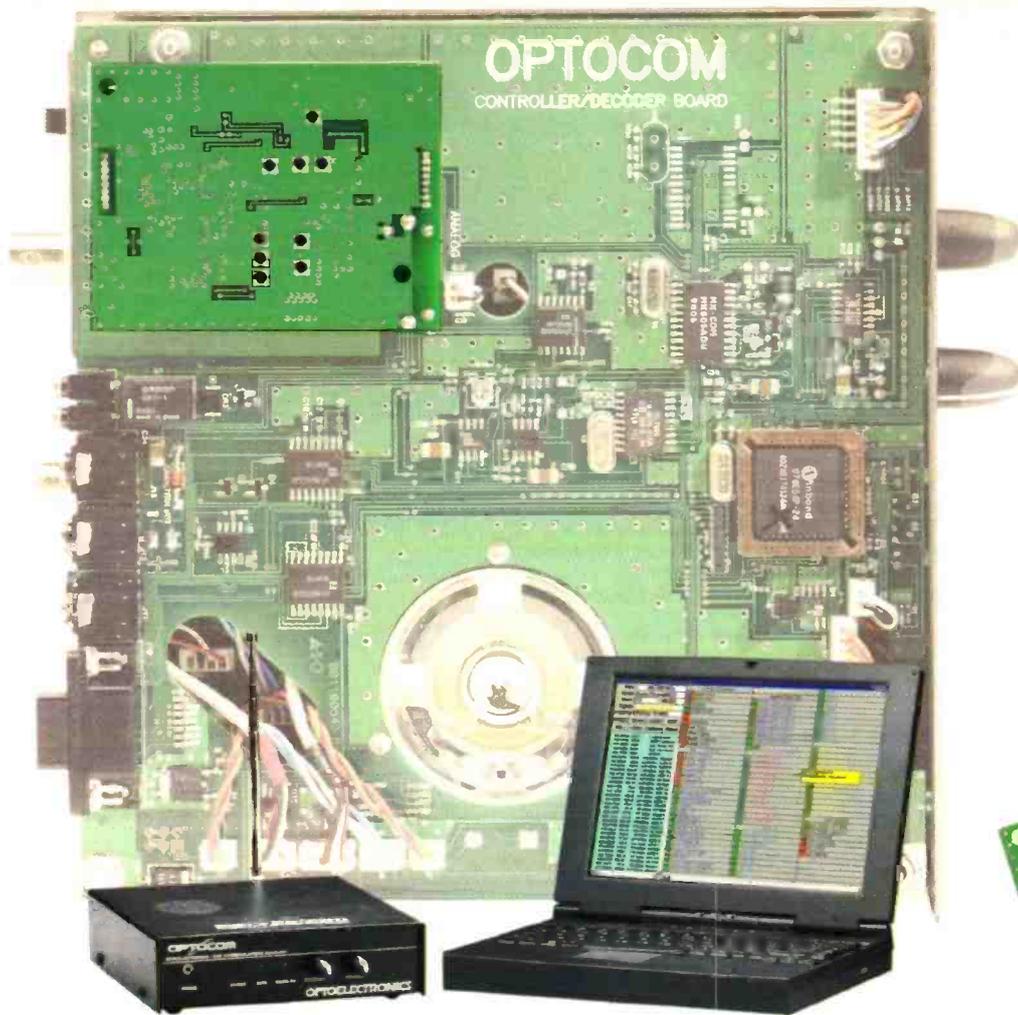
In charge of the Weapons Team is the FA (Fighter Allocator), who is responsible for the management of the flying programme, the allocation of areas to each sortie and to ensure that the WCs (Weapons Controllers) positions maintain their required standards. TAD 087 284.975MHz is a good frequency to monitor for this type of traffic.

The WCs control a variety of air missions including Offensive and Defensive Counter Air operations, Close Air Support and Battlefield Air Interdiction. Regularly heard with WCs traffic are TAD 500 378.100, TAD 501 263.450 and TAD 502 300.300MHz. One of the control positions is referred to as the FM (Fighter Marshall), usually reserved for transiting aircraft where hand-over requirements are co-ordinated.

The Surveillance team is made up of the SC (Surveillance Controller) who has the main responsibility of ensuring the highest quality radar picture possible. Under the SC is the LM (Links Manager) who looks after the set-up of the wide variety of digital data links.

Surveillance and Links usually share the same frequencies, TAD 020 270.025 or TAD 022 340.900 are regularly used in the north of the UK and TAD 054 389.875MHz in the south. These circuits are generally referred to as Link Co-ordination (LC) nets.

Continued on page 30...



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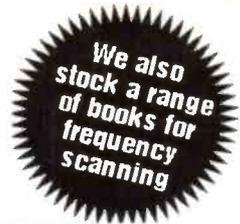
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...continued
from page 30

he or she is usually working with BUCHAN or NEATISHEAD MC.

The mission crew callsigns tend to be spoken as letters rather than the more common use of phonetics. Therefore you are much more likely to hear MAGIC TD as opposed to MAGIC Tango Delta.



(Crown Copyright)

Data Links

Listening to the mission crew in action, it won't be long before you hear reference to the 'Alligator' or 'Alligator Playground'. 'Alligator' is the codename for the Link-11 data system or TADIL-A as the American

military often call it. The 'playground' is the actual frequency used to broadcast the data.

Link-11 allows for the exchange of air, surface and subsurface radar tracks along with Electronic Warfare (EW) data and limited operational data between Command and Control units (C²). It is a synchronous data system capable of sending data at two different rates, 1364 bits per second (bps) on u.h.f., the fast rate.

On h.f., a beyond line of sight capability is possible, but on u.h.f. this is limited to line of sight, 25 nautical miles surface to surface or 150 nautical

miles surface to air. Under normal circumstances, Link-11 operates with a Net Control Station (NCS) interrogating each unit in turn for their data. It is also possible to operate in broadcast mode with a single or a series of single transmissions made by one participant in the net.

Although not ECM-resistant, the data link is secure so there's not much hope of hobbyists decoding the signal. An active u.h.f. data link does have its uses, though, as it provides a good indication that an E-3 is within listening range and other frequencies are therefore likely to be in use.

Those of you who live close to the coast, however, need to be sure that the data signal is not emanating from a naval ship as they often operate on the same frequencies. The two most active u.h.f. frequencies on which you will hear the Link-11 data stream are Kilo 20/TAD 117 338.200MHz in the north of the UK and Kilo 21/TAD 113 383.150MHz in the south.

Although many readers will be familiar with TADs, AWACS crews tend to use another designator list known as the 'Kilo' series when referring to either Link-11 or Link Co-ordination. Kilo frequencies can be either h.f. or u.h.f. and over the air the Link set-up may be heard as in the following example: "Kilo 06 and Kilo 20 for Alligator Playground, Kilo 29 for Link Co-ord". In this instance the data link is going to be simulcast on h.f. and u.h.f. using the frequencies 4.020/338.200MHz with the voice co-ordination on 389.875MHz.

Also discussed on the LC frequency is 'Timber', which is the Link-16 data system or TADIL-J as the American military often call it. Unfortunately, from a monitor's point of view, Link-16 makes redundant many of the clear voice communications heard over the air as it can handle data relating to Surveillance, Electronic Warfare, Mission Management, Weapons Co-ordination, Air Control, Fighter-to-Fighter and Secure Voice as well as a few others.

When compared with Link-11 it has quite a few improvements including jam resistance, increased data rate, increased information exchange, smaller data terminals (for fitting in fighter or attack aircraft), a jam-resistant secure voice capability and increased number of participants with accurate location and identification.

The Joint Tactical Information Distribution System (JTIDS) is the communications component of Link-16 and operates in the 960-1215MHz band, capable of providing links at 28.8, 57.6 or 115.2kbps. It is based on Time Division Multiple Access (TDMA) architecture, providing multiple simultaneous communications nets. This is achieved by each JTIDS unit (JU) being given a preassigned time slot in which to transmit/receive data to/from other units.

Each time slot is 7.8125ms long with the frequency changing every 13ms over a possible combination of 51 frequencies (frequency hopping). Each net is assigned a number relating to different frequency hopping patterns of which 127 nets can operate in any given time slot.

Within the article a number of frequency/designator tie-ups are shown. Although the secrecy classification of the TADs have been downgraded over the years they are still a sensitive issue. I have therefore decided to list only the relevant frequencies minus their designators, see **Table 3**. To accommodate newcomers who may be unfamiliar with military jargon I have also included some of the terminology regularly encountered, see **Table 4**.

SWM

Royal Navy ships such as HMS Illustrious regularly interface with E-3s (Crown Copyright).





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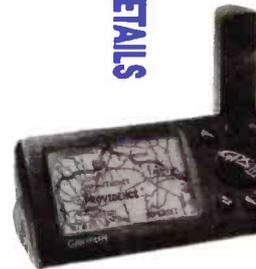
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KENWOOD	TH-G71 LATEST DUAL BAND HANDIE	£200.00	YAESU	FC-20 ATU FOR FT-847	£175.00			



aircraft would usually act as the aggressors and would attack a variety of airfields and other targets such as radar sites on the eastern side of the UK.

An airfield under attack could be an awesome sight. Two of the finest days I remember was Wattisham during this April 1981 exercise. The based RAF Phantoms and visiting Belgian Starfighters were arriving and departing all day providing many photo opportunities, but the most interesting part was the numerous attacks on the airfield. In glorious, highly photogenic weather the warning sirens were in regular use. In theory, the air defence radar units would alert the airfield, (and the waiting photographers), to an imminent attack and the sirens would be sounded, sometimes it was a false alarm but on most occasions it wasn't.

Over the two days attacks were made by well over 70 aircraft including 3 and 4 Squadron Harriers, USAF A-10s and F-4Ds, RAF Jaguars, German F-4Fs and F-104Gs and French Mirage 4As, (who often missed the airfield by a couple of km). I stated that in theory the siren was sounded, but not always!

Without doubt, the finest attack I ever saw was by the three USAF F-4D Phantoms from Spangdahlem. You could sense that these were most likely Vietnam Veterans who had more than a little real life experience of low level attacks! They came in so low that they had obviously evaded the radar, there were no sirens, no warnings, no nothing. Hidden by some trees behind us, with afterburners blazing they ran in, in line astern - at **zero** feet. There was no time to grab the camera but to just watch in awe as they took out the Control Tower and the Bloodhound missile sites, then they pulled up and were gone. All that was left was an airfield in pieces and a large group of silent, ashen faced aircraft enthusiasts who were almost in need of a change of underwear. After the three aircraft had disappeared from view over the horizon the attack siren sounded rather belatedly!

Now whilst this nostalgic look back paints a rosy picture of events 20 years ago it doesn't mean that the 21st Century cannot produce some excellent listening. The most significant difference of course being that in 1981 there were no u.h.f. radios. (It's hard to believe that the days of chasing aircraft without a scanner is only 15 years ago). Imagine the fun you could have had on this 1981 exercise with a couple of AORs or Icoms by your side!

Future Information

Is it worth going to a specific event and what will you see and hear when you get there? Unlike the old days when information could sometimes be scarce, you can now find out advance information from many enthusiasts and national magazines. A Subscription to *Scramble*, *Military Aviation Review* and hopefully the new *North American Aviation Review* will give you plenty of advance information

on exercises, deployments, air shows and other MilAir events. Incidentally, it was sad to see the demise of the *British Aviation Review* after all these years, I have been a subscriber since January 1972 when it was called the *Blackbushe Aviation Review* - I wish them well with their new US Military magazine venture.

The Internet also has several sites with information including the Scramble site at www.scramble.nl/ Then again, why bother to go to enthusiasts sites when the RAF list all the information for you! (How times have changed). Point your browser at:

www.raf.mod.uk/news/index.html then select **Deployments and Exercises**. By collating the information from magazines, plus the RAF and enthusiasts Web sites, you should be able to formulate a good advance overview of an exercise including the exercise area, the airfields involved and most likely the aircraft and units expected to take part. Armed with all this information it is now time to organise your master plan.

Location

With most major exercises taking place over anything from a couple of days to two weeks, this in theory gives the opportunity for the individual to not only listen from the home base station, but also to go mobile to airfields involved in the exercise. Subject to the length of an exercise, whenever possible I try to spend at least one day, (usually more), listening from home. With home listening being more flexible, this should give you the chance to search the airwaves for some of the active exercise frequencies before going on your travels. Also, the advance information you have collected should help you establish the best days to visit airfields to see the maximum activity.

Equipment

In my opinion, to monitor an exercise successfully, you need a minimum of **three** radios, if it warrants it, I often use **four**, and dare I say it, can become five including my hand-held. Now before you write to me and complain, I realise that this may be beyond the budget of quite a few people, but to monitor this sort of event it really is the only way. I am not suggesting that you all go out and buy a bank of four Icom IC-R8500s, (although it would be nice), but it is possible to own several radios without paying lottery prices.

My primary radio is an Icom R8500 which as anyone who has read my previous articles will be aware that I consider it to be the finest radio for MilAir listening I have ever used. In addition, I use an AOR AR2515 which is a US conversion of an AOR AR2002 with 2048 memories. An IC-R100 the small base station with 100 memories and my dear old AOR AR2001 which is ideal for spot frequencies. I also have my Yupiteru MVT-7100 hand-held on standby.

With the exception of my '8500, the other radios can all be picked up second-hand at reasonable prices, so if put together over a period of time, a multi-radio set-up can be achieved without an enormous outlay. I use two rooftop stainless steel double disconses with low-loss coaxial cable which feeds two RF Systems antenna splitters, each feeding two radios.

I also use two voice activated tape recorders which help when things get very busy, (both bought from Tandy). When you've got three or

four radios all chirping at once you do have to develop a particular skill for extracting information from what can sometimes be a cacophony of sound, but you soon get the hang of it.

My wife tends to make herself scarce during an exercise as the multi-radio noise tends to annoy her slightly, (a modest understatement!). As an alternative to the expenditure of a multi-radio set-up, you can always get together with a few like minded friends all using their own radio's.

Planning

Ownership of one of the widely available frequency guides such as *Airwaves 99* is essential to some advance frequency planning. Flexibility, can be a key factor so having at least two radios primed for more than one task is a good idea. An hour or two spent entering memory frequencies in advance is almost certain to bring dividends when the action starts.

Being the most sensitive radio I have, my R8500 is primarily used to search for new or active frequencies between 225 and 400MHz, (25kHz spacing), but is ready to be switched at an instant to scanning memory banks. Do a test search the day before the exercise and check to see if there are any internally generated signals, these frequencies need to be locked out as they will be needlessly stopping the search. The search should run through from 225 - 400 stopping only on voice modulations, local ATIS weather broadcast frequencies will also have to be locked out. I have a memory bank set up for all of London Military, plus a second bank with selected London Military frequencies specific to the area of the exercise. Your choice of London/Scottish frequencies would obviously vary, dependant on your location in the UK and the area covered by the exercise.

The next three of banks are linked and contain the primary UK ASACS Air Defence Radar frequencies including the main AWACS frequencies, again these can be reduced in numbers to target a specific area. Further banks are then programmed for Air Refuelling, AWACS and Royal Navy Air to Ship frequencies, plus a bank of frequencies known to have been used on previous exercises. These banks can be put into use subject to the type of exercise you are listening to. If the squadrons or units involved are known then a bank containing their Operations and Air to Air frequencies can be useful. Caution has to be taken including these Operations frequencies as at times they can be very active and it can distract you from the main task of chasing exercise frequencies.

The memory banks on the AOR AR2515 are set-up the same as the R8500 but as it has 2000 memories available I also have banks of some of the more rarely heard discrete frequencies. The IC-R100 with only 100 memories is solely used for area radar and would be set up for the relevant London or Scottish Military frequencies. The MVT-7100 has banks set up similar to the R8500, but as the IC-R100 is quite slow to scan, the MVT-7100 is normally set as a backup, scanning London or Scottish Military. On one of the radios I also keep one bank empty, and as the day progresses I fill it with all the various active frequencies in use during the exercise.

So the active starting set-up would be as follows: IC-R8500 searching the u.h.f. airband but ready to switch to London or ADR, the AR2515 scanning a mixture of ADR, AWACS, Air Refuelling, and exercise frequencies, the IC-R100 on London Military, backed up by the MVT-7100 and the AOR



AR2001 ready to accept any new or other spot frequencies. One final thing to consider is the delay settings on each radio, (assuming they are adjustable). Dependant on how busy it is I tend to vary between a timed restart to the scan after modulation has finished to leaving the searching radio on the infinity setting. If you do this it ensures you don't miss a new frequency when it is busy but also you must remember to restart the search!

Another piece of advance planning, (which is useful at any time when searching), is to make a numerical listing of your regularly heard local frequencies. My list includes the local London Military frequencies plus Approach, Radar, Operations, Air to Air and if necessary the ATIS of airfields within a 200km radius. My location is quite high up so you can probably reduce the radius for differing circumstances. You should also include any other frequencies regularly heard at your location such as TADS, Air Refuelling, Low level, etc. My list runs to about 95 frequencies and whilst I remember quite a few, my memory is not that good! So the point of this list is to give you a quick reference if the search stops on a frequency. By referring to the list you can identify a known frequency quickly and so move on swiftly to search for the good stuff, thereby ensuring that you are searching for the maximum time.

Mobile

On the road I take the AR2515 and the MVT-7100, the system is much the same but obviously scaled down. I usually only scan when I am mobile, with the AR2515 used for all the banks of discrete frequencies and with the MVT-7100 targeted on frequencies specific to the exercise. This will include London Military and the Approach and Tower frequency of the airfield I am visiting. I have to admit that when mobile, my main priority is photographs so the collection of MiAir information usually takes second place, but it is still relatively easy to collect a significant amount of information.

And Finally

So there you have it, with prior planning and the flexibility of several radios which can be quickly switched to different tasks you should be able to chase the action. Even with a multi-radio set up it can still be frustrating, with a big exercise the airwaves can be red-hot and you will still miss things, but you will have greatly increased the odds in your favour. The final most important item is a notepad and pen, not only to make a note of all those new frequencies you have heard but also to keep a record of them so you can send them to your favourite magazine, *SWM*.

SWM

To accompany this article are three photographs taken during exercises between 1979 and 1981. They are an RAF Lightning overshooting Coningsby (above), a Norwegian F-5 (page 33) plus a Belgian Mirage 5 (opposite).



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Table 1(b): STCICS HF Designators Listed By Frequency.

Frequency (MHz)	Designator
2.261	KV
2.266	MB
2.274	GD
2.350	BT
2.398	AO
2.577	KX
2.591	ST
2.841	KP
2.762	SA
3.026	WV
3.038	LA
3.038	AK
3.083	BF
3.092	LB
3.095	DV
3.101	FA
3.110	RM
3.119	CY
3.125	WG
3.131	FW
3.218	MS
3.274	X
3.302	PA
3.345	TO
3.380	KA
3.391	TO
3.512	QB
3.763	ZF
3.884	FR
3.887	KD
3.915	G
3.924	E
3.930	AH
3.939	AE
3.942	HE
3.945	BK
4.042	AVV
4.484	KR
4.540	UT
4.705	D
4.709	TVV
4.718	KJ
4.724	UA
4.733	CG
4.739	DS
4.742	FS
4.745	AG
5.095	PK
5.178	RE
5.270	MC
5.403	XA
5.420	KT
5.436	DA
5.447	L
5.684	TS
5.693	AB
5.699	RH
5.705	NJ
5.714	ZZ
5.720	EF
5.747	VV
6.891	RD
6.694	JT
6.701	LD
6.715	PO
6.724	TG
6.736	CA
6.739	B
6.748	HM
6.790	FE
6.766	AS
8.156	AC
8.190	RA
8.971	PH
8.972	QR
8.980	J
8.983	HJ
8.989	BX
8.998	DM
9.010	AD
9.022	AF
9.031	DYV
9.034	HK
9.459	RZ
10.634	PF
10.919	UB
11.181	AP
11.184	EK
11.205	A
11.208	FG
11.217	VE
11.235	EX
11.241	YC
11.247	HVV
11.253	EZ
11.259	EH
11.268	BL
12.057	KH
13.206	HD
13.211	YM
13.218	FT
13.236	I
13.248	HZ
13.257	F
14.460	ME
14.724	PZ
14.812	SE
15.013	DH
15.025	EM
15.031	H
15.040	EP
15.046	LD
15.061	GA
15.064	FV
15.072	LE
15.076	EN
15.091	DB
17.970	BA
17.979	UR
17.982	IN
17.988	BJ
17.995	DQ
18.000	BS
18.009	CM
18.018	BE
18.024	DT
18.850	MD
20.030	YZ
23.245	CO
23.250	YP
23.257	HX
23.270	EI
23.281	AZ
26.385	GI
27.000	HP
29.800	CZ

code-word is used to describe the type or class of the track, 'Pending' which is regularly heard, indicates that the track in question has yet to be positively identified, **Table 2** lists other track identities.

What Option?

The position is next. A few options can be used for this purpose. One of the most common is known as GEOREF, a system which has been in use for many years. Take a look at the 'Aircraft On HF Radio' article by Andy Thomas in the April 1988 issue of *SWM* and you will see little has changed.

GEOREF converts the latitude and longitude of a track into a four letter, four numeric code. The first two letters equate to a 15° by 15° box, in this case MK, which covers most of the UK, see **Fig. 1**. Each 15° box is further divided into 225 1° boxes, to which the second two letters HM refers. The four numerics are split in two and are the minutes of a 1° box read from the bottom left hand corner, west to east then south to north.

'Vector Logic' referencing is another method used to indicate the position, particularly during major exercises. Vector Logic reference points are a series of pre-determined points, made up of single words to indicate the position (girls' names were used during one exercise). Subsequent reporting gives bearing and distance readings relative to these points.

The down side for monitors is in not knowing the initial position, so all references to bearings and distances are meaningless. Tracking is simply the indicated heading of the track, usually expressed in degrees. The speed can be given in kph, mph or knots. It can also be estimated as either 'Slow', 'Medium' or 'Fast'.

Strength is the number of units in a single track, in the example there were three aircraft. Altitude is the height of a track given in hundreds of feet with low flying tracks reported as 'No height'.

The squawk code, although not always reported, concerns the interrogation of an aircraft's transponder by radar. Military IFF (Identification Friend of Foe) transponders operate using various modes. In a tracking report it is usually the Mode 3



which is passed. Mode 3 is actually the standard mode for civilian aircraft but military aircraft are also required to operate this as well. When included, it might be heard as "squawking mode 3 5101".

During large exercises each side is often allocated a colour and in some instances "squawking mode 1 yellow" or simply "squawking exercises" are heard. A secure coding system called 'Nuco' can also be used to encode the squawk code. Nuco is very effective when encoding small amounts of data, especially numerical.

The key list for decoding the messages is only valid for 24 hours and is therefore reasonably secure. The squawk code 5101 in Nuco format might be GS VB. Nuco is not just for the coding of squawk codes, however, listen on many NATO military circuits and you will hear this system used to encode frequencies, designators, positions, etc.

Next Exercise

The next large-scale exercise due to take place in the UK is the first Joint Maritime Course of the year, 'JMC001', tentatively scheduled to take place between February 25th and March 13th. During this period, a JAAWSC circuit is active daily between 0700-1645 with the exception of the Sunday. Happy tracking!

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Table 2: Track Identities.

Track ID	Meaning
Anyface	AEW aircraft
Big Dipper	Sea King helicopter (with Sonar)
Bottlenose	Refuelling tanker
Faker	Simulated enemy aircraft
Friendly	Friendly aircraft positively identified
Hooter	Jammer aircraft
Hostile	Enemy aircraft positively identified
Joker	Air contact, non hostile
Pelican	Maritime Patrol Aircraft
Pending	Aircraft requiring positive identification
Raven	Jamming aircraft
Texaco	Refuelling tanker
Snooper	Hostile surveillance patrol aircraft.

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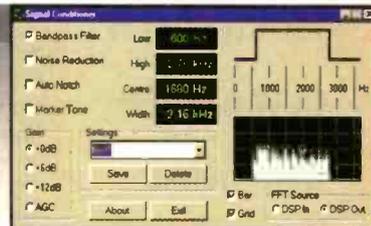
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Construction of internals

Construction of externals

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Modes

Tuning step size

IF bandwidths

Receiver type

Scanning speed

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Dynamic range

IF shift (passband tuning)

DSP in hardware

IRQ required

Spectrum Scope

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65 dB

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±2 kHz

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no

yes (for ISA card)

yes

yes

yes

yes

yes

yes

yes

yes

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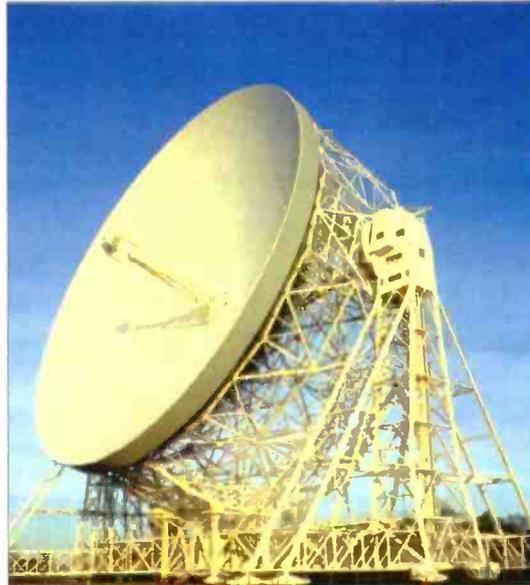
The History of

On a cold, foggy day in December 1945, a young research scientist from the University of Manchester sat huddled over a coke stove in a gardener's shed in a muddy field in Cheshire. He was there to experiment with an ex-Army radar system installed at a small botanical research station run by the University. Its location was a little-known rural backwater called Jodrell Bank.

Fifty-five years later, that remote site is home to one of the world's leading astronomical research institutes and the surrounding countryside is dominated by the world's second-largest, and most famous, fully-steerable radio telescope. That scientist, Sir Bernard Lovell, remains one of Britain's most accomplished astronomers and the history of Jodrell Bank, with which he is synonymous, is a fascinating story of post-war determination.

University Work

In the 1930s Bernard Lovell had worked at the University of Manchester with the renowned scientists WL. Bragg and PMS. Blackett. Blackett



The University of Manchester's 76m Lovell telescope, still the world's second largest fully-steerable radio telescope.

had developed the 'cloud chamber' technique used to study the collisions of subatomic particles. He and Lovell had been using a cloud chamber to study the origins of 'cosmic ray showers'.

Cosmic rays are particles believed to be created in the depths of space when massive stars explode. They consist mainly of extremely fast-moving electrons and protons. When they encounter the Earth's dense atmosphere they interact with other subatomic particles and produce 'showers' of

exotic and short-lived particles.

Blackett was convinced that the energy spectrum of the mysterious particles would reveal some hidden fact of cosmic significance. Just before the war broke out, Lovell was preparing a trip to France to measure cosmic ray energies.

Before he could set out on his journey, Lovell received a telephone call from Blackett and was told to report to a military installation at Bawdsey Manor near Felixstowe. Blackett, it turned out, was a member of a committee that advised the government on how recent scientific or technological developments could be used in the defence of the country. Suddenly, Lovell found

The first day at Jodrell Bank in December 1945. The trailer houses the ex-Army radar receiver.



The 66m diameter wire-mesh paraboloid radio antenna at Jodrell Bank.

Jodrell Bank

Jodrell Bank rose to fame during the race to place an artificial satellite in earth orbit.

himself receiving instruction in the fledgling techniques of radar detection and was told to report to a Scottish research station to help in the development of Air Interception Radar.

Air Defence Radar

EG. Bowen first demonstrated the air defence radar in 1935. By the start of the war in 1939 the Air Ministry had erected a series of 60m radar towers along the south and east coasts of England.

Working at a wavelength of 10 to 13m, these transmitters put out about 50 pulses per second with a power of several hundred kilowatt. The 40km spacing of the towers gave a complete radar screen out to about 160km from the coast. Any aircraft entering the radar beam would appear as a blip on the operator's cathode-ray tube and reveal its approximate range and altitude.

In the early years of the war, the Germans were frustrated by the effectiveness of the British radar defences, and began a series of devastating night attacks on British cities. The Air Ministry had foreseen this, however, and engineers had been working for many years on radar systems that could be fitted to night-fighter aircraft. The system would allow pilots to detect aircraft from several miles away and then guide them smoothly to an interception.

Frantic Development

Lovell found himself caught up in this frantic development. The use of radar in night-fighters was not just a question of making existing radar systems smaller. To form a narrow beam of radio waves, essential for a radar, a transmitter needs to operate at a short wavelength, of the order of a few centimetres.

The production of centimetre radiation was a difficult task until the invention of the cavity magnetron by JT. Randall and HA. Boot. Using this technology, Lovell helped in the development of Air Interception Radar, including early versions of the 'lock-and-follow' radar fitted to various RAF fighter squadrons.

Later in the war, Lovell turned his attention to the development of targeting radar systems. Throughout 1941 the Allies had become increasingly concerned about the effectiveness of British night bombing raids on enemy targets. It was estimated that only 10% of sorties reached their target areas. Clearly, pilots needed a radar system enabling them to see ground targets by night.

Lovell and his co-workers developed a system for Stirling and Halifax bombers, known as H₂S, consisting of a scanning radar housed in a large cupola on the undercarriage. The famous Pathfinder Force, whose task it was to locate bombing targets and light them with flares for Short Wave Magazine, February 2000

following aircraft, were equipped with the H₂S system. By the end of the war the H₂S system, operating at 12.5mm (1.25cm), could resolve features like railways, runways and bridges.

Wartime Work

Lovell's wartime work with radio techniques would eventually lead him into a career as an astronomer. On the very first day of the war he had witnessed sporadic, unexplained echoes on the coastal radar's cathode-ray tube at Staxton Wold, Yorkshire. He had wondered if these might be caused by the passage of cosmic rays through the atmosphere.

Once the war was over, Lovell was released from his duties and returned to Manchester. He was deciding how best to continue his cosmic ray research when Blackett urged him to find out if cosmic rays really were responsible for the radar echoes.

For this he needed a high-power, long-wavelength transmitter and a receiver of high sensitivity, just the kind of system used by the military. Using his contacts in the Army, Lovell acquired a surplus 'gun-laying' radar, a mobile system working at 4.2m used to assist anti-aircraft fire. It consisted of three trailers, one for the transmitter, one for the directional Yagi antenna system and the third for the generator. The Army kindly drove the trailers to Manchester and left them in the quadrangle of the University's Physics Department.

Lovell soon found that the equipment would not be usable in the centre of Manchester. The radar's cathode-ray tube was awash with interference from the electric trams running past the Physics Department. Permission was given for Lovell to move his equipment, for a two-week period, to the University's small botanical research station south of the city. In early December 1945 the three trailers arrived at the remote spot and were set up next to the botanists' huts.

Shooting Stars

It was not long before Lovell found that the sporadic echoes from the sky were not, in fact, from cosmic ray showers. They were from meteors, or shooting stars. A meteor is the fleeting trail of light we see when a tiny particle of space rock falls through the Earth's atmosphere. The particle heats the atmospheric gases until they are ionised,



Sir Bernard Lovell photographed in the 1960s.

Continued on page 48...

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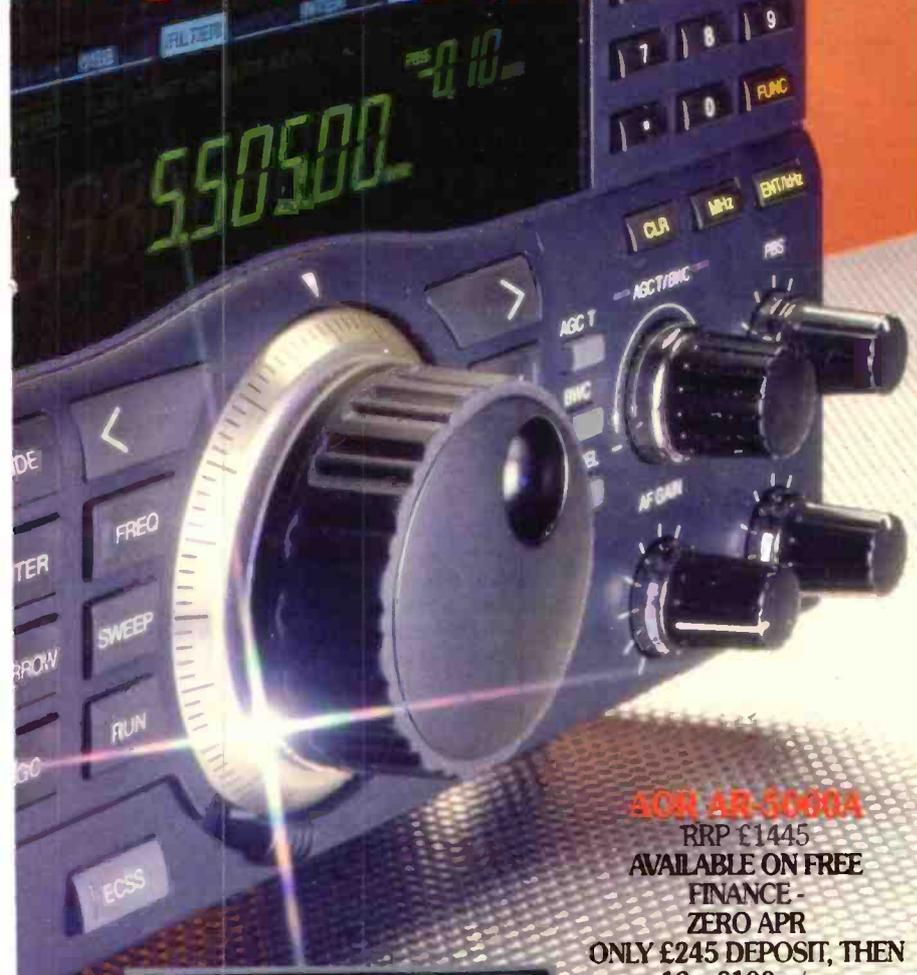
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 50-75 ohm coaxial
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 10dB +/-0.2dBs
 +50dBm IP 3rd order (10MHz/12V)
 11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)
 30-50mm can be fitted
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 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
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 Accessories Mains wall plug adaptor (230V A/12V DC). Interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps

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The History of Jodrell Bank

Continued from page 45...

that is, the electrons are stripped off the atoms.

Any conducting material, such as an ionised gas, reflects radio waves, and this explained the echoes seen on the radar screen. Lovell discovered that others had also seen meteor radar echoes.

During WWII the radar used to detect the approach of the devastating V-2 rockets had occasionally shown echoes when no rocket was approaching. The Army had also concluded that these were caused by meteors in the upper atmosphere.

Two Week Period

Lovell had soon outstayed his two week period at the botanical station at Jodrell Bank. But he remained, acquired some co-workers and moved more equipment into the surrounding fields. Over

the next few years they studied the meteor echoes in some detail and were able to show that many meteors originate in the 'dust-tails' of comets as they circle the Sun.

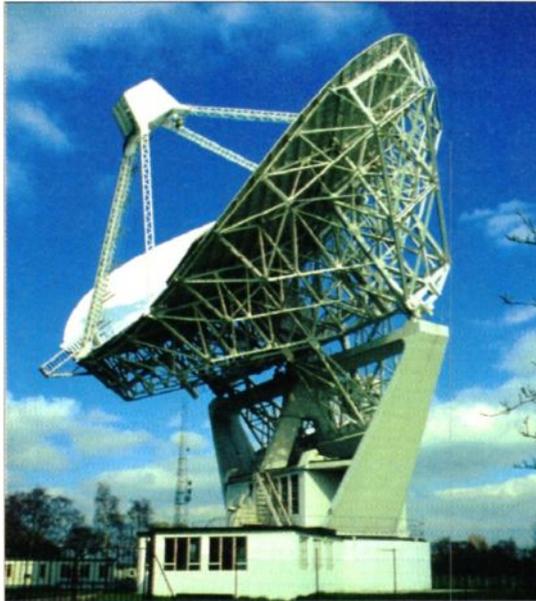
In 1947 the scientists obtained a small grant to build a 66m parabolic reflecting antenna made of wire mesh,

easily the largest radio antenna in the world at that time. With this they tried, once again, to detect cosmic ray showers.

By this time the equipment was proving more useful in other areas of research, and soon Lovell gave up the idea of studying cosmic ray showers with radar techniques and turned his attention to radio astronomy.

Young Science

Radio astronomy was a young science in the late 1940s. In 1931, Karl Jansky of the Bell Telephone Laboratories was studying radio interference caused by atmospheric phenomena. He had noticed a background radio signal coming from



the sky but had not pursued the discovery.

During the war years an American amateur astronomer, Grote Reber, built himself a steerable 9m dish. With this Reber managed to make a rough map of the radio emission from the sky. After the war many astronomers were becoming interested in these radio waves from space.

The 60m radio antenna at Jodrell Bank was soon put to work studying the astronomical signals and allowed astronomers to make many important discoveries, including the first detection of radio waves from another

galaxy, the Andromeda Galaxy, 2.2 million light-years away. But, because the reflecting surface was attached to the ground, the telescope could only survey that part of the sky directly overhead.

However, its success led Lovell and his colleagues to conceive of a telescope of similar size which could be directed to any object in the sky. Jodrell Bank was about to become a dedicated astronomical observatory and its encroachment into the botanist's fields was now permanent.

Radio Telescope

Eventually, Lovell engaged a consulting engineer based in Sheffield, Charles Husband, to draw up plans for a fully-steerable radio telescope. It was originally designed to work at long wavelengths that would require a wire mesh surface.

But in 1951 astronomers discovered that hydrogen, the most abundant element in the universe, emits radiation at 21cm. The telescope was redesigned with a solid steel surface so that it would be able to make observations at this very important wavelength.

After extensive negotiations the Department of Scientific and Industrial Research agreed to help fund the project and construction of the telescope was begun in September 1952. During the five years it took to build the telescope the project suffered many delays and rising costs which almost led to Lovell's imprisonment. Even when the telescope first became operational, in October 1957, the University of Manchester was heading a public appeal to save it from enormous debt.

The Mk1 telescope, as it was called, was driven by an ingenious electro-mechanical analogue computer which precisely controlled the motors so that radio sources could be followed across the sky. The dish of the telescope, 76m across, was supported on giant bearings at the top of two towers.

Mounted in these towers were the salvaged 375mm gun turret racks from the battleships *HMS Royal Sovereign* and *HMS Revenge*. These were incorporated into the design of the elevation axis of the instrument. The two towers moved on a circular rail track and carried the entire weight of the telescope, although a single stabilising framework was connected to the underside of the bowl.



The Mk1 and Lovell telescopes at Jodrell Bank.

First Artificial Satellite

With the telescope still not entirely operational, an event occurred which instantly propelled the project into the public eye. On 4th October 1957 the Soviet Union launched the first artificial satellite, *Sputnik 1*, into earth orbit.

The advanced state of the Soviet space program shocked the world. The rocket that carried *Sputnik* into orbit was a modified ballistic missile and military leaders were concerned that no radar had detected it. Hurriedly, Lovell and his colleagues equipped the giant telescope

with a radar system and on 12th October saw the echo of the rocket, still orbiting the Earth, as it sped 160km overhead at eight kilometres per second.

The telescope soon became an important tool for the Soviet and American space programs. A year after *Sputnik* the telescope helped track the Atlas rocket launches by NASA and a year after that confirmed the impact of the Russian *Lunik 1* spacecraft with the moon.

In October 1959 Jodrell Bank also received the telemetry from *Lunik 3* giving the first photograph of the far side of the moon. In March 1960 the telescope, being the only instrument capable of transmitting at sufficient power, was used to send commands to the US *Pioneer 5* space probe on its journey out into the Solar System.

Outstanding Cost

As a result of this work, the outstanding cost of the telescope was met by donations from Lord Nuffield and the Nuffield Foundation. The observatory was renamed the Nuffield Radio Astronomy Laboratories but has recently changed its name to Jodrell Bank Observatory to reflect its broader astronomical interests.

The telescope has remained a great success. It is still the world's second largest fully-steerable radio telescope and has been crucial in the discovery of quasars, the confirmation of the existence of pulsars and the detection of maser emission from star-forming regions. In 1993, the telescope again showed its worth by helping NASA attempt contact with its missing Mars Observer spacecraft.

Modified Telescope

In the early 1970s a new reflecting surface was placed above the old reflector and two circular wheel girders were constructed beneath the bowl to support the extra weight. The more accurate surface meant that the telescope could operate at much higher frequencies.

The modified telescope now weighs 3200 tonnes and reaches a maximum height above



Jodrell Bank's 32m radio telescope located near Cambridge, part of the MERLIN system.

ground of 88.49m. Jodrell Bank now has ambitious plans for an even more accurate surface to further increase its maximum operating frequency and its sensitivity. On its thirtieth birthday in 1987 the instrument was re-named the Lovell telescope, in honour of its founder.

The famous Lovell telescope is not the only instrument to be operated at Jodrell Bank. In 1964 a second telescope, the MkII, was built on the site of the 66m instrument.

The MkII has an elliptically shaped dish of about 25m diameter and was based on the design of the Goonhilly antenna built to receive signals from the *Telstar* satellite. The MkII

telescope at Jodrell Bank was the first telescope of any kind to be controlled by a digital computer a Ferranti Argus 100.

Interferometric Techniques

Jodrell Bank has been a pioneer in interferometric techniques, that is, combining signals from separate antennae to simulate a larger telescope. Experiments were carried out in the early 1960s and showed that the sizes of radio sources could be determined by recording the interference pattern formed between the two antennae.

By the mid-70s plans were in place for an entire network of antennae which, when combined, could produce a radio 'map' of astronomical sources. At the end of 1980 a system of six telescopes operating simultaneously on the same area of sky came into service. In 1990 a new 32m telescope at Cambridge was added to the array. The system is known as MERLIN, the Multi-Element Radio Linked Interferometer Network, and achieves the same level of detail as the famous Hubble Space Telescope.



The University of Manchester's 76m Lovell telescope.

Modern Research

As Jodrell Bank enters the new millennium it still remains at the forefront of modern astronomical research. It is a major centre for the development of sophisticated radio receivers and now includes a bustling visitor's centre and planetarium. It is difficult to imagine the cold and muddy fields into which Lovell first towed the ex-Army radar equipment, over 55 years ago.

You can visit the Jodrell Bank site which is located off the A535 (take J18 M6).

Opening times are: 1100 - 1630, Tuesday to Sunday until 18 March. Then opening times are daily, 1030 - 1730. Admission charges currently are: Adult £4.60, Child £2.30 and concession £3.30. Children under 5 years enter free, but are not allowed access to the planetarium. A family ticket at £13.50 allows two adults and three children free access.

You can contact the visitor centre by Tel: **(01477) 571339**.

The Jodrell Bank Web site is www.jb.man.ac.uk

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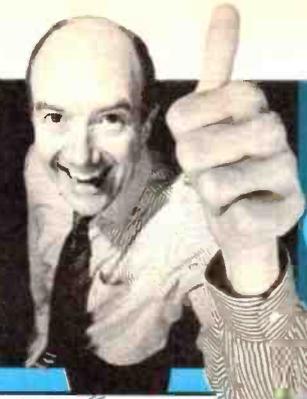
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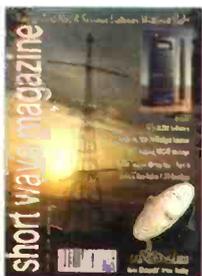
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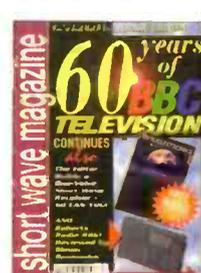
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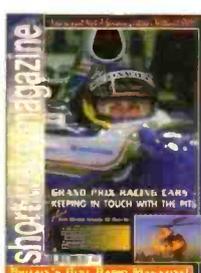
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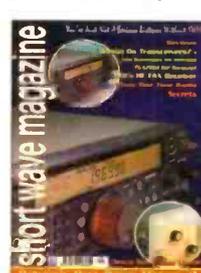
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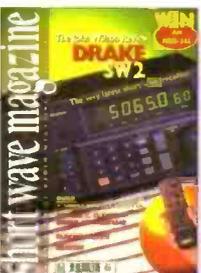
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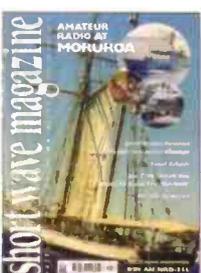
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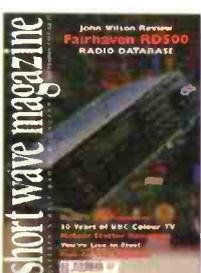
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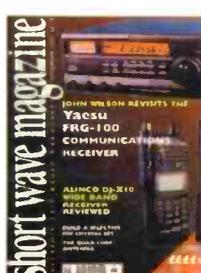
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Let's Be Radio Safe...Please?

An often overlooked aspect of any hobby, but especially pertinent to our mixture of mains electricity and other obvious hazards in and around the shack. Joe Carr K4IPV looks at how to keep safe.

Every now and then something happens to remind me that radio can be a dangerous hobby. Sometimes I read about some chap who is electrocuted erecting an antenna or working on a piece of equipment.

In one case, I was present in a broadcasting station when an electrician working on the three-phase 440V a.c. panel feeding the transmitter was electrocuted by working the panel 'hot', a spanner slipped and he became, shall we be crude, a 200A 'biological fuse'.

In another case, a friend of mine suffered serious injury (arm, leg and pelvis broken) because he failed to heed warnings about the difficulty of installing deep fringe area all-channel television antennas in a windy seashore location...and was blown off a roof.

Finally, a friend of mine was a professional electronics technician who worked on very large medium and short wave broadcast transmitters (50kW) for the Voice of America in the 1950s and 1960s. The transmitters he worked on were not in cabinets, but in metal 'rooms'. One day, he opened the access door and walked into the high voltage cage. Someone had disabled the interlocks that prevent accidents, so they could work on the live circuits. To his horror, he saw his companion about to throw the wall switch level that would energise the transmitter, unaware that my buddy was inside the cage. Fortunately, he was armed with a large adjustable end wrench, which he threw with great force against the wall just above the switch panel. Startled, the rogue turned and noted with dismay that he damn near electrocuted his fellow worker. After that, only temporary interlock jumpers were permitted, and a padlock was placed on the power panel switch handle...and the only key would be inside the cage with the worker in danger.

Antenna Erection Safety

Safety is not a 'given' where antennas are concerned. Antennas are inherently dangerous to erect if certain precautions are not followed. It is not possible to foresee all of the situations that you might face in erecting an antenna. I would like to give you all possible warnings, but that is

not even possible. You're on your own, and must take your own responsibility when installing an antenna. I can, however, give you some general safety guidelines. Knowledge of what you face, some hard nosed sound judgement, modulated by common sense, are the best tools on any antenna job.

One rule that is an absolute is that no antenna should **ever** be erected where either the antenna, the feed line or any part thereof crosses over a power line or can fall into the power line ('pole pig') transformer - **Fig. 1 - EVER!** This is a 'no kiddie' - don't do it! Power lines look insulated, but there are often small breaks or weakened spots (especially a couple days or more after original installation) that can bring the antenna into contact - lethal contact - with the live power line. Every year or so we hear about an s.w.l., scanner/monitor buff or amateur radio operator being killed by tossing an antenna wire over a power line. Avoid making yourself into a high power resistor!

And the same rule applies to situations where the antenna can fall onto a power line if it falls down or breaks. You have to examine the situation with a critical eye to see if there is any possible way for that antenna, or its support structure, to fall onto a power line if it breaks in any way whatsoever. On my lot in Virginia I have a 7m mast erected on the back of the house. When I installed it I made a scale drawing of the back yard showing the path of the power line. The 7m fall radius of the antenna was plotted for several possible antenna locations. It should not intersect either the power lines or the cable TV line when it falls. It should also not be in a position to fall over a pedestrian path, a place where children play, or across a public walkway or street (lawsuits are messy). Or as one chap found out the hard way, it should not be in a position to fall through a window!

Another caution is that you should be physically fit to do the work. While the on-the-ground portions of the work is not usually too strenuous, any climbing at all, even on ladders, can be taxing for some people. Antenna materials are deceptively lightweight on the ground, but when you get up on even a small ladder, they are remarkably difficult to handle. Attempting to manhandle a 7m vertical once wiped my back out, and I consider myself fortunate that the pain hit me after I'd dismounted the ladder. Besides, if you could see me, you would wonder why a man my size was on any ladder in the first place. Before using a ladder, learn how to use a ladder. A lot of homeowners, whether putting up antennas or painting the upstairs windows, fall off

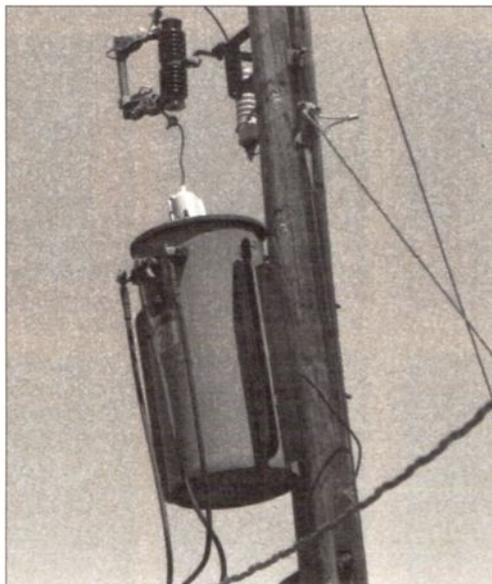


Fig. 1: Dangerous power mains transformer.

ladders that were being used incorrectly.

If the wind blows even lightly, the danger is magnified considerably. The friend I mentioned above - who is a large, strong bear of a man - attempted to install a 26-element television wide-band antenna on the roof of his second story house. It is located on the Chesapeake Bay (at the point where the bay, Hampton Roads and the Atlantic Ocean converge).

The antenna was easily handled with one hand on the ground and with no wind blowing, but up on the roof it was a different story. He was on the peak of the roof, when a gust of wind came up suddenly and caught the antenna. It acted like a hang glider, and pulled him off the roof, plunging down two stories to the patio below; he fractured his pelvis and busted both a leg and an arm. Expensive TV antenna, I reckon. Be Careful.

One good rule is to always work under the buddy system. Ask as many friends as are needed to safely do the job, and always have at least one assistant even when you think you can do it alone. Erecting a large antenna - and some small ones - without help is just plain stupid. At least have someone around who can call 999 if you mess up.

Always use quality materials and use good work practices. I generally prefer commercial kits, even for simple wire antenna (**Fig. 2**): Antennas, being potentially dangerous, should always have the best of both goods and workmanship in order to keep quality high. Complex antennas have a lot of metal fittings and fasteners (**Fig. 3**). Make sure that all are tightened properly. This is easy to overlook because some of those fasteners are usually left 'finger tight' until the antenna tuning adjustments are made. It is not just the electrical or radio reception workings that are important, but also the ability to stay up in the air safely.

When planning the antenna job, keep in mind that pedestrian traffic in your garden could possibly affect the antenna system. Wires are difficult to see, and if an antenna wire is low enough to intersect someone's body, then it is possible to cause very serious injury to passers by. In World War II, saboteurs and the Resistance - according to the movies - knocked Nazi motorcyclists off their bikes (and to their doom) using a bit of wire stretched across the road. Even when the person is a trespasser, the courts may hold you liable for injuries caused by an inappropriately designed and installed antenna. Take care for safety not only of yourself, but also of others.

One necessary reminder is that your local government might have some interesting ideas - legal requirements actually - concerning your antenna installation. The electrical, mechanical and planning regulations must be observed. There is a great deal of similarity between local codes because most of them are adaptations from certain national standards. But there are enough differences that one needs to consult local authorities. Indeed, you may need planning permission to install the antenna in the first place.

One problem that s.w.l.s and scanner monitors in the USA face is that their antennas are not protected by the FCC as are amateur operators antennas. Local governments in the USA have limited rights to regulate amateur antennas, only 'reasonable' mechanical and electrical standards can be imposed, so it may be illegal to install any antenna. About 30 years ago a friend of mine in a

radio club found out that his county had an ordinance that said an outdoor antenna must be double its own height plus fifty feet from the nearest property line. He received a summons after a complaint from a neighbour. In a county full of quarter acre home lots, however, that was a ridiculous law. Very few outdoor TV antennas met that strict requirement! So Hal went to the

court house and asked for 50000 complaint forms. Using a local county directory, he proceeded to fill out the same complaint as he'd received against every homeowner in the area. The county board repealed the law during the next meeting.

Save all paperwork regarding your planning permission, including inspection decals or papers, and the original drawings (with the local building inspector's stamps). If a casualty occurs, then your insurance company may elect to not pay a claim if you have violated an electrical, mechanical, or building or regulation. That clause may be overlooked by an enthusiastic antenna builder, but it could prove to be a costly oversight if something untoward happens.

Tower Safety

Yet another friend of mine, a chap I worked with in the 1960s, is a professional tower and antenna rigger. His main work is broadcast and commercial towers, but he also does some 30m amateur radio towers as well. He is normally quite a conservative fellow when working (except for the time in his youth when he dropped his trousers at the 300m level of a local TV tower!), and had some tips to pass along.

First, don't even think about working a tower without using an approved safety belt...and inspect it before each use to make sure it is in good repair. My friend uses two safety belts. One is the standard type, and the other is one designed to simply hitch him to the tower, and is used as a backup in case the regular one fails.

Second, wear an approved motorcycle crash helmet. It's amazing how many things fall off antennas and can hit workers below in the head.

Third, tether tools with strong twine or small rope. If you drop a tool, the guy below you will need the crash helmet.

Fourth, don't work when tired, or when it is either too hot or too cold for reasonable comfort. It is better to come back another day than to make the kind of mistakes that fatigue produces.

Fifth, wear appropriate comfortable clothing (including shoes or boots).

Finally, if you work on a slip-up tower, then use a safety bar (**Fig. 4**) to prevent the inner section(s) from slipping down while you are on the tower. The safety bar is a hardened steel bar, and is held

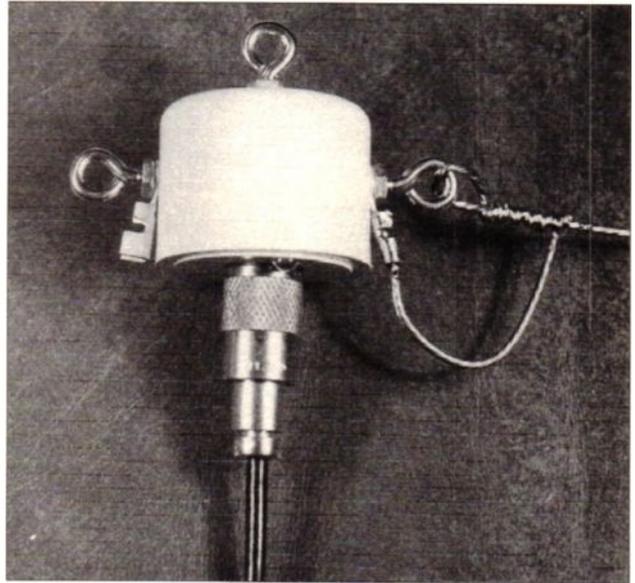


Fig. 2: Commercial wire antenna fittings.

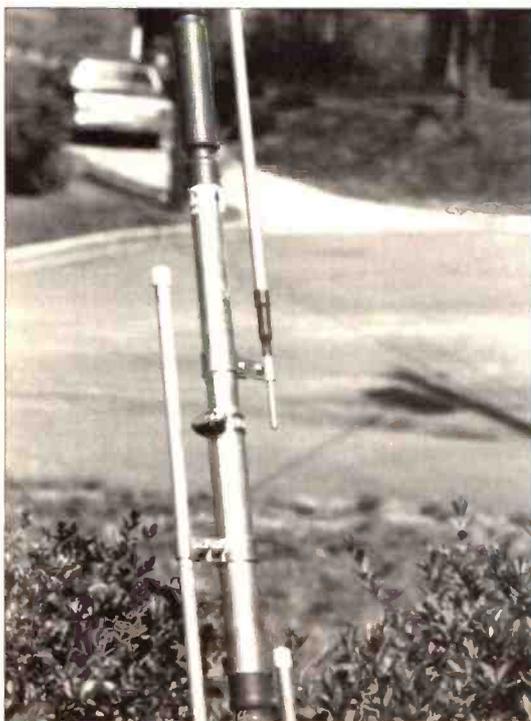


Fig. 3: Commercial antenna segment...note multitude of fasteners.

in place with light but strong chain. It prevents 'guillotine' action that severs hand and feet.

After hearing about one situation, I would also suggest keeping one person on the ground as a safety observer. A fellow I read about had a minor heart attack while up on a tower. Use a hand-held radio to keep in contact. If remote, equip the ground observer with a cellular telephone to call for help in case you are injured or become ill.

I was tempted to call this section 'having a safe erection', but something told me it wasn't appropriate. (*Seems apt to me...Ed.*)

Hearing Safety

Another safety issue regards your ears, or more specifically your hearing. It is a bit less dramatic than electrocution or falling off roofs, but it is nonetheless quite important. I never have a quiet day. Why? Because my right ear has a constant, never-ending ringing that sounds about like a 4kHz sine wave. The ringing started about two years ago. It wasn't constant at first, but over several weeks it got real darn annoying. So I went to the doctor, who in turn referred me to an ENT - ear nose and throat, (or an Otolaryngologist when he wants to impress himself or charge more money) doctor.

The ENT doc sent me to an audiologist who ran a simple audiogram and found rather bad high frequency hearing loss in that ear. She next ran an evoked potentials test called an 'ABR'. In this test they measure the patient's EEG (brain waves), while repetitively providing the same tone to each ear in turn for several minutes. When the EEG waves are signal averaged, the component due to the sound emerges and the rest is filtered out. It was abnormal.

The ENT doc next sent me to have a magnetic resonance imaging (MRI) scan of the brain to rule out an acoustic neuroma tumour. Now that's an experience! It doesn't hurt, but MRIs are aggravating as all get out. The ENT doc told me "I've got good news and bad news. The good news is that you don't have a tumor". So I asked him about the bad news: "...you don't have a tumor. If there was a tumor, then there's something I could do for you. Without the tumor, you'll just have to live with it".

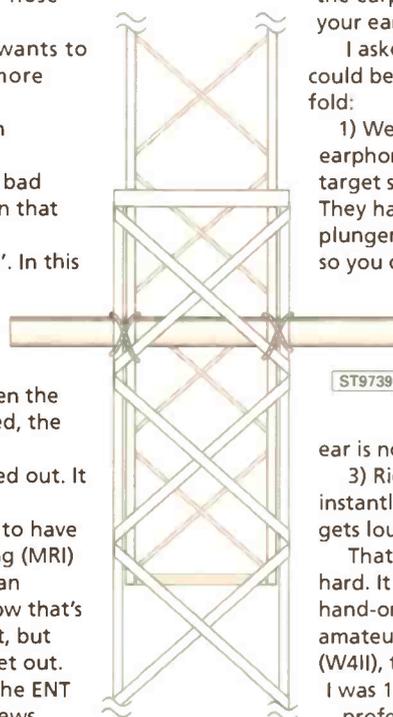


Fig. 4: Safety bar on telescopic tower.

We discussed my audio history. In many people my age the cause of ear ringing is 1960s vintage rock music, which we heard live. But that was not the case because I have disdained post-1960 (or so) rock music for many, many years and have never voluntarily listened to it for more than a few milliseconds (I'm a bluegrass and fifties rock fan). And I never listened to it loud. After further questioning, the doctor believes that my problem is due to my short wave listening and amateur radio hobby.

Yep! radio! The problem stems from the late 1950s and early 1960s when I was operating every day for several hours instead of doing homework (which explains my high school record!). With the gain up high, listening for a weak signal **through earphones**, I would frequently tune across some guy who was about a 'gozillion' decibels stronger than the signal I was copying. Either that, or the clown across town running a 2kW 'Loudenboomer' r.f. power amplifier into a high gain 'Bandbuster' antenna settled right on my frequency without listening first (rude!). I can remember some of those events causing an (almost pleasurable) buzz in my right ear. Those experiences caused damage to the cochlea structure of my inner ear.

I normally don't like to share personal things with my readers, but this story is a 'lessons learned' tale that hopefully prevents you from having similar problems. Earphones put a high audio power density into your ear. Even though communications receiver audio output stages tend to be low power (less than one watt in many cases), the 'power density' is high because of the confined volume provided by earphones. The high power density makes 40m c.w. like being too close to the bandstand at a rock concert. Avoid using the earphones in a manner that assaults your ears!

I asked the ENT doc how this problem could be prevented. His advice was three-fold:

- 1) Wear 'shooter's earplugs' under the earphones. These ear plugs are used by target shooters to prevent ear damage. They have a little piston plunger inside. The plunger stays open at normal sound levels, so you can hear what's going on around you, but snap shut when a high amplitude sound (like a pistol shot or 'loudenboomer' signal) is received.
- 2) Wear the earphones a little forward of the ears, so that the ear is not fully covered.

- 3) Ride the volume control so you can instantly knock down the signal level if it gets louder suddenly.

That second piece of advice struck me hard. It was one of those 'slap-palm-of-hand-on-forehead' experiences. My amateur radio mentor, the late Mac Parker (W4II), told me exactly the same thing when I was 14 years old. In addition, a number of professional merchant marine radiotelegraphy operators, and a former boss (who was a Chief Radioman in the World War II US Navy) gave me the same advice. But, dumb kid, I didn't follow it.

When I left the ENT doc's office, I asked him: "If you can't get rid of the ringing, will you at least tune it to the bluegrass station?". **SWM**

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

DX Television

November was pure magic! F2-activity was on the increase and for some DXers this was their first taste of reception beyond Europe. Reports of possible Meteor-Shower reception in the f.m. band from the USA and the Middle East made it a month to remember.

F2 Reception

Peter Chalkley (Luton) has submitted an impressive F2 report. On the 6th from the south-east there was a revolving star and what appeared to be Arabic script at around 0858UTC. The Channel E2 vision carrier was measured at 48.240MHz.

On the 7th at 0940 there was a man speaking against an Islamic-patterned wall, with a square-looking logo in the top-left of the screen. This was also seen by **Stephen Michie** (Bristol) and it could have been Iran. The signals faded at 0953, but another station emerged at 1003, accompanied by a co-channel signal. At 1535, a slow-fading carrier was heard from the south. No pictures were resolved, but there was a fair amount of 6m activity at the time.

On the 19th, Peter Chalkley discovered two Channel E2 carriers, one almost certainly being Thailand. Shortly after 0945 there was a female announcer bowing (a Thai custom) with titling resembling 'block' characters. The best day was the 21st with three carriers heard on Channel E2 at 0945 and reasonably clear pictures seen at 1000 unidentified, of course. An FuBK test card, presumably Iran, appeared at 1010.

Checking 45.25MHz (New Zealand Channel 1) and

46.25MHz (Australian Channel 0), a weak vision carrier could be heard on the latter frequency. Out of curiosity, Peter checked the AU0 sound channel and heard weak audio on 51.750MHz. At 1044 on the 23rd, very strong pictures were established on R1, possibly from Central Russia. The signals had disappeared by 1115.

On the 9th at 0857 **Tim Bucknall** (Congleton) measured a Channel E2 vision carrier on 48.2396MHz which coincides with the offset of the Nakhon TV-3 transmitter in Thailand. This transmitter has already been identified in Finland and the Netherlands.

Transatlantic reception took place on the 16th at 1652 when Tim heard Bob VE1YX of Bridgewater, Nova Scotia, on 50.115MHz. We wonder who will be the first to log the USA Channel A2 vision carrier?

From the south on the 25th at 1245, Tim resolved a weak carrier on 48.248MHz which coincides with that of TV Equatorial Guinea.

Tom Crane (Hawkwell) noticed on the Internet that the Genting Sempah transmitter in Malaysia was tentatively logged by a Dutch enthusiast, along with Iran (IRIB), on the 7th. On the same day, there was also a 6m opening into South Africa between 1130 and 1300. In Australia, the Biedenkopf (Germany) outlet of BR-1 was identified on the 11th by **Anthony Mann** in Perth, Western Australia.

In Northern India, **Lt. Col. Rana Roy** reports many days of Trans-Equatorial propagation (TEP) on Channel E2 from the south-east. Fluttery, but smeary, pictures (sometimes with sound) usually emerge between 1400 and 1700, local time. The signals are thought to originate in Thailand.

Good Old-Fashioned Sporadic-E

Sporadic-E activity was evident on the 13th with Italian and Spanish signals during the morning. **Stephen Michie** (Bristol) and **Peter Barber** (Coventry) both identified TVA, the Italian private station, co-channelling with RAIUNO on Channel A. **Ian Milton** (Ryton) and **Simon Hockenull** (Bristol) logged several Scandinavian and Baltic stations during the evening between 2000 and 2150.

The most impressive catch was Estonia with exceptionally clear pictures and sound using the new 5.5MHz sound spacing. According to **Pertti Salonen** (Finland), there was an Aurora that evening and the Northern Lights were visible in Vaajakoski, Finland. It has been suggested that the reception might have been due to Auroral-E propagation, rather than Sporadic-E.

Meteor Shower Activity

Reception due to the *Leonids* meteor activity was not as spectacular as anticipated. Nevertheless, **Stephen Michie** identified Slovenia (SLO-1) on E3 at 2238 on the 17th while **Tom Crane** (Hawkwell) saw bursts of RAIUNO on IA and IB at 0228 on the 18th.

Continued on page 60...



Fig. 1: Identification caption radiated by ABC in Australia.



Fig. 2: Caption transmitted by SEQ 'Sunshine Television' in Australia.



Fig. 3: Logo used for the French TF-1 weather forecast.



Fig. 4: Teletext logo radiated by Televisione Svizzera (TSI) in Switzerland.

Reception Log For November

Reception reports have been supplied this month by Stephen Michie, Peter Barber, Tim Bucknall, Simon Hockenull, Ian Milton and Peter Chalkley. Times are shown in UTC.

F2 Reception:

Day	Log
6	0858 E2 with revolving star/Arabic script on 48.24MHz from the south-east.
7	0938 E2 Arabic station with square-looking logo in the top-left of the screen. 1535 E2 unidentified carrier from the south during 6m activity.
8	0845 E2 Unidentified YL announcer.
9	0857 E2 TV-3 (Thailand) on 48.2396MHz.
13	0940 E2 Unidentified weak signals from the south-east on 48.24MHz.
16	165250.115MHz VE1YX (Nova Scotia) heard.
19	0942 E2 TV-3 (Thailand) with bowing YL with Western-style dress, adverts and alphabet characters in block-style. 1010 E2 FuBK test card (possibly Iran).
21	0945 E2 Three carriers resolved. Good pictures resolved around 1000. 1010 E2 Unidentified test card. 1010 AU0 Australia with a weak carrier on 46.235MHz. Weak audio on 51.750MHz.
23	0825 E2 Weak pictures on 48.24MHz from the south-east. 1040 E2 A second opening. Two carriers heard on 48.24 and 48.26MHz. 1044 R1 Strong pictures at around 1100. Weak sound with fade-out by 1115.
25	1245 E2 Weak carrier on 48.248MHz, possibly Equatorial Guinea.

Sporadic-E:

Day	Log
13	IA and IB (Italy) with 'tg1' News. A TVA (Italian private station). E2 and E3 SVT-1 (Sweden). E3 YLE-1 (Finland). E2, E3 and E4 NRK-1 (Norway). R3 ORT (Russia). R2 ETV (Estonia) R2.
18	E2 and E3 TVE-1 (Spain); E3 SLO-1 (Slovenia).
20	0930 E2 and E3 TVE-1 (Spain).

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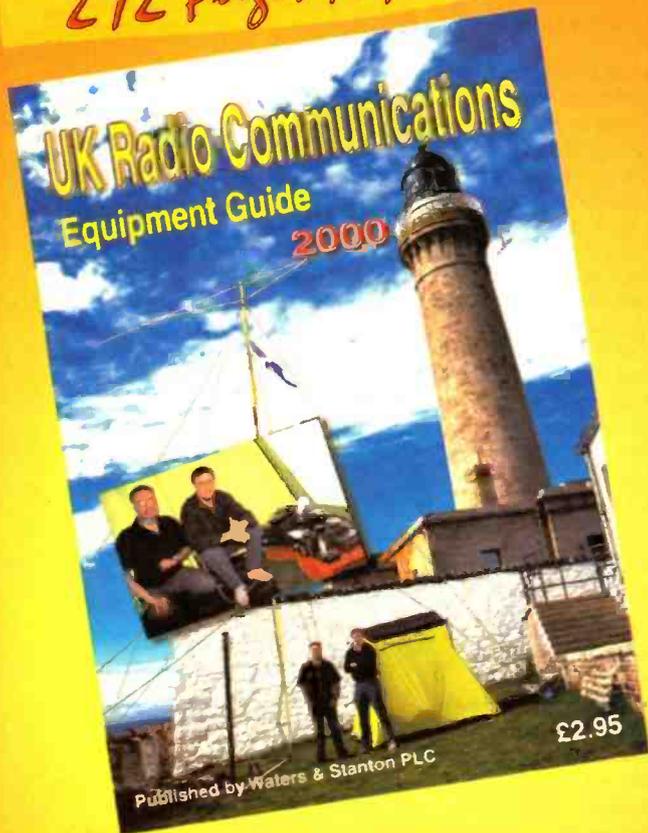
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Icom's wide range receiver has all the performance and engineering qualities you expect from this company. Features include USB, LSB, CW, AM, FM, WFM * Wide dynamic range * 232C interface * 1000 alphanumeric memory channels * Comprehensive scanning * Sleep function and Timer * IF Shift control * 3 Antenna connectors * Voice synthesizer option * Keypad frequency entry * Analogue S-meter * Large LCD readout etc. Send for brochure.

AOR-3000A Receiver 100kHz - 2036MHz

£699



The AOR-3000A goes on and on. It offers a wide frequency range at a very competitive price. Features include USB, LSB, CW, AM, FM * Fast 50 channels per sec search. * GaAsFET RF amplifier * Wide range of tuning steps from 50kHz * RS-232 port * 400 memory channels * Built-in clock * Channel pass feature * Back illumination * Rear whip antenna etc. Ask for leaflet.

NASA HF-4E Receiver 30kHz - 30MHz

£199



Computer Compatible FREE Software Disk
This new receiver covers 30kHz to 30MHz and is designed for SSB, CW and AM reception. A much improved version of the Target HF-3, it is fitted with 2.6kHz SSB filter, advanced mixer design, back-lighted display, active active antenna facility, and computer output. Included in the package is a software disk and 12V AC mains adaptor. **Optional self-powered active antenna £59.95**

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YAESU FRG-100 Receiver

50kHz - 30MHz

£389



The FRG-100 has stood the test of time. It offers full coverage of the short wave bands plus long wave and medium wave. It features, * USB, LSB, AM, CW, * 50 memories * 2 stage attenuator * Noise Blanker * Band Scanning * Memory Scanning * Dual Speed AGC * High and low impedance antenna inputs * Programmable steps from 10Hz - 1kHz * Optional Narrow Filters, PSU and FM board * BFO reverse for CW * Twin Clocks. Ask for leaflet.

AOR-7030 Receiver 0kHz - 32MHz

Phone



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.

Fairhaven RD-500VX 20kHz - 1.75GHz

Phone



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Airband Receiver

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Yupiteru MVT-7000EX
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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.



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AOR-8200
500kHz - 2040MHz

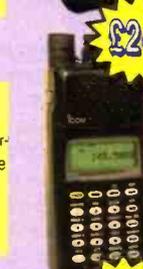
This wide range scanner is fitted with a data port for computer control. Features include USB, LSB, CW, FM, WFM * Programmable steps * 1000 memories in 20 banks * Alphanumeric display * Built-in AM antenna * 8.33kHz steps for air band * Rechargeable ni-cads, AC charger and helical antenna.



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ICOM IC-R2
500kHz - 1309MHz

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£129

...continued from page 57

FM Reports

Tropospheric reception was mainly confined to transmitters in the United Kingdom. However, on the 12th, Tim Buckhall (Congleton) heard a Polish station on 93.8MHz. Other signals included SRP-3 (Sweden) on 97.0MHz from Hörby plus German stations located in the north of the country.

The *Leonids* meteor shower produced lots of activity on the f.m. band during the early hours of the 18th. The peak was predicted at 0200UTC but, unfortunately, the display itself was obscured by extensive cloud layer over most of the country.

Ian Milton (Ryton) monitored both the TV and f.m. bands, the latter being more productive probably due to the lower threshold required to produce a signal. Between 0145 and 0215, there were signals of varying strength with stations fading in and out every five seconds or so.

George Garden (Edinburgh) also took advantage of the Leonids. From 0200 there were strong repeated bursts of France Musique on 91.1MHz from Niort. Also on this frequency, BBC Radio 3 from Llangollen was identified during the night.

Extra Long Distance Reception

Mike Gaskin (Cornwall) reports a near-constant babble of f.m. stations from around 1100. At some time during the night, the RDS had displayed 'KOL YISR' on 101.4MHz. Mike had fallen asleep so he missed the actual event. KOL ISRAEL has a 100kW transmitter at Beersheva on that frequency but Mike is suspicious as he does not think that the Western European RDS is used in the Middle East. Could meteor-shower reception occur over such a distance?

Normally, reception is confined to typical Sporadic-E distances, i.e. from within Europe. However, a startling event took place at 1115 on the 29th when **Mark Hatton** (Hayes) heard a five-second snippet of a traffic report on 87.7MHz which sounded Canadian or American. There were references to 'at 5.26', 'Channel Four' and 'Looking at live picture' which suggested that the reception could be the TV sound of Channel A6 (87.75MHz). Mark E-mailed various US broadcasters and WECT in North Carolina responded, confirming that the transmission was theirs!

KIBC Identified

Pádraig Deely (Ennis, Éire) has identified the photograph of the KIBC (Kababayan International Broadcasting Corporation) caption received by Lt. Col. Rana Roy in a recent column. 'Kababayan' is a Filipino word meaning 'fellow countryman' and seems to be a special service intended for Filipino workers overseas. It is broadcast via satellite, cable and terrestrial TV stations throughout Asia and the Middle East but there is some uncertainty as to whether the station is actually based in the Philippines.

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 'jpeg' files on PC disks.



Fig. 5: The regional News programme from the Swiss Italian-language service, TSI.

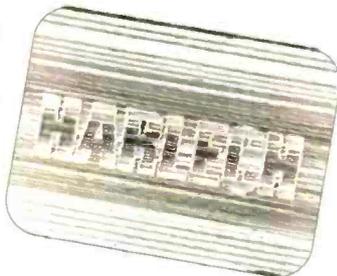


Fig. 6: This month's ramble in our regular 'Down Memory Lane' spot. Who remembers this psychedelic (and, some would say, headache-inducing after watching the complete sequence!) logo used by Harlech TV in the late Fifties?

■ **DAVE ROBERTS** *SWM EDITORIAL OFFICES, BROADSTONE*

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

Scanning

Outro and Intro

The time has come to bid farewell to Faris Raouf as our regular scanning columnist. Faris has done a sterling job over the 13 months he wrote the column and I know we are all going to miss his input. He has become extremely busy in his other 'life' as a computer journalist and no longer can spare the time to feature within the *SWM* pages. I wish to thank Faris for his past submissions and his hard efforts on your behalf.

Faris E-mailed the following message to sign off.

Dear all,

I just want to say **thanks** to everybody who wrote or E-mailed me during my time as the 'Scanning' columnist on *Short Wave Magazine*. I've had a great time writing the column, and I hope you all enjoyed it. I also want to thank Martin Lynch & Sons and Waters & Stanton, who have both supplied me with a range of products for review as well as expert technical advice over the last year or so.

I hope to be back in the pages of *Short Wave Magazine* with the occasional review, but otherwise you can keep in touch with my activities by visiting my web site at www.faris.demon.co.uk. The site is currently under heavy construction, but hopefully by the time you read this the work will be finished.

Faris Raouf

Now to welcome your new Scanning scribe - Dave Roberts, without further ado here is Dave...

Ed.

Just when you were wondering what to listen to along comes the

Sunspot Maxima

Well, you can be forgiven for thinking that this sunspot cycle has been a bit of a non event so far. Listening to the RSGB news on 145.525MHz on a Sunday morning will give you a fair idea of what the sun could be up to for the following week. A few weeks ago the broadcast stated that the current cycle appeared to have stalled. This could have been the case but current indications are that things are picking up. You may be forgiven for wondering what this has to do with scanning. The thing is that there is a tremendous amount of radio traffic at the lower frequencies, say between 30 and 50MHz which we can tend to ignore while listening to more local, less exotic stuff. For instance, during the last sunspot maxima I was listening to a US police force on the east coast of America involved in chasing bad guys stealing from a storage facility. The chase was being conducted on foot and the officers would have been using hand-held radios which were then linked to the low band base station so that the mobile patrols could join in the fun. This was on 37MHz. Simultaneously there were at least twenty other channels active with various law enforcement systems operating within ten megahertz and also other commercial traffic was booming into the set from the east of the US and Canada.

Now don't think that you are going to hear this stuff with the supplied rubber duck antenna on the top of your hand-held because you ain't. You will certainly need an external antenna. That, however, is as exotic as it gets. The antenna that I was using was a straightforward quarter wave for the two metre amateur band mounted on a chimney stack at my home in Bucks located in a valley.



The radio was the trusty AR1000 hand-held, which although was a good set in its time, the AR1000 however, is not noted for superb sensitivity but for wide band coverage. I appreciate that many US and Canadian law enforcement systems have now migrated to 800MHz trunked working and there is widespread use of Mobile Data Terminals in vehicles, but you will hear signals from the north east of Canada and the US if you listen. Set the receiver to scan in 5KHz steps and scan between 30 and 45MHz. If there is an opening, traffic from North America and probably some from Eastern Europe will come in. A good tip to save wasting time scanning if there isn't an opening is to tune round the amateur band at 29MHz n.b.f.m. and see whether you can hear the amateur repeaters from the States. If you can, then set the step, go to 30 - 45MHz and have some police/fire action from the other side of the Atlantic.

An don't forget to let me know when and what you hear!

Police Scanning

OK, you can stop hyperventilating. I'm not advocating that you do. I'm just pointing out that the police are soon to become, shall we say, less audible throughout the UK and Europe.

Whereas, at the moment many police transmissions are still in the clear in v.h.f. and u.h.f. and although some are encrypted using various systems and some use trunking, this could well change. If the Government has it's way it will anyhow. For Her Majesty's Government are desirous of flogging off to the highest bidder, the frequencies currently in use by the police and other emergency services. This sale will bring in plenty of revenue from the commercial sector and will force the police and others to move. The question has been to what alternative?

The answer seems to be Terrestrial Trunked Radio (TETRA for short). The government set up the Public Safety Radio Communications Project to look at a new integrated system for public safety radio. A consortium called Quadrant, formed from four major communications/high tech companies (BT, TRW, Nokia and Motorola) has now built equipment to the European TETRA standard. The bottom line in all this, is that if the police, fire and ambulance services can afford it, and it looks like they will have to, then in the next 12 to 18 months the familiar emergency services will disappear the current spectrum allocation throughout the UK to be replaced with a buzz on about 380MHz on frequencies relinquished by the military for this purpose.

The system is, as you can imagine, a fair bit better than the simple 'natter' systems in use at the moment. It relies on land-line links from base stations to the telephone network, but this allows users of the terminals (they aren't radios any more - they're terminals...got it!) to make 'phone calls on the internal 'phone systems or to the main network. Also, talk groups can be in different counties or even countries and all be within hand-held or vehicular set contact with each other. This is, of course, very handy when simultaneous raids have to be carried out at a precise time at different locations. The terminals (remember...not radios) are under the

overall control of the despatcher who sits at a work station running Windows software and who can put any set in the system into transmit or switch it on or off or even exclude it from the system should it have been lost or stolen. Yes, this is a fancy system. There are concerns by fire and ambulance services that should there be a major incident then the police may hog all the available capacity and leave them in the communications nether world. These concerns will have to be ironed out by the authorities. Their

main common concern is, however, cost! One county police force in the south midlands estimates that TETRA will take up nine per cent of their annual budget. So TETRA's path may not be so smooth. As a senior police officer from a large provincial force said to me last week. "Tetra is a radio, a very good radio, but it is still a radio". So you never know, you may not be able to hear the 'digi buzz' on 380MHz in your area for a while yet.

There are at the moment strong rumours of digital scanners being developed and a friend of mine in the professional communications field has heard that there is a system that will scan TETRA and resolve the audio. I remain to be convinced. The possibility of such 'digi-scanners' has so concerned the Canadian authorities that I have heard that they propose to make them require a licence and then presumably not issue any licences other than to the authorities. The prospect of officialdom rolling up and raiding your home to try and find your radio receiver takes us back to Europe fifty five years ago and seems a tad unhealthy to me.

Finally

It seems that the space has run out before I have even got into my stride this month but don't forget if you have any info or questions (anonymity guaranteed if required) then please E-mail or write - I will answer through the column if you wish, and if I can, or otherwise I will reply by E-mail or snail mail, direct to you.

That's it 'till next month - keep the radio warm.



Amateur Bands

An interesting question comes from our anonymous correspondent who asks "Given the modern council-house back garden of, say, about eight metres square, with maybe five square metres at the front, what would you do for antennas?". Two scenarios: a) for the person who 'knows the bands' and b) a complete newcomer. For the latter my advice would be to begin with a random 'wire round the picture-rail' and listen round until you think you've transferred to category a)

For the front, I'd be inclined to make and erect a white flag-mast, complete with halyards. Fly a flag on suitable dates. Fit a 'lightning conductor' down the side, connect it to a good earth via switched loading coils, with a coaxial feed back to the shack. In the back garden my home-brew tilt-over mast carries a triband ground plane - remains of a beam destroyed in a gale. Finally, if you can catapult a weight over the roof, an end-fed wire fed via an a.t.u.; mine covers Top Band, and the above-ground radials run right round the garden - a lovely trap for thieves, who then fall straight into the wheelbarrow!

Finally, tune up, preferably using an antenna analyser, and log the settings. For 1.8, 3.5 and 28MHz you'll need two spots; for the others, the mid-band setting will do.

Letters

A bit thin on the ground this month rather as one expects just before Christmas. Let's make a start with the all-c.w. log from **Ted Trowell**. Top Band gave him LX1DA, GD4UOL, HB0/SP2FOV, and UX0UN; a bit earlier 7MHz stumped-up with HL1DH, ZB2FK, JY9QJ, HB0/HA0HW/P, VK8AV, HZ1HZ, ZA/S51PF and 10MHz accounted for PY7ZY and HC8M. 14MHz showed V26YR, V51AS, YV5DTJ, PP7CI, PY4AR, PY0FZM, and 5A1A and 18MHz VP2V/G3TXF. At 21MHz we see PY2TE, PY2AWG, V47BY, and 3W7TK while 24MHz dredged up VK7CW, JY9NX, OH0PA, A45XR, E4/G3WQU, 6W/K31PK, KP2J, W7CT in Utah, V47GU, and AD6C. Finally on Ten, Ted booked in VR2JK, XX9TRR, PY1NSZ, 5B4/UA3TU, ZA/SP1PF, V47GU, YV1NX, ZS1HZ, CO2OR, 9G5MF, 3D8BB, XQ0YAF(Chile), KP2J, YV5/OH0XX, FR8GL, P43JB, ZD8Z, 7X4AN, KL7NL, HK6KKK, HC5AI, ZP5KO, VP2V/G3TXF, TU2XZ, and 3U8BB(China)

Ted also includes some QSL addresses, namely ZD8Z via VE3HO; V47GU via DL7VOG; XX9TRR via N6XJ, JY9QJ via DL5MBY; PY0FZM via DL2HZM; 9G5MF via KC7ZV; and HC8M via DL6FBL

Emrys Griffiths in Carmarthen asks about IRCs. You need first to check that the country to which you mean to send your IRC accepts them. In countries where inflation is rampant, it is often better to use a dollar bill - 'green stamp'. The point is simply that in such countries the dollar is a much more useful currency than the 'proper' one. On the subject of direct QSLing, do be aware that in countries where inflation is serious, putting a call sign on the envelope is 'asking for it'. The postal people soon realise that the amateurs incoming mail contains pretty cards and dollar bills, so all are ripped open, and the 'green stamps' stolen.

Now we move on to Oxford where **Paul and Peter Goodhall** share a shack. Not for too long though; young Peter has asked for a receiver of his own for Christmas...we only hope Santa doesn't get stuck in a chimney with it in his sack. Meantime, on 14MHz we note VK2BCY and VK3OM working G4JNH; while on 28MHz we see N2NY, KD0HY, W4JM, N2GJY, K3II, A1S working RA1QX, RV6VJK connecting to KT4WW1WEF and N3RS after S51A, W1GD, W2PS, W4OX, N1EU, N4GU, W1US, AA1QD, ZX0F after WA2JUN, W2KQE

and N2RM; a few days later 3V8BB's pile-up included LUs, UA9OCF, and Europeans., then OH1MA knocking off KZ1H, VO1XC, ZP5PAH, VQ9NL, 8R1Z in QSO with KG5FX, the Z32XX into N4TUN, KD4FAZ, W4SD, K2OF, K8NY, N7GK, W1CBI, HK3TAS, W0TXW, W9WPW, while A61AJ was noted working KA8CBL/M. On November 12, 21.025 c.w. they landed 9M6OO/P for Spratly Is. In the wee sma' hours of course 3.5MHz is the place to be and here they encountered a fair crop of Ws working in to Europe, but as early as 2000 they logged RW4PL working JA5QC to add a flavour to the crop. One guesses Paul has been working hard on the antenna systems - it always pays off.

Next we find the characteristic hand of **Colin Dean** in Barnsley. Top band yielded EA5UPR, GM7V, IK0AIZ, LY3BS, LZ2K, OH2U, OK1DX, OT9A, PI4ZLD, and SP3GEM. Thence up to 7MHz and AT0LVH, A45XM, A61AN, BV2FT, BV2RS, EK3GM, EX8M, HL5FUA, HZ1RT, IG9A, JA4HCG, JA6WOR, OD5NH, P3A, RV0AM, RW9UMT, R1ANZ, SU2MT, TA2EH, T77CD, UK9AA, UN9PT, VK1MJ, VO1VM, XJ1JF, XX9TRR, 4L2M, 4S7RD, and 5A1A. Up again to 21MHz for A43IB, HI9/DL2ARD, OH0JTU, R1ANZ, TA2BK, VP2MCM, V47KP, YC4WIO, Z23JE, and 5C8M. The big crop was 28MHz though, with A41LZ, A43IB, CM7DS, CP6EB, C6AN/EK4JJ, FS/K7UZM, FY/F5PAC, HC1OT, KC4CD/HR2, KG4CM, KP2A, KP4/SM5AOE, PJ2C, TG9NX, TO2OY, UN7JX, VE2CSI, VP2MGL, VP2VF, VP5R, VP5/W5WWW, V26B, V26SW, V47KP, V47NG, WP2Z, XE1JEO, ZX0F, 5C8GM, 5N0NAS, 6V6U, KN5H/6Y5, 8R1RPN, 9K2GS, 9N1HA and 9Z4CT.

Finale

That's my lot for this century. The deadlines for the 21st century will continue to be the first of each month, and the address as always **Box 4 Newtown, Powys SY16 1ZZ**. If you have a query which needs a personal reply, please enclose an s.a.e. or IRC - I can usually but not always answer them fairly quickly.

Coming Events

Firstly, **Bhutan; Jim Smith VK9NS** is still working on it. Yonten A51TY(ex-AC5TY) is keen to get back on, and Jim hopes A51 may re-appear in 2000.

CT1EEB hopes to be on from Dili in East Timor when his work with the UN Mission permits; however, CR8 is not currently a DXCC country.

Looking for P47 VE3MR will be there until April as P49MR. QSL direct to VE3MR. The proposed Italian TT8 operation is postponed to March when the rainy season is over.

Marion Island is represented by ZS8D until April 2000. On sideband look on 7.070, 14.260, 18.145, 21.345, 24.945, 28.475MHz. Morse buffs try 7.024, 10.111, 14.045, 18.080, 21.045, 24.905 and 28.045MHz. QSLs via ZS6EZ. Do note though, that the environmentalists have caused the old rhombics to be removed, leaving a high broadband inverted-V.

Towards the end of March look out for Norfolk Island activity - no more details at the time of writing. However, for Thailand HB9AMZ and his XYL have moved there and Kurt is now HS0ZBS.

Don't forget the Millenium station from Finland, OH2000 which will be on for the whole of 2000.

5H30C is IN3KIZ; for how long is not known; but we do know that C21JH and C21/VK2QF will be active in March and April - cards to home calls.

Ex-A92GD is now EL2RF from Monrovia, and the cards should go to K1SE, POB 685 Manassas Park, VA 20113.

VQ9 Chagos activity is to be hoped for soon; I understand that W3PO is there for several months, though at the moment I have no more data. Kosovo is not on the DXCC list, but I hear that RW3AH expects to sign YU8/RX0A.

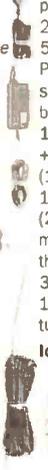
Now a QRT - XX9AS has closed down in Macao but hopes to be on from somewhere else soon. And Slim, blast him - signing YI2CL asking for cards via WA3HUP; as FP5AP asking for cards via W3HKN, PY0FA even though the real PY0FA is no longer on the island, and P51BH peaking on the wrong beam heading. Save your s.a.e.s QSLs, dollars and IRCs on these Phoneyes!

On a happier note OH2BR intends an extended expedition to Pitcairn as VP6BR. Keep an ear open for this one, as Jukka's departure date from Auckland is tied to the P & O container ship which visits Pitcairn.

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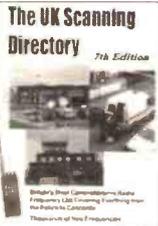
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DJ-X10 also available.

Attention-123!

The last 'Attention 123' briefly covered, amongst other things, the general Numbers station situation since the ending of the 'Cold War'. Now it's time to give a resume of stations active during the closing months of 1999. Only those regularly and commonly heard in this country are included.

Unfortunately, as there are so many, only very brief details can be covered here, but at least it should give an idea of what can be found. Stations are listed in the standard ENIGMA order. Nearly all are active at least once a week, some many times daily. Prefixes: M = Morse, E = English, G = German, S = Slavic languages, V = all other languages. Variant suffixes are generally not given here. Nearly all send repeat messages in extra transmissions - on same day, different day of week or, for example, 1st and 3rd week of month.

Some station schedules may send the same message repeatedly (until replaced), some may never repeat a message (other than in scheduled repeat transmissions). The **traffic** level of a station is a measure of the number of apparently **different** messages sent, **relative to the number of schedules**, rather than the number of transmissions, frequencies or changes.

Where **'full level'** the station is of a type which always sends apparently different messages (except in scheduled repeats). Much traffic may of course be 'dummy' and carry no messages and undisguised null message formats are used by many stations.

Family Ia (Russian FSB) - usually excellent signals - relative activity levels between family Ia & b member may vary, these stations are very flexible - schedules may last years or days, and traffic levels vary from low to very high. Messages can be very long - over 400 groups, but generally up to 200.

M14 - several/many weekly schedules, some dual message (M14A) add up to around 140 groups, very high traffic levels.

E6 - a few weekly schedules.

G6 - one weekly schedule.

S6 - in Russian, several weekly schedules.

V6 - in Spanish, one weekly schedule.

E17y - heard in early hours, transmits from Cuba.

E17z - historically from this family, but now comes from Ukraine or Belarus, erratic, but usually daily when present.

Family Ib (Russian GRU) - usually excellent signals.

M12 - very many schedules, some very stable, others short-lived, busiest of family I, GC usually around 143, very high traffic levels.

E7 - a few weekly/monthly schedules.

G7 - a few weekly/monthly schedules.

S7 - in Russian, several weekly & monthly schedules.

V7 - in Spanish, two weekly schedules.

XPh - high pitch Polytone (for unattended automatic reception), two weekly schedules, medium traffic levels.

Family II (US CIA).

E5 - many weekly schedules (mainly short-lived), usually two parallel frequencies, high traffic levels.

Family III (Polish Intelligence?).

M3 - numerous weekly/daily schedules, often very long-term, relatively few messages and many of these are repeats from a year or two earlier, very low traffic level (messages often appear in flurries), several transmissions daily.

E11 - one weekly schedule, messages rare.

G11 - one or two schedules (monthly/weekly), messages rare.

S11A - modified Russian, one or two schedules (monthly/weekly).

Family VII (E European) - less active than formerly, full level traffic.

M17 - two or three weekly schedules.

E1 - one or two weekly schedules.

Family IXa (Czech & Slovak origins) - full level traffic.

M7 - used for unattended automatic reception, several weekly schedules (often short-lived), often repeats M10's messages.

M10 - many weekly schedules with repeats, always two parallels.

M10E - as below, plus two other (daily and 3-day/week) schedules.

S10E - in Czech, 28 day cycle of schedules for six consecutive days each time, uses encrypted IDs.

Family IXc (Czech & Slovak origins).

M39 - erratic but may be very active for a few days at a time (uses two parallel frequencies), full level traffic.

S17C - in Czech, one daily schedule, two parallels. Control station - sends a single non-random five-figure group.

Family X (British MI6) - encrypted IDs, full level traffic, fixed 200 group message blocks.

E3 'Lincolnshire Poacher' - nine regular daily sliding schedules, three parallels.

E3A 'Cherry Ripe' - seven schedules Mon-Fri, two parallels.

Family XI (now transmits from Poland) - much reduced and reorganised, encrypted IDs, full level traffic, German replaced with American English.

M4 - one monthly schedule with repeats, fixed 100 group message block.

E23 - three monthly schedules, each with repeats, three fixed 100+100+50 group message blocks now without breaks.

Family XII - Jean-Michel Jarre music.

V8 - in Arabic, monthly schedule with repeat, full level traffic (E9 seems to have disappeared).

Family XIII (transmits from near Budapest) - use non-random encryption (doesn't send conventional text messages), full level traffic, ignores international frequency allocation.

M29A - several schedules (daily and weekly).

G4 - three note tuning signal, generally one monthly schedule with four transmissions per week, female announcer shouts as if on parade ground!

Family XIV (Russian) - transmits from Kaliningrad enclave.

M1 - regular hand-keyed 'A' Network has six weekly schedules (no repeats) which usually have three special 'End of month' formats (M1A/B) on last Thu & Sat of the month (full level traffic). The 'B' Network runs several weekly schedules with repeats (variable traffic levels). The 'C' Network is erratic and unpredictable. Sometimes two parallels.

M45 - one weekly schedule with repeat, two parallels, low to medium traffic levels, hand-keyed.

S21 - in Russian, one weekly scheduled with repeat (others may still exist), apart from ID, same messages and habits as M45.

Family XV (E European) - full level traffic.

M13 - numerous monthly schedules with repeats, several transmissions daily, M13A changes ID monthly.

E18 - one monthly schedule with repeats, messages can be very long - 300 or more groups.

G22 - one monthly schedule with repeats.

Family XVIII (Cuban DGI) - full level traffic.

M8 - numerous daily schedules, often surprisingly strong in Europe, M8A the commonest sends three 150 group message blocks, uses 'cut-number' Morse.

V2 - in Spanish, numerous daily schedules but M8 is busier.

Family XIX (French DGSE) - full level traffic.

M16 - hourly h+40 on four parallel frequencies, control station - sends addressee lists repeatedly for 20mins.

M51 - very active, daily for hours on end, sends continuous 100 group messages, each with serial number, two parallels.

0 - not allocated to families (others may exist).

M23 (W European network) - very active, several schedules, several times daily, often two parallels, many disguises, traffic levels vary from full to nil depending on schedule.

M26 & M34 (East European) - erratic, but when active may operate continuously over several days, medium traffic levels.

M40 (N Korean) - numerous daily schedules, but a few are consistently heard in Europe, suggesting European origin?

M52 & M56 (West European network) - erratic, but when active may operate continuously over several days, control type station.

M76 - two known daily schedules, very active - several messages per transmission, some carried over for weeks, others may be dropped after a day or two, occasionally hand-keyed.

E10 (Israeli Mossad, etc.) - numerous daily schedules, often at same time, often three parallels, traffic levels very low to very high, depending on schedule, ignores ITU frequency rules.

E15 (Egyptian) - several daily schedules, low traffic levels.

You can contact ENIGMA (details above) for further information, and you can send in any interesting logs for which we are always grateful. By the time you read this, many numbers stations will have already sent their recipients encrypted New Year greetings. As usual, they're ahead of us! Best wishes for 2000 from ENIGMA.

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SSB Utilities

Easyjet

For the past few years, one small airline based at Luton Airport has been showing the big boys how to attract passengers, and how to get them quickly and cheaply from A to B. Easyjet has a fleet of 18 modern Boeing 737-300 aircraft, based at Luton Airport, but with aircraft operating from many other UK airports. They have very distinctive markings - lots of orange - and their 'phone number in huge letters along the side of the aircraft. They fly on 27 routes all over Europe, and over the next three to four years they will be getting 15 brand new Boeing 737-700 aircraft, so there are plenty of aircraft to listen for.

During October and November I started to see reports of their aircraft being heard on h.f. - the first time that LDOC frequencies have been reported for this airline. So far, the reported frequencies for Easy jet Ops are 11.363, 13.285 and 21.931MHz, although there is the possibility of at least one more lower frequency. On these frequencies, the LDOC ground station uses the callsign Easy Ops, while the aircraft use either their flight number (e.g. Easy 451) or the last two letters of their aircraft registration (e.g. Easy Yankee-Delta).

A well-known UK airline LDOC frequency is 11.363MHz, and it is also shared by Britannia Airways and Monarch Airlines. Both these airlines are based at Luton Airport, which may indicate that there is some sort of sharing going on between the airlines. Both Britannia Airways and Monarch Airlines are listed in *Airwaves 99* as using 6.556MHz, so this may be the unidentified lower frequency. I have listened for many hours to 11.363MHz in the hope of hearing some of these signals myself, but so far I have not had too much success. The nearest that I have come is to hear a series of SECAL tones one night.

Another frequency which may be worth watching is 10.066MHz. While writing this month's text during early December, I heard an Easyjet flight on 11.363MHz trying to contact Easyjet Ops at Luton. When they were unable to make contact, the flight said that they would QSY to 10.066MHz. I heard them calling on that frequency, but they never seemed to make contact with Luton.

New Hercules

After many months of waiting following delays with the aircraft, the RAF officially took delivery of their first new C-130J Hercules during late November 1999. Most of the aircraft have already been delivered to the UK, but have been waiting to be completed to RAF specifications at Cambridge Airport.

Earlier in 1999, one of the aircraft was delivered to the Defence Research Agency (DRA) at Boscombe Down in Wiltshire, where it has been undertaking a series of trials to ensure that the aircraft is fit for RAF service. This has involved a number of flights over the summer months, but I have yet to see any reports of the aircraft on h.f. To be honest, most readers (and I include myself in that category) would probably not realise they were listening to a DRA aircraft - they are not heard too often on the usual Architect frequencies.

However, now that the first aircraft has been delivered to RAF Lyneham in Wiltshire (home of the RAF Hercules fleet), the remaining aircraft should follow quite quickly over the next few months. The RAF are expecting to have all 25 new aircraft delivered by early 2001, replacing 25 of their original aircraft. I still do not know what series of ASCOT callsigns will be used by the new aircraft.

At the moment, the 4000+ series callsigns are used by the Hercules C.1 variant, and the 5000+ series by the C.3 (stretched) variant. I would fully expect the new aircraft to use a different range entirely, and I would like to hear from anyone if they manage to log a callsign in the 7000+ or 8000+

ranges, especially if they are able to provide details of the aircraft SELCAL code.

Press reports indicate that as each of the new aircraft are delivered to the RAF, one of their older aircraft is withdrawn from use and returned to Lockheed Martin, so perhaps the SELCAL code from the retired aircraft will be transferred to the new C-130J Hercules. But only careful logging of RAF flights on Architect frequencies is going to provide the answer to this conundrum. For what its worth, some of the first RAF Hercules to be withdrawn from use have been re-worked and sold to the Sri Lankan Air Force. I wonder how long they will last?

Readers' Logs

Most months I receive letters from readers which include long lists of frequencies and loggings of traffic heard on them. In the past I have tended to avoid using them, as there is either very little to report about a single logging on a single frequency, or sometimes there is just too much to report. It also happens that I receive long lists of frequencies where the listener has been unable to identify the stations involved, but does not report what he heard - what callsigns were heard, what were they talking about and even the date and time is missed out.

This month I thought that I would include a selection of loggings from **Ian Johnson** from the West Midlands. It contains a list of frequencies and stations heard covering the range from below 3MHz to above 17MHz. There is a mix of aeronautical and maritime traffic varying from Europe to the USA.

I have omitted some of the more well known frequencies such as Shanwick and Gander ATC. I also note that Ian's list of frequencies seem to be 200Hz lower than

published frequencies. This may indicate a calibration problem with Ian's receiver, or maybe he finds it easier to listen to the signals when they are slightly off-tuned. In either case, Ian does not mention what kind of receiver or antenna he uses, so I hope that mentioning this will prompt him to write again with details and more logs.

I have also taken the liberty of correcting some of the descriptions provided by Ian - I hope that he doesn't mind too much! One which

deserves special mention is the frequency of 6.688MHz, which Ian listed as Portland Ops. The Naval Air Station at Portland in Dorset closed during the early part of 1999, and all the Royal Navy Lynx helicopters were transferred to RNAS Yeovilton in Somerset. I see

no reason for the Portland Ops radio equipment to remain at Portland, and I am sure that it will have moved to Yeovilton, so I have changed the entry accordingly.

I am happy to include similar lists from other readers, if they wish to send them to me. If you are unable to identify the stations on a particular frequency, please include as much other information as possible - callsigns, language and some details of what the conversation was about.



Monarch HQ

Ian Johnson's Frequency List.

MHz (u.s.b.)	Comment
2.761	Ostend Harbour shipping info
2.762	Kinloss RCC alternate frequency
3.131	Kinloss RCC alternate frequency
4.484	Kinloss RCC alternate frequency
4.645	Tallinn Airport VOLMET, Estonia
4.706	Kinloss RCC alternate frequency
6.688	Yeovilton Ops, RNAS Yeovilton, Somerset
6.691	RAF Operations
7.801	Stockholm Radio discrete frequency
8.743	(Marine Channel 809) Reykjavik Radio, Iceland
10.165	Stockholm Radio discrete frequency

Web Watch

EasyJet - <http://www.easyjet.com>
 Monarch Airlines - <http://www.monarch-airlines.com>
 Britannia Airways - <http://www.britanniaairways.com>
 RAF Lyneham - <http://www.raf-lyneham.org.uk> or
http://www.raf.mod.uk/front_line/hercules.html or
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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.

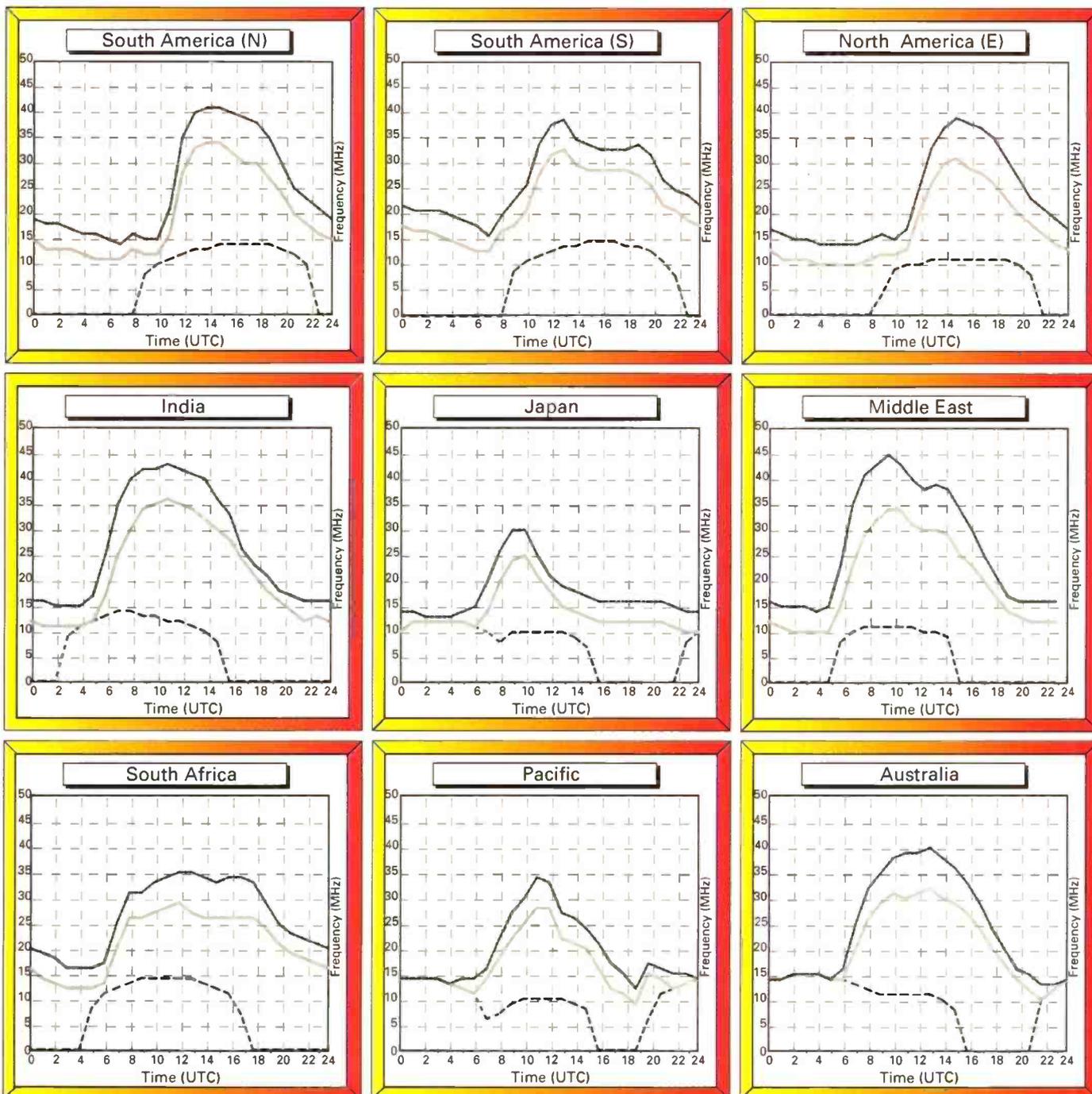
Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50%

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 frequency.

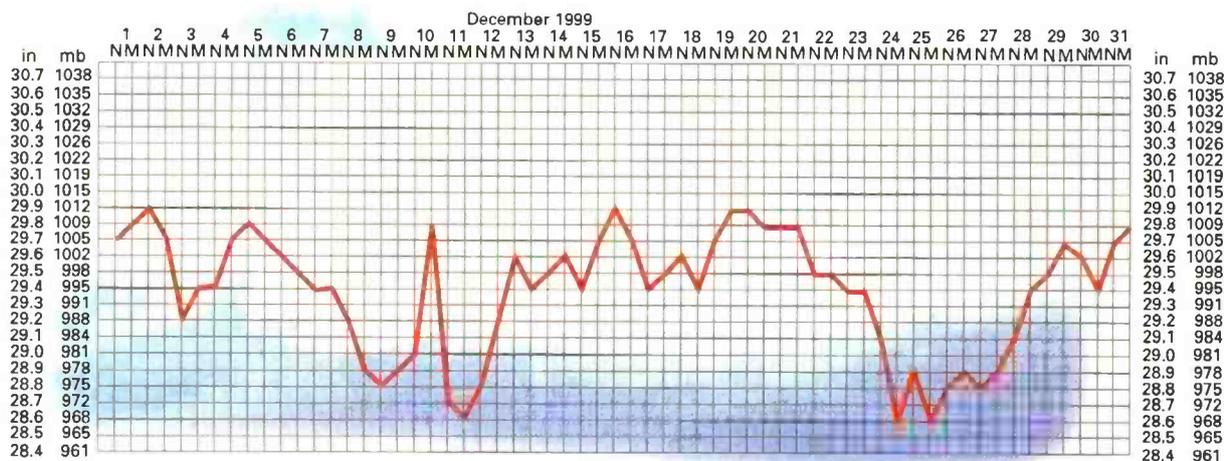
Good luck and happy listening.

February 2000
Circuits to London

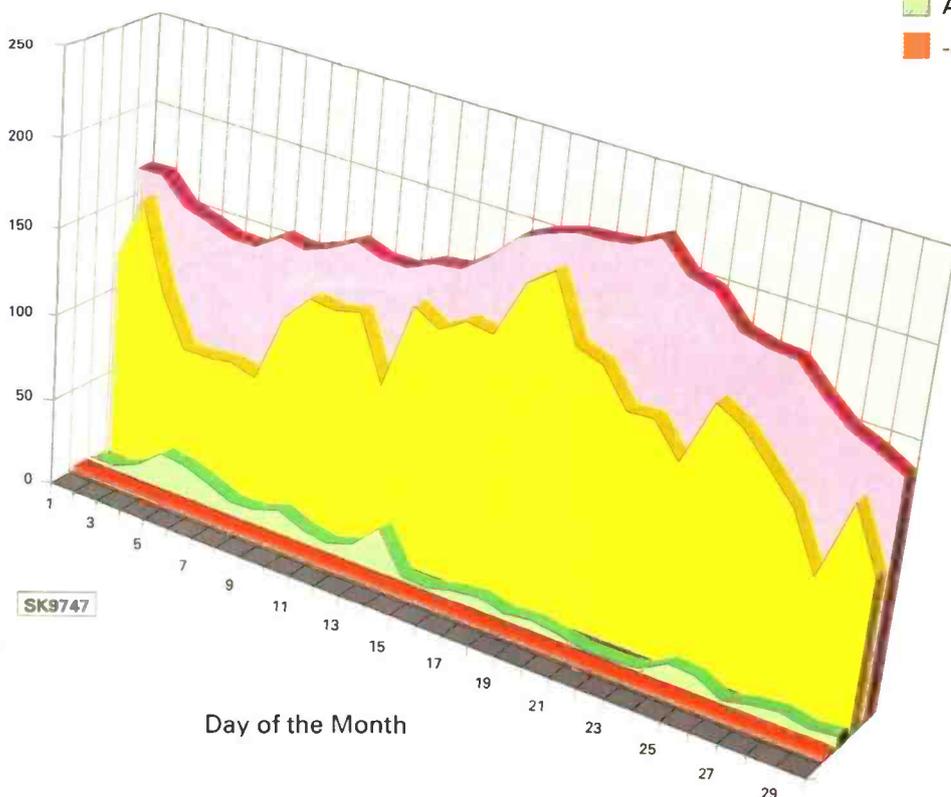


Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, December 1999.



December 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.



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YAESU FRV-7700 VHF CONVERTOR	£55





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Satellite TV News

Signals From Orbit

Italians are very emotional folk and this was clearly demonstrated the afternoon of December 8th, *Intelsat 705* @ 18°W transmitted a funeral from a large church of I assume a local dignity. The coffin - laying on the floor - was surrounded by weeping mourners and others including police. It was eventually lifted by several men from the general melee and manhandled from the church. Two TV cameras were used and the transmission back to the studio carried an ident 'ARTEL VEGLIA (LE)' on colour bars before the uplink was switched off - 11.135GHz-V.

Meanwhile, on *Eutelsat W3* @ 7°E, another Italian sourced event was in progress, seemingly a Christmas concert for school kids involving a pile of Christmas puddings - 11.174GHz-H - both of these sightings were in clear analogue.

The Mars Polar Lander unfortunately lost communication with Earth and its NASA control team on December 5th. The Reuters digital lease, *NSS-K 11.566GHz-V* (SR 5632; FEC 3/4) carried extensive live coverage of the technical and press meetings ex Houston over the next couple of days but on Tuesday December 7th the Polar Lander was officially written off. The craft sported both an 8GHz X-Band dish and a low gain omni directional (that is above H to H) u.h.f. antenna transmitting a 0.5W at a 'high u.h.f. TV frequency' - but nothing was heard. Three large dishes, Goldstone, Cal; Canberra, Australia and Madrid were in use, but even these 70m diameter monsters detected nothing - little chance for my 1.2m Ku-band dish!

Both **Cyril Willis** (Kings Lynn) and **Dean Rogers** (SE2) have been scanning the Clarke Belt these past few weeks with some success. Cyril found that *Eutelsat 2F3* @ 36°E has provided much traffic and in particular the BBC Moscow-London digital circuit - 11.600GHz-H (5632+3/4) - which always fires up with any late Russian news, the past few weeks have been dominated with the Russian/Chechnyan conflict. The Russians seem to let any footage (uncensored) out of the country and it's common to see the local (Moscow) news bulletins fed over this same lease for possible cutting into European/American news programmes. I found an onward news package into the USA on *NSS-K* (21.5°W) in clear NTSC analogue - 11.615GHz-V. The Andrew Harding BBC report was packaged with colour bars and 'EBU Moscow' ident.

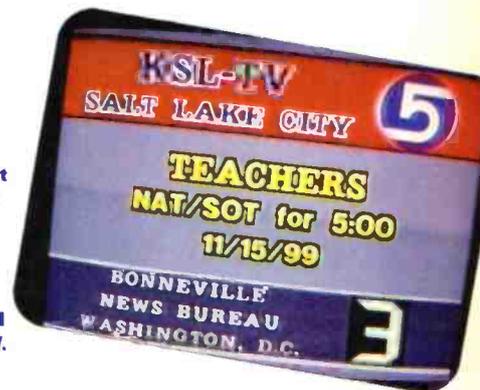
Dean Rogers meanwhile has been very busy on his upper floor flat balcony and with his father's help fabricated an extension arm to lift his 800mm dish higher and to clear local roofs, allowing the dish to pan round to 50°W. Dean, being a sports enthusiast, was rewarded with eight hours of Ryder Cup Golf on the *NSS-K* digital lease - 11.491GHz-H (6111+3/4) - they idented on colour bars as 'ETP RYDER', ETP being European Tour Productions. There is now access to *PAS-1.45°W*; *PAS 3R/6-43°W*; *Orion-1-37.5°W* and the hot sports spot of *Intelsats 601/801* @ 34.5° and 31.5°W respectively.

Dutch football too via *Telecom 2D* @ 5°W with an Intrax uplink into Canal Plus early November, 11.514GHz-H (5632+3/4). He also advises that EDTV Dubai is now active at the *Hot Bird* slot - 13°E - his Humax FTA receiver clocked in EDTV-1; EDTV-Sports; EDTV Business and EDTV Drama. EDTV-Sports shows a varied menu of sporting events including some programming in English.

Dean comments that he's intending to buy an IRTE Omnisat and a larger dish and to install same prior to the Christmas break. Winter and of course we'll be looking forward to skiing and various snow action. Already Austrian snowboarding has been carried live into Eurosport via *Eutelsat W2* @ 16°E, Saturday November 18 - check out 11.132GHz-H (6111+3/4) though oddly this feed carried audio fx only, no commentary.

The 21st and the NTL *W2* lease - 11.015GHz-H featured

Channel 5, Salt Lake City with a news package via the *NSS-K Atlantic Reuters digital lease* - 21.5°W.



Alas the Mars Polarlander RIP, a NASA-TV caption.

Rugby European Cup action (5632+3/4) for British Eurosport with both commentary and a separate sound fx carrier.

Roy Carman (Dorking) is a very active satellite observer and mid November watched the facility 'KOTV' setting up equipment for the Lennox Lewis fight at Las Vegas - this in clear NTSC analogue via *PAS-3R/6*, 12.704GHz-H, an interview followed with a rep from the Lennox media team.

Mid November and Roy went into a digital bouquet spin logging numerous digital packages on several satellites - he was just testing out his new RSD ODM-300CA digital receiver. On *Orion-1*, 37.5°W he found UPC Sport; UPC Film 1; UPC Extreme Sport; UPC Club on 12.654GHz-H (13203+3/4); *Telecom 2D*, 5°W Tele Rural; Globecast Espana; Bloomberg on 11.601GHz-H (27500+3/4) and following Dean's sightings of the EDTV bouquet @ 13°E, Roy found a larger offering on *Arabsat 3A*, 26°E - Dubai; Dubai EDTV; Dubai Sport; Dubai Business; Euronews (English); Euronews (French); Orbit Prompt; Mostaklan Arab on 11.749GHz-V (27500+3/4). Abu Dhabi TV have also launched on this satellite - 11.767GHz-H - SR 27500; FEC 3/4.

November 24th and Roy watched a SISLink eight feed out of central Manchester, marking the opening of the rebuilt city centre after an IRA bombing some years back - apparently the extensive CCTV surveillance system has been set up to 'design crime out'! I've also a tentative report of an *Orion-2* test transmission en route for the 12°W slot whilst parked at 15°W slot at 11.565GHz-H+V, I have no further information at this time. The satellite should come on stream early December at the 12°W slot.

A few days in mid November the 'Antenna Hungaria' test card appeared in clear analogue on 28.5°E *Kopernikus DFS-2* @ 11.547GHz-H - no reason and it subsequently disappeared!

The Globecast digital lease bouquet on *NSS-K*, 11.590GHz-V (20145+3/4) - carried a corporate presentation for Hewlett Packard staff on November 15th @ 1730UTC onwards. HP saw the need to re-invent HP back to the staff and public hence the transmission which was carried on ch.2 in clear NTSC and ch.3 in clear PAL. Computer corporates are fairly common satellite fare and the 21.5°W slot is a favourite - often as with a recent IBM event, transmitted in clear analogue.

I was delighted to hear from **David Lott** (Cambridge) who's been active for many years in TVDXing and has made the transition into satellite. He relates that his satellite



SISLINK 38-UKI 507 and an unusual ident flag via 36°E.



November 16th night and NDR live on a bleak German hillside in the hope of a Leonids spectacular!



Interview with Leonids hopefuls - via *Kopernikus DFS-2* @ 28.5°E analogue.

experience goes back to the Russian Sputnik in the late 50s (I recall the Lasky's 'Sputnik Special', a government surplus R208 receiver @ £6.19s.6d that tuned 20-60MHz and was claimed to pick up the first Sputnik signals at 19.995MHz - did it?). David is now with the digits and uses an RSD ODM300 digital receiver, he comments that some SISLink horse racing feeds are carried on *Sirius 5°E* - earlier in '99 he had received several on the ODM300 but now they suspects that SIS are now using PowerVu (Scientific Atlanta) which renders normal MPEG-2 digital receivers but useless.

The larger courses, e.g. Ascot, Newmarket, etc. are thought to be using leased BT fibre optic cables which means fewer satellite circuits. David currently uses an SWM 1.1m offset dish + Grundig 0.7dB noise LNB and split into a) an Echostar SR8700 and b) the ODM300 and a spectrum analyser.

Children in Need is the annual BBC run event the last Friday in November and a good hunting ground for regional OB feeds. I stayed on 36°E and 'found' SISLink 29 UKI 418A uplinking out of Prestwick Airport, the specific content was an aircraft departure, meanwhile SISLink 12 UKI 253 was carrying 'BBC CIN DUNDEE' with a very long offering from a large hall, presentations, fancy dress, etc. (11.684-H; 11.675-H respectively @ 5632+3/4). Interesting that SISLink UKI 418 has appeared in recent times with alternative idents being UKI 418A or 418B.

Finally, check out the new analogue channel now in action on 2F3, 36°E, it's called 'TLI' (Television Locale Independente) and features a full 24-hour service on 11.178GHz-H with audio @ 6.60/7.20MHz. There are many interesting programmes, recently an hour long documentary showing in production and technical detail the TV service 'Tele Nouvelle Caledonia' and the local radio service. My school French is circa 1955-60 so the arrival of TLI might help out somewhat though I found that the Macdonalds at Rouen spoke excellent English! Merci beaucoup.

Orbital News

The Afristar satellite that has been testing high quality radio programming since Autumn 98 has now opened regular L-Band (1.5GHz) programming across Africa. Worldspace, the promoters of the new radio service, initially will target South Africa and then move onto the high population regions of Nigeria, Ghana, Kenya and progressively the rest of the African continent.

Receivers will feature simple set-top antennas and are now coming on-stream from companies such as Sanyo, JVC, Panasonic and Hitachi. The Afristar has three main donwlink beams covering Africa, the Middle East and the Mediterranean region. Eventually other 'radio' satellites will offer a similar quality service to the main regions of the globe.

Having commented on the use of fibre optic cabling above, interesting to read Malcolm Campbell's statement in a media mag. As a senior BT business manager he states that the largest impact in recent times as been the arrival of digital, which now comprises most of their satellite traffic, very few communication operators now seek analogue transmissions.



A live murder hunt November 3rd for a fugitive thought to be hiding in the dockside building, police cars out front (from TV helicopter).

Into 2000 Malcolm reckons the significant impact will be from exploitation of fibre optic cabling, whereas a satellite solution is always sought, increasingly fibre optic is used and is equally cost effective. BT may soon invest in their own dedicated fibre optic between London, Paris and New York.

Eutelsat made available the proceedings of the UN's 'World TV Forum' throughout December '99 via their *Hot Bird 5* capacity at 13°E slot running 12.539GHz-H, SR 27500; FEC 3/4. The annual Forum discusses advances made in television and how it can be used to progress the lot of mankind (I wonder how 'The Simpsons' feature in their discussions?).

The *Astra 1K* satellite launching later in 2000 into a 19.2°E slot will offer some 52 high power Ku-band and two Ka-band transponders. The Ku-band transponders will all operate between 10.70-11.70GHz offering coverage in a spot beam into UK/Ireland whilst the other beam will cover Continental Europe, down to the Canaries and reaching towards Moscow. The Ka-band transponders will offer experimental capacity within the 18.30-22.20GHz band.

Meanwhile, a delay in the launch of *Astra 2B* following design modifications to the solar panels back at the factory has meant *Astra 1D* has been temporarily moved from 19.2°E to the *Astra* digital slot at 28.2°E to cover digital short-fall.

As *Orion-2* went into operation at the new 12°W, the operator Loral Orion (Loral Space and Communications) announced that henceforth *Orion-1* (37.5°W) and *Orion-2* would be renamed as *Telstar-11* and *Telstar-12* respectively. Due to the siting of the Eutelsat *Atlantic Gate* satellite at the 12°W slot, and to avoid mutual conflict with the proposed slotting of *Telstar-12* at the same orbital position, Loral have retained the *Telstar-12* satellite at 15°W until further notice. *Telstar-12* is now in commercial operation from the same slot. Loral have a number of other active *Telstar* satellites, mainly serving the Americas and the Pacific Basin region.

Immarsat have just marketed a new packet data satellite service that will benefit users in areas outside of normal terrestrial/cellular coverage and will be charged for data carried rather than time 'on-line'. The company's press release states that they have 'added an infrastructure providing a packet switched environment which IP (Internet Protocol) naturally runs across'. Immarsat are using earth stations in Cornwall, UK and Singapore to carry the first service phase.



The NASA TV home page, both Polarlander pix via *NSS-K* digital.

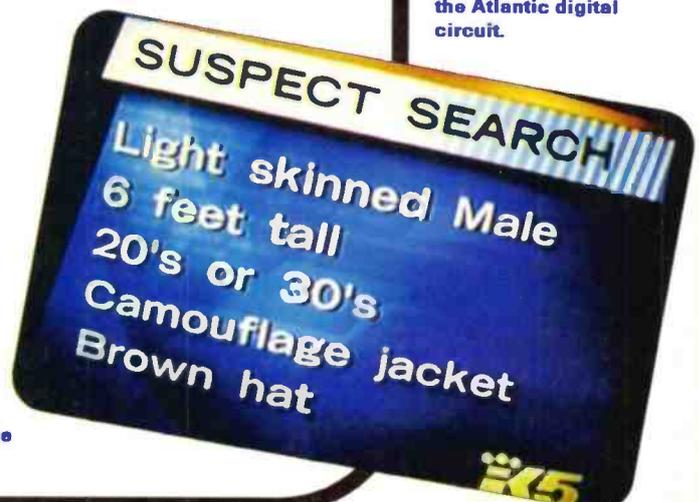


The 'SkateAmerica 1999' event live via the Globecast digital lease on *NSS-K*.



American test pattern, but unknown location!

This is the suspect's description, a relay of the local TV channel in Northlake, Seattle via the Atlantic digital circuit.



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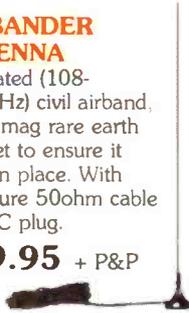


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channels per second and up to 75 search
steps per second

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scanning for about 2 seconds before
moving to another channel so you can
hear more replies

Auto store quickly finds and
automatically stores active frequencies in



each bank, then searches for additional
active frequencies while skipping
previously stored channels

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stored in memory for about 3 months
during power loss

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Airband

What's the greatest problem facing electronic engineers today? Chips are now available with hosts of functions packed into them. Compare this with the situation just over 30 years ago when a two-band transistor radio receiver was the height of technology! Now we can have full-duplex radio transceivers (cellular 'phones) in our pockets and phenomenal computer power on our laps.

According to Moore's observations, chips will continue to get smaller, cheaper and be capable of even more functions for some time to come. Each technological milestone represents lessons learnt, paving the way for even more complex developments. One day, this progress will reach a plateau when the size of elements on a chip becomes comparable with that of the charged electrical particles that they carry. Even then, science will strive for further developments by other means. Light could replace electrons as has already happened with fibre-optic communications.

We will have all these technological marvels, and more, in this new millennium. We will take them for granted and cease to marvel, merely wanting more. But one problem could remain unless the will is there to put the effort into its solution.

All this equipment in close proximity is going to cause mutual interference. The technologically-advanced chip in a computer, operating at u.h.f. clock speeds, will send out interference that will block reception on a nearby radio receiver. If the receiver was needed for safety of life communications, as would apply to the airbands, then the thoughtlessly or cheaply designed computer could cause interference that puts humans at risk.

I was pleased to see the sensible approach taken by the German authorities and reported by **Martin** (Clapham, Bedfordshire). The concern is that cable TV systems will interfere with aircraft radios and official moves are being made to prevent this from happening.

In the UK, when they started to talk of 'cabling the country,' the impression was given that the latest technology thin fibreoptic cables would be threaded through existing British Telecom ducts. What actually

happened was that broadband coaxial cable was laid by ripping up our streets, leaving ugly scars and damaged paving. All in the name of quick profit and with little consideration as to the possible effects of mutual interference.

At least I was able to report in December that the threat from power line transmission has been averted. Let's hope that the

new, technologically-aware, millennium brings with it a resolve to invest in the solution to the e.m.c. problem rather than to follow the old trend of putting profits first regardless of the consequences. Flight safety is just one of the many reasons that make this sensible.

Accident Investigation

What if the worst happens? Aviation is administered internationally by the ICAO, a United Nations body based in Canada. Countries that aren't UN members

are obviously not bound to adhere to the international recommendations.

Each member state has its own administration and in the UK that duty falls to the CAA which is able to make laws through the Air Navigation Order. It also runs part of air traffic control, jointly with the MoD, through an organisation called National Air Traffic Services (NATS).

If there's an accident, it could be that the CAA are responsible because of inadequacies in the law or its enforcement, or due to faults in the NATS infrastructure. To avoid allegations of bias, the CAA does not therefore investigate accidents.

In the UK this duty is assigned to the Air Accidents Investigation Branch of the Department of the Environment, Transport and the Regions. Next time you hear of a media report that the CAA (or Federal Aviation Administration, FAA, in the United States) is investigating an accident, you know to switch into sceptical mode! In the States, the National Transportation Safety Board (NTSB) does the same job as the AAIB over here.

8.33kHz Update

According to **Jonathan Clough** of Javiation (who advertise in *SWM*) there is much 'disinformation' about the new, narrow channels on the v.h.f. communications airband. I haven't direct access to the Internet myself and so can't comment on the contents of the web page at <http://www.javiation.co.uk/833.html> but remember that I have listed the exact frequencies on the *SWM* web page. If you would rather have them on a floppy disk, write in to express your interest (but **don't** send a disk yet - if all 25000 readers asked at once, I couldn't cope!).

If you have a specific question on the new channels then please write in and ask me. I have a copy of the official user guide. Don't you reckon that it's best to go back to the official source if you want the most accurate answer? I will reply to all such questions, here in this column for all to see, by referring to the necessary documents.

In The Air

Living near Aberystwyth, **Quentin Cruse** is in the lucky position to see plenty of activity in the North Wales Military Training Area. A while ago, we were promised a 'peace dividend.' The Cold War was over and defence requirements were reduced. This meant that airspace previously reserved for military training could now be released to give extra capacity to the burgeoning civil sector.

One manifestation of this is the appearance of conditional routes (CDR). To the north of Quentin, running northwest/southeast, is one such route. It's UB39 and, being prefixed with U, is an Upper airway which means above FL245. The conditions attached mean that the military are likely to occupy this airspace in working hours Monday to Friday and therefore airlines may not plan to fly the route during those times. Outside of these hours, the route may be included in a flight plan just like any other airway.

Another route is UW502, to the north-north-east of Quentin and running north-north-west/south-south-east. The conditions are the same as for UB39. Close to it is military TACAN route TB1.

In this area, UB39 is controlled on 133.6. As well as

Abbreviations

AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
CAA	Civil Aviation Authority
CD-ROM	Compact Disc - Read Only Memory
e.m.c.	electro magnetic compatibility
FL	flight level
ICAO	International Civil Aviation Organisation
kHz	kilohertz
MHz	megahertz
MoD	Ministry of Defence
TACAN	TACTical Air Navigation
u.h.f.	ultra high frequency
v.h.f.	very high frequency

Bristol Boxkite.

Christine Mlynck.





Chipmunk. Christine Mlynek.

this frequency, UW502 is also controlled on 129.375, 134.425 and 135.575MHz. Note that UW502 is only available for traffic to or from Edinburgh, Glasgow and Prestwick.

Information Sources

How can Quentin and other interested readers obtain the relevant charts and information? The Military Training Areas (there's also one over Lincolnshire) are shown on *ENR 6-5-1-1* which is actually part of the *AIP* (not included on the CD-ROM version). Although the chart itself is free from the CAA (orders go to Westward Digital) you have to pay postage.

An airways chart such as Aerad UK(H)6 shows TB1 (in faint grey print), UB39 and UW502 (the adjacent legend '1&3' refers to the conditions that I've already mentioned). On the back of this chart is a frequency list. The *AIP* of course lists more detailed frequencies.

If you're really keen on military aviation and have at least £360 to spend then the RAF (via 1 AIDU, Northolt) sell the military version of the *AIP*. In three volumes (of which Volume 3, Part 1 is not available to the public, a shame as it describes the low-flying system) it's not available on CD-ROM.

For the exact definition of the wording to be used by pilots and controllers, the latest edition of CAP 413 *Radiotelephony Manual* is now on sale from the CAA at a mere £6 plus post.

How does the ordinary reader obtain these goodies when equipped with nothing more than mail-order, there being no flight briefing unit or ops room in sight? Easy! All my recommended sources will supply you in this way. All you need is my *Airband Factsheet* which you obtain from the Broadstone Editorial Offices (not from me!). Just send a pre-paid self-addressed reply envelope to hold two A4 sheets.

Frequency & Operational News

Duxford is planning the following events this year and they are listed in *AIC 134/1999* from the CAA. July 8 & 9: Flying Legends. September 9 & 10: Duxford 2000. October 15: Autumn Air Show. Frequencies in use will be Duxford Information 122.075 and Duxford Ops 122.675MHz. They do great work at Duxford in restoring older aircraft to flying condition and my final item this month is also about heritage.

Living History

I began this column firmly rooted in 21st century technology and wasn't afraid to remind ourselves of the real problems that must be solved in order for that technology to yield its full benefits. Now that we are in a new millennium, it would be all too easy to draw an imaginary dividing line at the end of 1999 and forget our past.

Let's try not to let that happen. Aviation itself has now been around for quite a long time. Last August, the Yorkshire Aeroplane Club braved bad weather to celebrate their 90th anniversary at Leeds & Bradford Airport. I expect it was called Yeadon when the Club was founded. Among the various visitors flying in for the occasion, **C. Robinson** (Leeds) noted G-AZHC, a Jodel D.112 (made in France in 1958), in yellow colour scheme.

All letters received up to December 8 have been answered. The next three deadlines (for topical information) are February 7, March 6 and April 10. Replies always appear in this column and it is regretted that no direct correspondence is possible.



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***REVIEWED!**

David Butler G4ASR reviews the new **Icom IC-PW1** Linear Amplifier in the March 2000 issue - what did he discover? You'll have to pick up a copy of next month's *PW* to find out!

***LONDON SHOW SPECIAL**

Pick up a copy of the March 2000 *PW* and you'll have your very own guide to the **London Amateur Radio & Computer Show** taking place at **Picketts Lock** next March. We hope to bring you news of who'll be there, what they'll have on offer as well as a Floor Plan and Lecture timetable.

***ANTENNAS IN ACTION**

Tex Swann G1TEX has more antenna-related news, reviews and projects for you next month.

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73 from Dave G4KQH, Technical Manager.

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PMB4	Adds 5 extra frequency offsets to DFD4	£9.90

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AA4	25 to 1300MHz wideband, compact	£19.90
AB118	DX reception on VHF air-band	£18.80
MB156	DX reception on VHF Marine	£18.50

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TX2000	QRP CW with plug-in band module	£24.90
LM2000	Links DC2000/TX2000 for transceive	£16.30

Most kits can also be supplied as assembled PCB modules. Optional hardware packs are also available for most kits - please see our website or send for more details.

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Decode

Real Beginners

Now we're well into winter and the new millennium, it's time to see if we can introduce a few new listeners to our ranks. Over the past few months I've received several letters from readers asking for some real basics on how to get started in decoding and even what this decoding stuff is all about. So this month I'm going to spend some column space covering what I think our part of the hobby is all about.

Let's start by trying to describe just what it is I attempt to cover in this column. The simplest description I can think of is to say that it's just about all non-speech radio signals. Although all frequencies are available, Lawrence Harris's 'Info In Orbit' column covers the satellite based v.h.f. and u.h.f. area, so most of my time is spent dealing with h.f. based information.

However, the exception to this is the v.h.f. ACARS system that's used by commercial aircraft. Despite the undoubted interest in all things to do with aircraft, it's the h.f. bands that attract the most attention for Decode enthusiasts.

Range Of Signals

The range of signals available to decode are enormous and range from basic modes such as Morse Code through to FAX, Slow Scan TV and complex multi-channel systems.

Now you may well be asking why would anyone want to decode all these strange signals. In many cases it's simple curiosity. People love to be able to take a sneak look into other communication worlds and see what sort of messages are being sent.

Another reason for wanting to get into decoding is to get information for another hobby altogether. A good example of this is the yachtsman who wants to use radio to get hold of weather charts or navigational warnings. Now this information is freely transmitted all over the h.f. bands and is available for anyone with the appropriate decoding equipment.

Another common interest among Decode listeners is foreign RadioTeletype press broadcasts. These are to be found all around the h.f. bands and generally originate from the Middle East, Russian states or third world countries. Many of the broadcasts use plain language English and provide an interesting perspective on the news events we see around us via our own national news services.

The third main reason for listeners turning to Decode is based around a technical fascination with non-speech communication systems. For some, it can be trying to see if they can resolve very weak signals. This not only requires good equipment, but an

amazing degree of skill to, first of all find the weak signal, and then be able to optimise the settings on your equipment to transform the weak warbling sound into recognisable text or picture output from your decoder.

Complete Communications

For some, the fascination extends to trying to identify complete communications networks just by recognising the transmission types and then using their knowledge of propagation to work out approximate locations for the transmitters. This might sound a bit far fetched, but there are networks of enthusiasts that use their combined knowledge to try and work out what's going on. If you're at all fascinated by this type of analysis, you will very soon find yourself well and truly hooked!

The real technical enthusiasts bury themselves in trying to understand the technicalities of how some of the more unusual signals function. In

these cases you start by just listening around to find what sounds like an unusual signal. Once located, you then use a variety of analysis tools to really get inside the signal.

In a typical case, spectrum analysis is often the first step and can reveal the basic data pattern. This is then followed by detailed analysis of the data signal to look for repeating patterns and see if the system in question has any similarities to other well known systems. As you can see, this can be a very technical area which can really test your powers of deduction. This is a very specialist area so you

will usually find that there's very little documentation around to help you - it's mainly down to you!

Where To Start?

OK so you're interested, but where do you start? The very first step is to get a communications receiver. Now the best advice I can give here is to get the best you can afford. The receiver will be your sole source of signals and will see you through all manner of different aspects of this hobby, so it's worth spending a bit if you can.

You will hear people claim that you can decode successfully with very simple sub-£100 radios. Whilst I know this is possible, it will always be more difficult than using a better quality radio. To help you get started here's a few essentials you need to consider if you want a receiver for utility decoding.

The first, and absolute essential point, is that it must be able to receive s.s.b. signals. This is the prime mode used for all data decoding so you just cannot start without it.

The next point to look at is the tuning steps. By this I mean the individual tuning increments that occur as you turn the main tuning dial. Although the tuning may well feel continuous, if you were to tune across a steady



Continued on
page 81 ...

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... continued from page 79

carrier whilst set to s.s.b. you would soon hear that the frequency changes in small but, very clear, steps.

For utility decoding you really need tuning steps of less than 100Hz and if you really want to get into the more complex modes and picking signals out of the noise, you need to be 25Hz or better. Once you've got a receiver of this specification, you just need to check that there's a 'line-out' socket that you can use to feed your decoder. Although you can use the external speaker jack at a push, the 'line-out' option is much better as it's not effected by the volume control setting.

Classic Receivers

Classic receivers for Decode listeners include the Lowe HF-150, Icom R71, NRD-535, AOR AR7030 to name but a few. I would generally advise steering away from the very wide range receivers (h.f. through to GHz) as all but the most expensive require design compromises that often result in mediocre h.f. performance.

Choosing a decoding system is probably the most difficult part of the operation.

Here it really helps if you already have a PC and know how to use it. If you do then you can have a ball because there's loads of free and shareware programs around that you can experiment with until you find just what you want.

If you're a PC novice then things are potentially more difficult because you're not only learning how to use the PC, but also trying to understand this new hobby. There's no need to be put-off though, as thousands of new listeners have started from this point.

Popular Package

If you are new then one of the best ways to start is to get one of the popular decoding packages and interfaces from a dealer that will give you some good support. Regular readers will know that I've enjoyed a long relationship with Pervisell, primarily because their products and support are excellent. Their reputation has spread to the main software authors and they are now UK agents for most of the popular software that's used by 'Decode' readers.

The main programs you will use rather depends on the type of signals that grab your attention. If it's RTTY news broadcasts or maybe amateur teletype signals then you could use either *RadioRaft* or *Hamcomm*. Whilst *RadioRaft* has the advantage of some built-in signal identification and automatic decoding, *Hamcomm* can automatically decode and translate SYNOPTIC weather broadcasts. If your interest tends toward FAX image reception then *JVFAX*, *JVComm32* or *MeteoScan* are prime choices.

In each of these cases you will need a basic PC which should really be a 486 based system (you can

pick one of these up for not much more than £50). If you can run to a faster Pentium system, so much the better, as there are loads of very sophisticated signal analysis tools available for the more modern systems.

Simple Device

The final piece of hardware you will need is an interface to connect between your PC and receiver. This relatively simple device is required to convert the audio signals from your receiver into voltage levels that the computer can deal with. There are lots of people selling these either in kit form or ready-built and a look through *SWM* will show several options.

The best, in my view, are those from **Pervisell** (no they don't pay me to say this, they really are good). The Pervisell units use professional surface mount technology to house the complete interface within a standard 25-way D-type connector which is fed by a high quality audio lead that terminates in a 3.5mm jack ready for your 'line-out' jack.

The very latest offering from Pervisell is a full transmit and receive lead with adjustable hysteresis and variable transmit audio - all for just £29.95. For more information on this and the various software deals, contact Pervisell at **8 Temple End, High Wycombe, Bucks HP13 5DR, Tel (01494) 443033** or visit

their web site at <http://www.pervisell.com>



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Klingenfuss Latest

If you're just getting into decoding or you're an old hand you will need frequency lists to help you find and identify stations. The latest to come my way for review is the Klingenfuss *2000 Guide to Utility Radio Stations*. This is a good reference for utility enthusiasts and is now in its 18th edition. Not only does it contain international listings of over 11200 frequencies, but it's packed with a wide range of essential information for the serious listener.

If you're into FAX and maritime transmissions there is a full FAX schedule so you can easily find the station that's transmitting the chart you want. This is supplemented by a full NAVTEX international listening so you can catch those navigation and weather warnings. What really makes the book important is it's regular update and for this year Joerg reports nearly 9000 changes from last year's list.

To supplement the guide there's also a new *2000 Super Frequency List* on CD-ROM. This is a wonderful reference that's ideal for anyone who bases their operation around a computer. The frequency listings are very comprehensive.

There are also some sample software packages on the disk. In this case it's *RadioRaft* and *RadioManager*. This latter program can work with the frequency list to automatically control your receiver and tune it to any station you like. This makes tuning around a breeze.

For more information contact Klingenfuss Publications at Hagenloher Str. 14 D-72070 Tuebingen, Germany or see the *SWM* Book Store.

My thanks to Joerg for supplying the review copies.

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Info in Orbit

If one newcomer to the Internet has made its mark during the last twelve months, it is - at least in my view - the launch of the RIG weather satellite forum, otherwise known as 'rig-I'. When such a list was first suggested by **Julian Moss** in the original 'wxsat-I' forum, I felt that the subject of WXSATs was adequately covered by the current list, and that there was little point in starting yet another. The fact is that the list has quickly attracted a lot of discussion amongst members concerning reception problems in Britain, the finer points of software settings - content not previously covered in such detail in the original list - and competitions! Recent topics have



Fig. 1: METEOR 3-59
December 1600UTC.

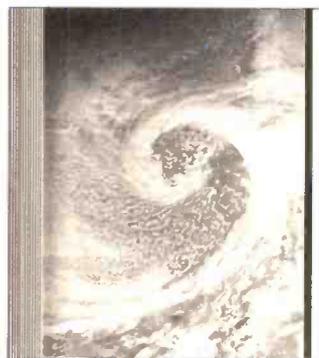


Fig. 2: RESURS 01-4
image from 8 December
at 1201UTC.

even included the clarity of reproduction of this column, and the question of its possible online publication. Be assured that I monitor comments carefully, and seek advice from above (the Editor!) where necessary. It remains my aim to provide a wide audience with information on this hobby - and all comments and feedback is welcomed. Julian Moss and **Dave Cawley** administer the list and you can join by sending any E-mail to: rig-I-subscribe@onelist.com Alternatively, you may find it preferable to join online at: <http://www.onelist.com/subscribe/rig-I> This method provides greater flexibility including the option to use the digest version in which you receive a daily collection of the E-mail postings, rather than having them individually sent to you.

Current WXSATs

As anticipated, *METEOR 3-5* re-commenced transmissions on 9 December and my first pass was logged at 1412UTC. Those new to the wonders of WXSAT monitoring may care to check out the position of the satellite at that time. The satellite is south-bound during the day and had just come out of the dark northern twilight. This transmission was a fairly short one, so I have included the following pass instead - see



Fig. 3: NOAA-14 infra-red
image at 1427UTC.

next few minutes, the set of black columns changes, starting from the right side of the block; white columns appear sequentially - representing the open state in the form 000000, 000001, 000010, 000011, and so on until all

Fig. 1. The left side of the image shows the sequence of black-and-white bars, followed by the grey scale - white to black. The aperture-indicating bars are next, showing a full set of black columns indicating a fully open sensor aperture, because the WXSAT has just emerged from night. During the

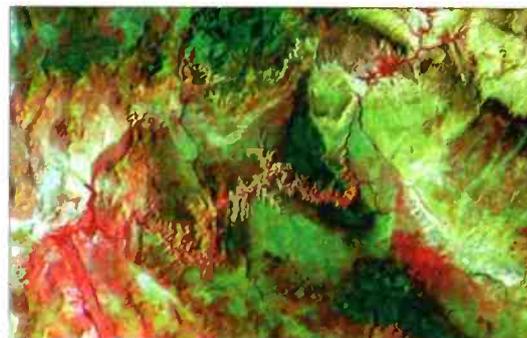


Fig. 4: FENGYUN-1C from Ed Murashie.

the columns are white - representing a minimum aperture. Clever stuff?

Images from *RESURS* have provided dramatic views of the active weather systems that visited Britain and Europe during December. Within about seven days, two systems crossed Britain from the south-west - see **Fig. 2** - bringing gales and rain - but looking very picturesque!

The upper left part of the picture shows the dark northern polar region that remains without sun for months. *RESURS* is always passing south-bound during the day, in sun-synchronous orbit, and on this occasion passed straight over the centre of the depression - giving a superb view. Behind the curved front, clearly defined shower clouds can be seen, ready to end the drought! Two and one-half hours later, *NOAA-14* passed north-bound - see **Fig. 3**. This infra-red image illustrates the lower resolution of the NOAA image (due to the provision of two spectral bands within the same time-frame), and the image content itself - which is different.

Spectacular Images

With our WXSATs (geostationary and polar) providing four types of image (PDUS, WEFAX, h.r.p.t. and a.p.t.), I try to provide a complete selection for most editions. When I asked for a non-UK-based (h.r.p.t.) image from *FENGYUN-1C* on the Internet, a set of images arrived from **Ed Murashie**, including a beauty of the American Grand Canyon. FY-1C has 10 channels of which three are categorised as 'ocean colour' covering the bands 0.43-0.48, 0.48-0.53, and 0.53-0.58 microns. Consequently, *FENGYUN* images can provide virtually true colour - as seen in Ed's superb picture - see **Fig. 4**.

China's meteorological satellite data receiving and processing system consists of three ground stations located in Beijing, Guangzhou and Urumqi, and a data processing center (the National Satellite Meteorological Centre). It was constructed as a national priority project and completed in December 1987. The system also receives and processes data from NOAA satellites. I hope to include a regular selection of images from the various satellites as available from various sources. My own station permits reception of all but h.r.p.t. transmissions.

METOP On Course For 2003 Launch

The planned launches of future WXSATs, as published by the World Meteorological Organisation and those of the individual countries, shows that new WXSATs are planned for launch under the European flag. Hopefully, within a few years, NOAA WXSATs will be joined by a companion - the METOP WXSAT - transmitting complementary data. METOP forms part of the EUMETSAT Polar System (EPS), which in turn constitutes the European contribution to an International



Fig. 5: The FY-1C satellite.

Joint Polar System (IJPS) to be operated with the United States.

The Director General of the European Space Agency (ESA), Antonio Rodotà, together with the Director of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), Dr. Tillmann Mohr, signed a contract in December 1999 with Matra Marconi Space, for the development and production of a series of three METOP satellites. METOP is the first European polar orbiting satellite dedicated to operational meteorology and climate monitoring. The first spacecraft of the series is scheduled for launch in 2003, and will orbit at approximately 840km, comparable to NOAA and other polar orbiting WXSATs. METOP satellites will provide complementary sounding and imagery data, with a coverage of most of the globe every day.

METOP is designed by Matra Marconi Space of France, together with a European industrial consortium which includes, among others, Daimler-Chrysler Aerospace of Germany, Matra Marconi Space of the United Kingdom, and Alenia Aerospazio of Italy. The satellites are based on a platform derived from the ESA's ENVISAT and CNES's SPOT-5 platforms, both scheduled for launch in 2001.

METOP carries twelve instruments that will provide valuable information for meteorologists as well as Earth science researchers. In addition to a suite of established instruments provided by the US National Oceanic and Atmospheric Administration, an advanced Infrared Atmospheric Sounding Interferometer (IASI) is being developed in Europe, which will significantly enhance the measurement capabilities compared with existing polar satellites. Another 'first', is a sounder based on the occultation of GPS radio signals by the atmosphere - the GRAS instrument - being developed by ESA. METOP will also carry a five-channel Microwave Humidity Sounder (MHS), directly procured by EUMETSAT.

Other European instruments are new to operational use, but have been used with great success by weather centres since they were flown on ESA's ERS satellites. Developed by ESA, the Advanced Scatterometer (ASCAT) instrument will provide key information about the winds over the ocean surface and the improved Global Ozone Monitoring instrument (GOME-2) measures the ozone content of the atmosphere. Overall, METOP data are expected to provide critical information for the improvement of Numerical Weather Prediction systems.

The METEOSAT family, also developed by ESA and now owned and operated by EUMETSAT, has been in space since the late 1970s. They will soon be replaced by METEOSAT Second Generation.

ESA - The Background

The European Space Agency had 14 Member States (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway,

Spain, Sweden, Switzerland and the United Kingdom) - until 15 December. ESA's purpose is to provide for and promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for space applications systems. On 15 December, Mr José Mariano Gago, Minister of Science and Technology, and Mr Antonio Rodotà, Director General of ESA, signed an Agreement on Portugal's accession to the ESA Convention.

EUMETSAT - The Background

This is an intergovernmental organisation that establishes and maintains operational meteorological satellites for 17 European States - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom. From July 1999 EUMETSAT also has two Cooperating States - the Republic of Slovakia and the Republic of Hungary. The images and data from METEOSAT make a significant contribution to weather forecasting throughout Europe and neighbouring continents.

The ESA METOP Programme includes the design and development of the prototype satellite through a joint team provided by the two organisations. In addition to the coordination of user requirements and specification of the overall system, the EUMETSAT Polar System (EPS) Programme includes the procurement of the two recurring satellite models, the launch of all three satellites, the development of a ground segment and the operation of the complete system over the 14 year programme lifetime. My thanks to ESA/EUMETSAT for providing this update.

Further information can be obtained from:

ESA: Franco Bonacina, Public Relations Division, Tel: +33 (0)1 5369 7155. EUMETSAT: Madeleine Pooley, Information Services Division, Tel: +49 (0)6151 807 606.

Internet Site For h.r.p.t.

The Meteorological Service of Singapore (MSS) is one of a number of sites that provide daily high resolution images from NOAA WXSATs. The site is updated at about 1400UTC with a selection of images including



Fig. 6: computer room for FY-1C, courtesy CMA.

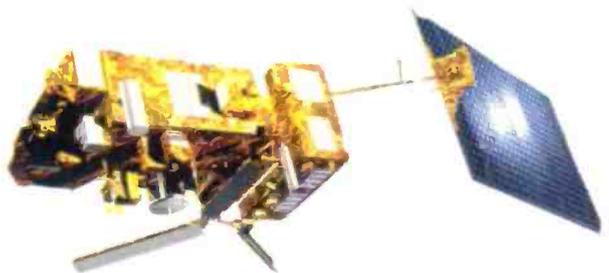


Fig. 7: METOP simulated picture courtesy EUMETSAT.



Fig. 8: unencrypted AIVH format at 0602UTC - visible-light disc.

NOAA high resolution images of Kalimantan and Sumatra, together with GMS images at 0030 and 0730UTC. MSS is a department under the Ministry of Communications and Information Technology, and provides various weather information and forecasts in support of Singapore's national needs. <http://www.gov.sg/metsin/noaa14.html>

METEOSAT Primary Data

Last time, we reached the first BIV format image (at 0458UTC) that carries the European sector full resolution visible-light - together with infra-red, the latter being included twice each hour throughout the 24 hours. These are the first visible-light images of the day, and are available, though without a decryption unit they appear as meaningless garbage. The AIVH format at 0534UTC is a full-disc combination of infra-

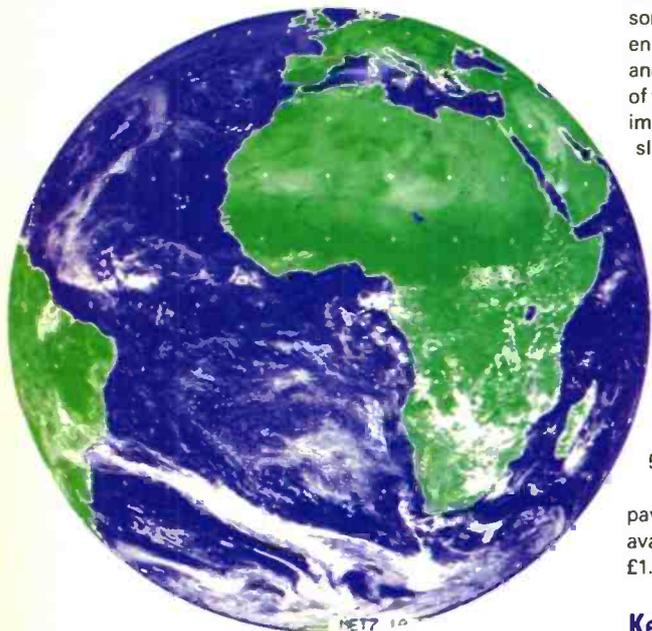


Fig. 9: CTOT (WEFAX) whole-disc, visible-light image from METEOSAT-7 10 December 1222UTC.

red and half-resolution, visible images. Note that with the exception of the 1134UTC image, all full-disc, visible-light images are half-resolution. The full-disc maximum resolution (visible-light) image is transmitted just once each day - at 1134UTC.

Relayed images from INDOEX continue, with the established sequences giving way to occasional WEFAX images. The latter include the full-disc infra-red (DTOT) and water vapour (ETOT) from METEOSAT, together with formats from GMS (southern section), and more quality

check images. The three-hourly infra-red image from GOES-east comes in at 0654UTC. The hour up to 0700UTC includes the full-disc images from GMS, including the late-in-the-day visible-light disc, followed by the infra-red disc from GOES-west.

WEFAX & PDUS

All home-produced images transmitted by METEOSAT-7 originate from the same high resolution scans. PDUS images are the highest resolution images transmitted for users (and are mostly encrypted); WEFAX images are versions produced by degrading the original resolution in order to produce an image format that can be transmitted within a short time interval at a lower data rate. Two such images from the same scan are shown in

Fig. 9 and Fig. 10;

the WEFAX CTOT has been enhanced by the addition of a colour mask and some contrast enhancement, and the contrast of the AIVH image has been

slightly increased for better reproduction.

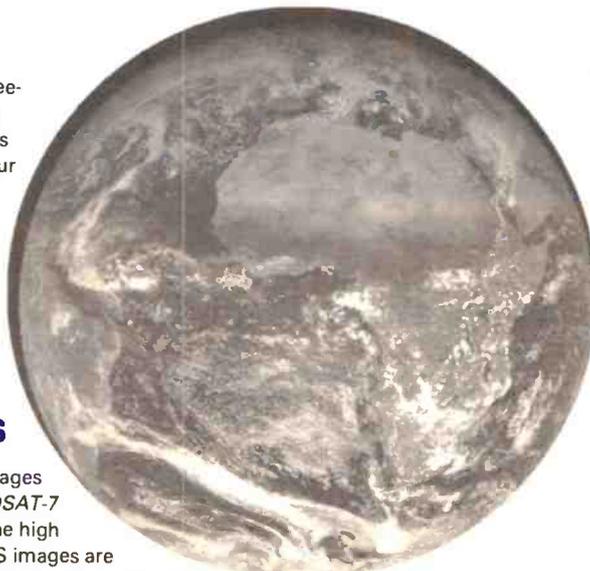


Fig. 10: AIVH (PDUS) whole-disc, visible-light image from METEOSAT-7 10 December 1201UTC.

Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz.

NOAA-15 transmits a.p.t. on 137.50MHz.

NOAAs transmit beacon data on 137.77 or 136.77MHz.

METEOR 3-5 transmits on 137.30MHz.

OKEAN-4 and SICH-1 use 137.40MHz for brief transmissions.

RESURS 01#4 transmits a.p.t. on 137.85MHz.

METEOSAT-7 (geostationary) uses 1691 and 1694.5MHz for WEFAX.

GOES-8 (western horizon) uses 1691MHz for WEFAX.

Shuttle Launch Schedule

The Shuttle Endeavour *Radar Topography Mission* (SRTM) STS-99 is scheduled for launch on 13 January 2000 at about 1611UTC for an 11 day mission in an orbit of 57° inclination (therefore passing over Britain).

STS-101 *Atlantis* is currently scheduled for launch on 16 March. It is another International Space Station (ISS) mission, with orbital inclination 51.60°.

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

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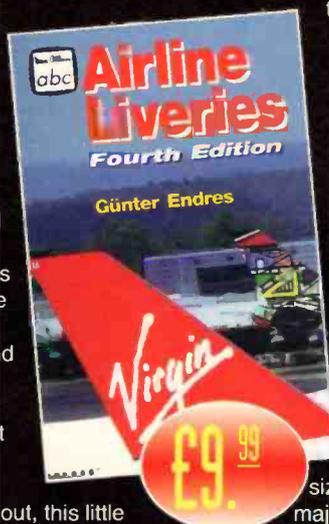
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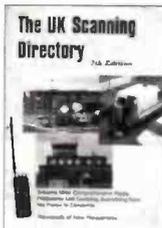
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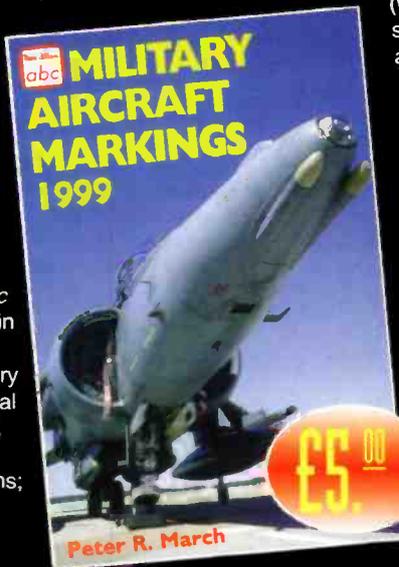


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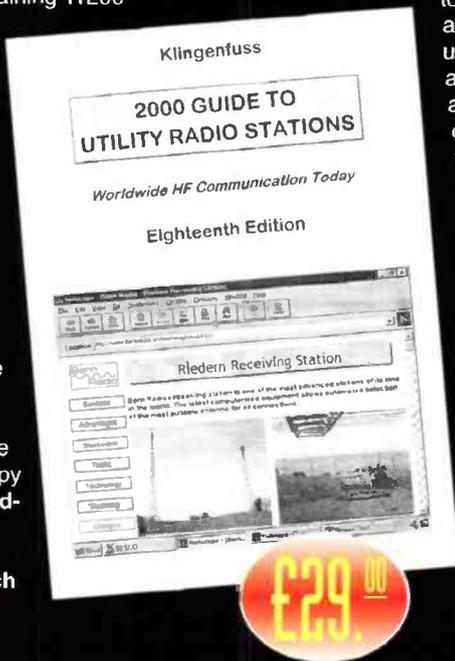
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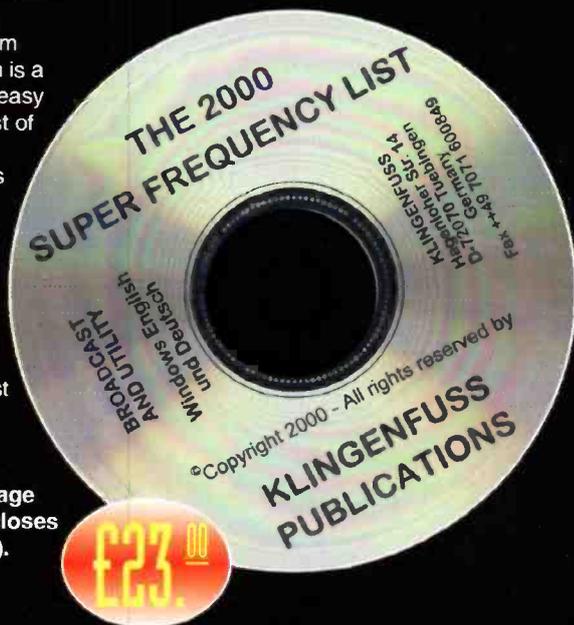
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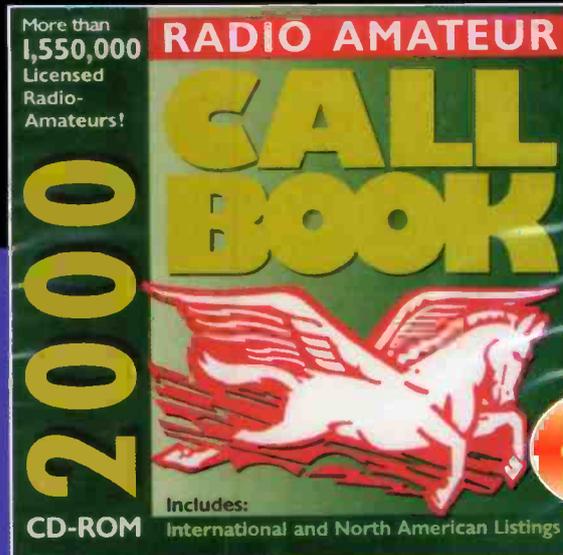
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Revealing a Remarkable Receiver



Icom are proud to announce their latest radio receiver - the IC-R75. This dedicated HF+50 MHz, all-mode unit has frequency coverage stretching from 30kHz to 60MHz in USB, LSB, CW, RTTY, AM, FM and S-AM. In addition to an extremely sensitive receiver, the twin PBT, 2-level pre-amp, selectable Auto-Gain Control (AGC) and noise blanker help to capture and clean up DX signals, whilst the RF attenuator reduces interference from strong local stations. The IC-R75 also has a Synchronous AM detection circuit to prevent audio distortion while receiving AM broadcasts.

A comprehensive range of features can be found in this extremely compact radio, measuring only 241(W) x 94(H) x 229(D) mm. These small dimensions give complete installation flexibility however you choose to operate, as a base or mobile.

The user-friendly front panel has a large, clear, alphanumeric LCD display. This shows the frequency or '6+2' character channel name. The panel also has a numeric keypad to allow direct frequency entry or memory channel selection. The SQL control may also be configured to adjust RF gain and/or squelch threshold. The large, front-mounted speaker provides clear audio, even at the maximum level of 2 watts.

Other features include a bar graph-style, digital signal meter, 99 memory channels, 2 programmable scan edges, an internal clock with ON/OFF timer functions and three speed-selectable scan functions; (program scan, memory scan and priority scan).

This superb receiver is designed to suit a range of market sectors from the demanding 'decoder' to the interested SWL. The IC-R75 incorporates Icom's leading edge technology and offers a range of features that make it exceptional in many ways. It sets a new standard for performance and value, and will become a popular choice for SWL's everywhere.





LOWE ELECTRONICS LTD

Here at Lowe Electronics we've been advising people on monitoring the airbands for over thirty years. That kind of makes us unique as we believe no other company can match our expertise in this field. Just take a look at some of the products we offer the airband enthusiast and if that's not enough, send off for our free catalogue packed full of more goodies, or check out our website!



WAB10

A great little receiver offering an inexpensive entry in to the world of airband radio. Offers digital tuning to allow easy selection of frequency and built-in telescopic antenna.

Ordering Information
Product Code: WAB10

Low Price £39.95

Carriage: £5.00 P&P



AR108

The AR108 is a palm-sized scanner covering 108 to 180 MHz. It is therefore ideally suited to operation as a receiver for civil airband frequencies. The radio actually covers 108 - 180MHz with the VFO covering this frequency in two bands. 108 - 136.975MHz for the Civil Airband and 136 - 180MHz for the rest of the VHF band.

There are 99 memory channels for each of these bands, which are set independently. There are also facilities to lock in frequencies in the memories to pass on.

Ordering Information
Product Code: AR108

Low Price £69.95

Carriage: £5.00 P&P or
£10.00 by Courier

GPS3PLUS

New from Garmin, the GPS3Plus. This is Garmin's first GPS designed for vehicle mounting. The new improved basemaps contain much more detail than before and just wait till you see what you can do with Germin's MapSource CD-ROM maps! From these you can upload map sections into your GPS3P for even more detail and routeplanning. This will revolutionise your travel!



Ordering Information
Product Code: GPS3P

Low Price £349.00

Carriage: £10.00 by Courier



MVT7100

In our view...simply the best!

This is the scanner of choice for many of our serious users. If a radio is transmitting and you are close enough you will hear it on the MVT7100. Superb for monitoring military and civil airband channels - also allows you to listen to ground crews and base security. Its shortwave coverage with SSB offers opportunities for monitoring Shanwick and the trans-Atlantic routes!

- LSB/USB/AM/WBFM/NBFM Reception
- 1000 memory channels
- High sensitivity
- Signal Strength Meter
- Illuminated keypad
- High speed search & scan functions
- User friendly
- Battery save function
- Priority function
- Individual power/volume and
- Tuning dial
- Channel pass function on memory

Ordering Information
Product Code: MVT7100

Low Price £199.00

Carriage: £10.00 by Courier



IC-R2

Our lowest priced full coverage scanner also happens to be our smallest! The frequency coverage is from 0.495MHz to 1309.995MHz with NO GAPS making it ideal for monitoring military airband channels.

Ordering Information
Product Code: IC-R2E

Low Price £149.00

Carriage: £10.00 by Courier

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Send us four first-class stamps for our latest full colour catalogue, full of receivers, antennas, books, accessories, nightvision and GPS receivers and more!