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Short wave m

Broadcast

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17 BANDSCAN AMERICA



Info In Orbit Special

22 WEATHER SATELLITES - GETTING GOING

It all started during a lunch hour...yes, that's when Lawrence Harris first heard about weather satellites. But it took a further 15 years before he found the opportunity to re-investigate them. To 'get going', check out page 22.

32 INFO READERS' PICTURES

Lawrence shares a few more of the pictures submitted by 'Info In Orbit' readers.

36 INFO IN ORBIT

Lawrence's usual monthly column.

40 OKEAN-O - A SATELLITE WITH A MISSION

Recent bursts of telemetry from *OKEAN-O* may have been the first heard from this type of satellite by some newcomers to WXSAT monitoring. Lawrence takes a look at its instrumentation which helps explain the unusual images that we may see during the months ahead.

45 WXSAT RECEPTION COMPETITION

Competitive image acquisition was the theme of the recent RIG mailing list contest. Turn to page 45 for the winning entries.



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To provide you with a ready reference here are the contact details of all our regular authors.

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Magazine

Other Features

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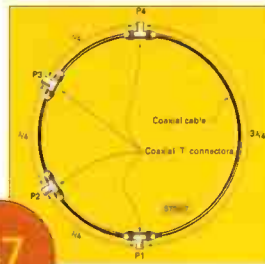
Not that long ago, Paul Swansbury found himself discussing various radio 'wish lists' with like minded devotees. Did they come up with a dream receiver? Turn to page 24 and find out.

47 PASSIVE RF PARTS THAT YOU CAN USE - PART 2

Joe Carr K4IPV brings you the final part of our exposé on combiners and splitters.

50 RTTY WEATHER INFORMATION

Philip Mitchell explains how to become an expert weather forecaster for a minimum outlay, by utilising a wealth of data transmitted via h.f. radio teletype.



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50

COVER SUBJECT

NOAA-14 UK a.p.t. image.

Roger Ray.

MISSED AN ISSUE OF SWM.

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SWM Services

Subscriptions

Subscriptions are available at £33 per annum to UK addresses, £40 in Europe and £44 (Airsaver), £50 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £55 (UK) £68 (Europe) and £74 (rest of world), £85 (airmail).

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, **Badger Boards, 12 Hazelhurst Road, Castle Bromwich, Birmingham B36 0BH, Tel: 0121-681 4168**. A small catalogue containing components, projects and p.c.b.s is available, free, to anyone sending **Roy or Sue Martin** an s.s.a.e.

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.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**. The E-mail address is **bookstore@pwpublishing.ltd.uk**

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

First off, some sad news and an explanation. Many of you have asked where 'All At Sea' has gone.

Unfortunately, John has been unable to write for us as he is on leave due to the serious illness of his son. I want to wish John and his family all the very best at this difficult time. Let's hope that life will soon be back to normal.



cannot continue to write the 'Scanning' column.

So, there is an opening for someone to take over the column from Faris. If you feel that you might be able to produce a monthly column, which includes dealing with fellow readers' queries, both via post and E-mail, and covering scanning

news and developments, theory and practical advice, then please contact me at the Editorial Offices here in Broadstone, Tel: **(01202) 659910** or E-mail: **kevin.nice@pwpublishing.ltd.uk** and I'll be happy to discuss the vacancy in more detail. You never know, you too could be a SWM author.

Trading Post

We, and Zoë in particular, have had one or two unpleasant 'phone calls relating to 'Trading Post' adverts. For that matter, we regularly get calls along the lines of, "If I send my ad now, which issue will it go in?". Or, "Am I too late for the next issue?", followed by "can you take my ad via the 'phone?'".

We run 'Trading Post' as a service for all our readers, and on the whole, the service is very successful, both from the sellers' and the buyers' point of view. We state at the head of the Trading Post page that advertisements are accepted on a first come first served basis. Any ads that don't make it in time for one issue get carried automatically into the next. We do not accept advertisements by 'phone as this is fraught with danger, in that it is so easy for errors to occur this way. What we do require from all users of the 'Trading Post' service, is that they either post, FAX or E-mail their ads to the Editorial Offices. For the record, a 'rule of thumb' the cut-off for any issue is the Friday four weeks before its publication date. This is **not** negotiable, so please don't try.

My Gear

Whilst on the subject of 'Trading Post', I've decided to have a bit of a radio clear-out and have several items for sale, Racal and Palsy receivers to name but two. All the items have been well cared for and have enjoyed a very good home whilst in my ownership. It's always tough to see old friends go, so it must be to a good home or I'll not be able to go through with letting them go. Take a look at this month's 'Trading Post' for more details

Scanning Columnist

Faris Raouf, our regular 'Scanning' author, is suffering with too much work from his 'full-time' employer. As a consequence, he has been struggling to find the time to cope with producing his column for this magazine. Faris has therefore told me that he regrets that he

Radio Push or Pull?

If you have read page 24 in this issue, you'll find an interesting point of view put forward by Paul Swansbury. Paul puts the case that radios that are commercially available come a little short of the mark for his and his friends requirements.

This set me thinking. I guess most of the shelf products can easily fall into this category. I remember vividly 'enhancing' my own first station with preselectors, antenna tuners, crystal calibrators, 2m converters and bigger 'add-on' battery packs to mention but a few accessories that enabled me to customise standard products that I could afford and make them better fit my needs. I also recall building sets to fit my requirements too. All this took was some imagination, some rudimentary tools, a little luck, experimentation and dare I say skill. It is worrying to think that spirit of "I can make it better" may well have left the hobby. After all, we wouldn't want to spoil the resale value of our commercial kit would we?

Phone & Win

Coming soon in SWM will be a 'phone-in entry style competition. We aim to run a new competition every month and will be sharing a competition entry line with sister magazine *Practical Wireless*. There will be some pretty good prizes on offer and you'll be able to enter as many times as you like. The winner will be drawn from the correct entries on a monthly basis. Keep your eye on these pages for more news.

Kevin Nice

Dear Sir

Following retirement I have become very interested in air traffic control, which I find a fascinating subject for both civil and military, general scanning from 25-1300MHz and h.f. receiving from 1.5-25MHz.

Although I have purchased a number of books on the subject, two receivers, discone and home-made long wire antennas and also taking *SWM*, as a complete Novice, I am finding it difficult to understand in layman's language how radio works, and what the abbreviated names and symbols stand for. In addition to this, the array of ancillary equipment, e.g. a.t.u.s, active antennas, pre-maps, filters and baluns, etc., I find baffling and what do they do - which type of antennas are the best and how should they be mounted.

As I want to develop this fascinating hobby, like other Novices (friends), your help would be much appreciated. I understand you cannot recommend any specific manufacturer, but how about a series of articles in *SWM* on the above, aimed at the beginners to explain the above and their use, which I am sure many people like myself would find interesting and useful and make reading your excellent *SWM* that much more interesting.

If Godfrey could help me with specific advice on airband equipment, I would be very grateful. I trust that you will accept these comments in the constructive manner they are intended.

P.S. A glossary on all abbreviations used in *SWM* would be helpful too.

**G. Sims
Wiltshire**

A beginner's series is in the pipeline. A glossary of terms is close. - Ed.

Dear Sir

Re: Peter Hall's letter about the R7000 lithium battery; if it's any consolation to him, I bought my receiver in 1985, I believe it was one of the first batches in this country. The battery in it was still going strong when I had the receiver serviced in 1998, but I had it replaced as a precautionary measure in any case. Other components in the receiver have failed over the years but not the battery!

Thanks as always for a good read.

Bob M

Dear Sir

Just lately, you and your publication have come in for a goodly amount of rather unjustly critical reviews. I would like to redress the balance in your favour. I read all of the many hobby magazines dealing with radio and electronics. Some now into past history, it is sad to say. I am glad to see that *Short Wave Magazine* is still amongst the healthy titles available.

The general content is well balanced, with the right amount of the technical as well as the tongue in cheek articles. I know how hard you work trying to please everyone, and I for one think you are doing a very good job holding it all together.

Thank you for being the one to inform me, entertain and educate me, where else could one get so much for so little. Hold your head up, and let the critics disappear up their own coaxes.

Please keep on as you are giving us the very best in radio news and reviews. Also, I have written to Radio Canada International, recommending your publication as a valuable source of information. So long for now from one who voted with his money and took out a year's subscription.

Thank you all who work so hard to please us out here in the wilderness.

P.S. I have just read the latest offering - well done to everyone.

**Ian Johnson
West Midlands**

Dear Sir

I have a back copy of *Short Wave Magazine*, October 1996, which included an article by David White G3ZPA - 'The Story Of The Bombe' - and also in the December 1996 issue, a subsequent letter by David J. Whitehead about the Post Office 4-rotor Bombe 'Cobra'.

My reason for writing is that I have been asked to produce an account of the Engineering design and development of the Bombe (the Cantab project), primarily by The British Tabulating Machine Co. (BTM) and its chief designer H H Keen. The history will not be complete without an account of the 4-rotor Bombe of 1942-45 in which the 'Cobra' design approach is an important part.

I am therefore asking if it is possible for you to provide Mr Whitehead's address so that I might ask him for a contribution. I understand from his letter that he was closely involved with the

'Cobra' and had written an account of this. Hopefully, this account might still be available.

May I also ask if you received any reply, to your invitation to do so, from any RAF technicians who were associated with this, or with any aspect of the Bombe, and which may be relevant?

I am one of those who contribute to the Bombe Rebuild Project at Bletchley Park and I hope that the printing of this account will be complete while the project is ongoing. I would be most grateful for any assistance you are able to give.

**A. J. Keen
Cheshire**

Anyone with any information that they feel they can share, please write via me at the Editorial Offices here in Broadstone, thanks. - Ed.

Dear Sir

I enjoyed reading Michael Osborn's page regarding Radio RSA, it certainly brought back many happy memories of the days of my listening to them in the early 1970s. Reception was very good in daylight hours on 21.535 in the 13m band Rugby and cricket from Johannesburg and *South African Panorama*.

Night time, the frequency of 11.800, that also was great, and on checking my log book for 1977, most of the broadcasts received have SINPO's of 5. On the subject of frequencies, I am about to purchase a scanner for the very first time. However, being somewhat of a Novice, may I say that reading all the reviews on the subject in *SWM* has been invaluable to me as the size of the scanner is most important to me, being disabled in the right hand.

I look forward to many more years of reading *SWM*.

**Gerald Guest
West Midlands**

On behalf of the whole team, may I say, we look forward to having you read the fruits of our toils - KN.

Dear Sir

When I read the recent *SWM* review of the Optocom communications receiver, I realised that this was the bit of kit I'd be waiting for to show me what is in 'receiving range' of my house, to enable me to 'tidy up' my existing scanners programme as well as finding out times that various frequencies are used. Of course, it is handy to know if new ones are being sneaked in as well.

Messrs Nevada had one on my doorstep within 12 hours of my ringing, and I had to agree with your reviewer that it 'oozes' quality.

Of the two floppy disks that came with it, I found the Radio Manager handy for programming a particular frequency (Radio 2 or the local repeater group for instance), to listen to while doing something else on the computer, but I seem unable to get it to do any more, and the default setting is a nuisance. Does it do anything else?

The *Trackstar* program is something else, but oh dear! Working out how to use it, let alone program in my own frequency ranges, is another matter. I fully appreciate that my computer awareness is not that of a 12 year old and that I need help, but even with a lot of guidance, my *Windows 95* transferred to a non-existent internet port and the whole set of systems disks re-inserted, not to mention a file of teddies thrown out of the pram, I've still not mastered it.

The whole program baffled our computer shop wizards, so I took the whole hardware set-up to a chum who talked me through the loading. I thought I'd got it, but got home to find I hadn't. The problem is, after programming in the required *Trackstar* search ranges in the date manager, how to get them to show up on the screen and actually get them searching.

To date, the pile of teddies outside the pram has reached EEC mountain size and my skill of solitaire games has leapt up, but the Optocom remains idle. I've got the antenna on my roof now and the plumber has mended the pipe I sat on while feeding the feeder through.

Does anyone know of any easy ways to program this or are there any similar CDs or floppies that can be loaded? Thanks for a great magazine.

**R. Wild
Portland**

Anyone? - Ed.

Dear Sir

I thoroughly enjoyed the 'Radio Scotland' article by Daniel Burke in the October *SWM*. I used to listen to the 'real' RS while getting ready for school - it used to come in quite well in the mornings, especially in Winter. It was a shame when we lost the pirates and, like Daniel, I later became involved with land-based pirate radio.

Our station, Radio Aquarius, started in the early 70s and was Manchester's first regular weekend pirate, broadcasting from the fields and hills of south Manchester with equipment powered by car batteries. I built nearly all the m.w. a.m. transmitters, the f.m. ones being conjured up by Charlie, the founder of the station, and we doubled up as presenters, our programmes being pre-recorded on cassette.

We were finally closed down in 1975 after a series of raids, the last one leaving a couple of us with suspended prison sentences. Probably a good time to stop! For the last three years, one of the old 'Aquarians' and I have been writing a book about Aquarius, and with a bit of luck (there have been many setbacks) it will be out in time for Christmas. Anyone requiring further details is welcome to E-mail me at

**hazel.heron3@virgin.net
Andrew Howlett
Cheshire**

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.



New Look Catalogue

Maplin Electronics have recently launched the latest and most widely used electronics catalogue in the UK. The latest catalogue is in a new format, coupled with some amazing special offers. September's edition sees over £60 worth of vouchers included in the catalogue.

The autumn/winter catalogue (order code CA20 £3.99) has been increased to 1600 pages, incorporating over 2000 price reductions. The addition of over 1500 new products to the portfolio further improves this new edition. Complementing the paper edition is Maplin's double CD-ROM catalogue (order code CQ04 £1.95), which has comprehensive search facilities, pricing in sterling and euros, product pictures and technical specifications, plus over 1000 databases.

The catalogue is available by calling Maplin's order line on **(01702) 554000** or alternatively call into one of Maplin's retail stores nationwide. Failing that, check out their secure and full interactive website at <http://www.maplin.co.uk>. You can also purchase copies of the catalogue at branches of WH Smiths nationwide.

Oops

In the story entitled 'Polish Weekend', which was printed in *Communique* in October 1999, the correct caption to the picture should have read, (L to R) Kris Jasinski MOAXH of the Polish Scout Radio Group, H E Ryszard Stemplowski, the Polish Ambassador and Verdun Webley GORKV, Chairman MKARS.

Calling All Clubs

We at *SWM* are currently compiling a list of all radio clubs in the UK. If you would like yours included in this comprehensive list, please send updated information about your club, i.e. where

you meet, times, dates, contact information, and anything else you feel relevant, to **Zoë Shortland** at the *SWM* Editorial Offices. This information can be sent via post, FAX **(01202) 659950** or E-mail to zoe@pwpublising.ltd.uk. We look forward to hearing from you.

Alive & Well!

The **British Amateur Radio Teledata Group (BARTG)** announced at the start of the year that it would not be holding its usual annual rally in 1999. While attending another rally, BARTG stand staff found out that some people had taken the absence of BARTG's popular annual rally to signal

Two-Way Communication

Promising to revolutionise the way the modern family communicates, Cobra Electronics is launching **microTALK™** radios, a new kind of two-way communication for busy people with active lives. Cobra is the market leader in consumer two way radios in the US, and has been the leading seller of Citizen Band (CB) radios.

micro TALK is a form of private mobile radio communications (PMR 446) which has gained approval from the Radiocommunications Agency to operate in the UK without a licence fee. Its introduction follows a ruling by the European Radio



the demise of BARTG itself. Nothing could be further from the truth!

BARTG is alive and well and promoting amateur radio datacoms to the very best of its abilities. BARTG also continue to promote its quarterly magazine *Datacom*, which is the main benefit of membership. *Datacom* aims to carry a wide range of articles, mostly written by members of BARTG, covering many aspects of amateur radio datacoms. *Datacom* is also, of course, covering PSK31, the newest (and very popular) datacoms mode to hit amateur radio.

Membership of BARTG is open to all enthusiasts of amateur radio datacoms, whether listener or transmitting amateur and regardless of the type of amateur radio licence held. After 40 years of promoting datacoms within amateur radio, BARTG realise that datacoms is something that everyone, old timer or novice, can learn and thoroughly enjoy.

If you would like to find out more, including membership prices, etc., contact the BARTG Membership Secretary **Bill McGill G0DXB, 14 Farquhar Road, Maltby, Rotherham, S. Yorkshire S66 7PD, Tel: (01709) 814010 (1900-2100), E-mail:**

members@bartg.demon.co.uk

BARTG is also on the web at www.bartg.demon.co.uk

New Website

A new website allows radio enthusiasts to get a free web address for their existing Internet homepages. Amateurs can replace long addresses like <http://www.members.hosting/~G9XYZ> with a short, memorable address like, **QSY.to/G9XYZ**. From then on, anyone, anywhere in the world can simply type QSY.to/G9XYZ into an Internet browser and get redirected to the

New Valve

The Y644 is a version of the venerable 4CX250B - it is identical mechanically. However, it is substantially different electrically because the Cossor CGR1020 v.h.f./u.h.f. ground/air communications system was originally developed to use the Y644 by ECI in the United States.

The Cossor system is used by the British Military and by military organisations throughout the world. The Svetlana Y644 is fully qualified by the British Ministry of Defence for the CGR1020 ground/air communications system. The Svetlana valve is now being used extensively by the British MoD and is exactly plug compatible with the Y644 manufactured in the United States. The Y644 is currently available from Svetlana distributors throughout the world.

More information from Svetlana Headquarters at **8200 South Memorial Parkway, Huntsville, AL 35802, USA.**



Communications Committee at the end of last year, which allocated a 446MHz band for business and recreational communication.

The pocket sized radios are easy to use and provide very clear sound quality with a range of up to two miles. Measuring just 130mm tall and weighing less than 170g, they are easily powered by four AAA batteries or a Cobra rechargeable battery pack and come in a range of fashionable colours, with a removable belt clip and wrist strap.

All microTALK radios offer an exclusive combination of user friendly features, including incoming call alert, a retractable antenna and roger beep which indicates when the other party is done talking. The microTALK 2 features eight channels with 38 sub-channels each, while the water resistant microTALK 3 features a unique vibrating silent call alert, a feature exclusive to Cobra.

The microTALK hand-held radios are available in three models - microTALK 1 (PMR-100) priced at £69.99 or £129.99 for a pack of two, microTALK 2 (PMR-250) priced from £119.99 and microTALK 3 (PMR-300) priced from £129.99.

The products are being distributed in the UK



by Pama & Co Ltd. For more

information,

visit the Pama web site at

www.pama.co.uk or

www.pmr446.com or

call them for more stockist

information on **0161-248 1046**.

homepage of G9XYZ. The service is completely free and you can sign up on-line. Find out more at <http://qsy.to>

example to warm the loft or a room at a time that's convenient for you.

For mobility and stability, there is a robust wheel and foot, with a pull handle which means it

Welcome All!

The **Hoddesdon Radio Club** welcomes all short wave listeners and has a very varied programme, including talks, visits and dinners, BBQs and an excellent venue, on alternate Tuesdays, at the Conservative Club, Rye Road, Hoddesdon, Herts, from 2000. Further details from **Don** on **0181-292 3678**.

Warm Your Shack

Portable heaters are ideal for those whose hobby takes them to the loft, a back room or garage, as they can heat a single room without the cost of putting on a full central heating system. The Dimplex Rio is a '2-in-1' portable radiator, with direct heat to warm you and convected heat to warm the room.

Its balance of radiant and convected heat is found to be the most comfortable form of heating for people - radiant heat is similar to the warmth of the sun, while convected heat warms the air without drying it. It is very safe, efficient heating and because it is electric, it simply plugs in.

The Dimplex Rio comes in Misty Grey/Atlantic Blue trim and all have variable thermostatic control, which helps to maintain an ideal temperature and anti-frost protection. There is a choice of adjustable heat settings for added economy and a 24-hour timer option can be programmed to come on automatically, for



The six-model range Dimplex Rio '2-in-1' portable radiator, available in 1.5, 2.0 and 2.5kW, is ideal for top-up heating wherever its needed.

can be easily moved around. All models are very slimline and convenient to store away when not in use. For details of prices and to find your nearest stockist, contact Dimplex on **(01703) 785133**.

IOTA 2000

The RSGB IOTA Committee and CDXC (Chiltern DX Club) - the UK DX Foundation have announced the establishment of the IOTA Millennium Programme - IOTA 2000. The purpose of this programme is to celebrate the Millennium, to promote IOTA activity and to have fun on the h.f. bands. The IOTA 2000

Continued on page 10...

Send your news to Zoë Shortland at the Editorial Offices

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.

November 6/7: The Thirteenth North Wales Radio & Electronics Show is to be held at the North Wales Conference Centre, Llandudno. The show opens at 1000 both days and the entrance fee is £2 for adults and under 14s free, when accompanied by an adult. There will be a Clubroom and an extensive Bring & Buy. More information from **M. Mee GW7NFY**, Rally Secretary on **(01745) 591704** (combined telephone and FAX number).

November 14: The Great Northern Hamfest is to be held at the Metrodome Leisure Complex, Queens Road, Barnsley, near to town centre, less than two miles from junction 37 M1 motorway, just five minutes walk from the train and bus stations. Doors open at 1000 and admission is £2. The venue is all on one level with excellent disabled facilities. There will be the usual trade stands, component and specialist interest groups and a large Bring & Buy. Morse tests on demand, from 1200 till 1500 (don't forget to bring two passport photos and the appropriate fee with you). Talk-in on 145.550MHz. **Ernie G4LUE** on **(01226) 716339** or **(0836) 748958** between 1800 and 2000.

November 14: The Midland Amateur Radio Society are holding their 11th Radio & Computer Rally at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open at 1000. There is a large free car park, free hampers draw, trade stands, local clubs and special interest exhibits. For trader information call **Norman G8BHE** on **0121-422 9787** or for general information, call **Peter G6DRN** on **0121-443 1189**.

November 14: The Bishop Auckland Radio Amateurs Club (BARAC) Rally will take place at Spennymoor Leisure Centre. Please note this is a venue ideally suited to both trader and disabled, as it boasts good parking and easy access to a large ground floor. There will be the usual radio, computer, electronics and Bring & Buy stalls, as well as catering and bar facilities. Morse tests are available on demand. As you can imagine, there is a lot to do within the confines of the leisure centre, for those of the family not interested in radio. Doors open 1100 (1030 for disabled access) and admission is just £1, under 14s free of charge if accompanied by an adult. Talk-in on S22. **Keith M0BLN** on **(01388) 601401** or **(0374) 417660**.

Continued on page 11...

FULL COMPUTER CONTROL



AOR receivers and major items are capable of full computer control

As reported in the June 1999 Short Wave Magazine, a new production run of the AR7030 has been completed and is shipping. The AR7030 has retained the same design but has 'evolved' in certain areas. The latest production features **alternative click encoders** which provide a smoother and more consistent quality feel and a **new-style liquid crystal display** with higher contrast and a wider viewing angle.



Now in its 4th year of production, the AR7030 has established itself as the popular performance trendsetting short wave receiver representing the new 'benchmark' in excellence. There have been many new entries by competitors since the launch of the AR7030, some feature DSP but none can match the **sheer performance excellence** of the AR7030. Don't take our word for it, have a look at the many technical reviews and compare the technical results. Go on, compare it to others!

Internationally and independently recognised as being in 'a class of its own'.

The balance between high performance and value for money is excellent.

Awarded receiver of the year 1996/97 by WRTH and consistently awarded 5 stars by WRTH and Passport to World Band Radio in every edition with Passport nominating it as the Editor's choice.

AR7030 £799 AR7030 PLUS £949

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



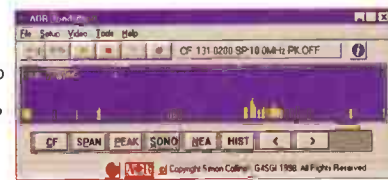
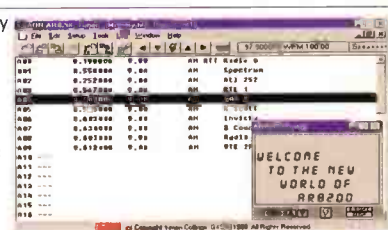
Shown here with optional slot cards

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



CONTROL CAPABILITIES

Control, many have software available as a free internet download



★★★★☆ **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.

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. **EP.O.A.**

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.

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 10kHz - 2600MHz
- ✓ 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, 1Hz NCO tuning
- ✓ 1,000 memories, 10 memory banks, 20 search banks, 5 VFOs (all twice!), alpha tag, EEPROM chip storage
- ✓ Multiple IF bandwidth 3kHz, 6kHz, 15kHz, 30kHz, 110kHz, 220kHz with an option position for 500kHz CW. (30kHz is ideal for WEFAX).
- ✓ High sensitivity and excellent strong signal handling assisted by a preselected front end from 500kHz - 1GHz
- ✓ Extensive RS-232 control list
- ✓ SDU ready with IF output for spectrum display unit

Setting new standards, **SDU5500** Spectrum Display Unit Coupled to the AR5000 receiver, the SDU5500 provides a spectrum display of 10MHz bandwidth anywhere between 10kHz and 2600MHz.

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. The SDU5500 supports a number of AOR and ICOM receivers, in addition, the SDU5500 may be used with other receivers which offer a 10.7MHz I.F. output with suitably wide bandwidth, please refer to the colour leaflet for details. The firmware is FLASH up-grade-able from our web site with free supporting PC software also available from the web site.



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'!



AR8000 all mode hand portable receiver 500kHz to 1900MHz. Dot matrix display, a real trendsetter. Computer / reaction tune port and many features.



ARD2 portable ACARS & NAVTEX decoder & display unit, can be operated from internal batteries or external d.c. supply. An RS-232 port expands capabilities, **free supporting software** from the AOR internet web site.



The **AR3000A** is evolution at its very best. Wide band all mode receiver, 100kHz to 2036MHz high performance, RS-232 port as standard. Respected best seller with over 70,000 sold world-wide. The PLUS version has enhanced facilities.

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



Tel: 01773 880788 Fax: 01773 880780
info@aor.co.uk www.demon.co.uk/aor **E&OE**

Isle of Man ARS

Members of the **Isle of Man Amateur Radio Society** meet on the 2nd Tuesday of the month in the Sea Cadet HQ in Douglas. The building is next to the Water Board HQ in Tromode Road (off the bottom of Bray Hill). Everyone is welcome (tea, coffee and biscuits on tap!).

For more up-to-date information about what's on at the meetings and other amateur radio events, check out their web site at:

www.qsl.net/gt3flh

Last Young Amateur

Sixteen year old **Mark Haynes** from Harlow, Essex, was recently pronounced winner of the Young Amateur of the Year Award 1999 by the Radiocommunications Agency. Mark will receive first prize of £500, a certificate from Stephen Byers, Trade & Industry Secretary, and will be invited to a conducted tour of the Agency's Radio Monitoring Station in Baldock, Hertfordshire.

Mark gained his Novice licence at the age of 12 and became the youngest radio amateur in his home town. In July, he organised and ran a special event station commemorating the 175th anniversary of the Royal National Lifeboat Institute. He also took part in a 24-hour Island on the Air (IOTA) contest from his club station.

Runner up for the award is 15 year old **Daniel Keene** from Alton, Hampshire. He receives a cheque for £200 from the Agency, and will also be invited to visit the Agency's Baldock Monitoring Station.

... continued from page 7

Programme will be administered by CDXC on behalf of the RSGB IOA Committee.

The objective of IOTA 2000 is to contact as many different IOTA island groups as possible within the Millennium year, 1 January 2000 to 31 December 2000 on the h.f. bands. There are two types of contact that count for credit - premium contacts and normal contacts. Premium contacts are made during particular months and score extra points. A series of attractive certificates - the gold, silver and bronze certificates - will be available as will participation certificates.

Nevada Communications have agreed to sponsor IOTA 2000. This sponsorship will cover the costs of administration and certificate design.

Details of IOTA 2000 can be found at www.cdxc.org.uk and the rules, together with a listing of island groups, including the months when premium scores are made, can be downloaded from this site. This programme should be great fun - no QSL cards are required.

For those who would like further details and do not have Internet access but have a computer, send a floppy disk and post paid mailer to **G3NUG, QTHR**. For those without computers, send a C5 size envelope and £1 (\$2) to cover printing and postage.

For more information about the RSGB and its activities and services, contact the General Manager **Peter Kirby G0TWW at Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, Tel: (01707) 659015.**

Southgate ARC

Since its original inception in 1936 as the Southgate and Finchley Group of the RSGB, the aim of the **Southgate Amateur Radio Club** has been to hold meetings, bringing together persons interested in Amateur Radio or Electronics generally, and to foster the spirit of Amateur Radio. The Club provide a meeting place and forum where those with similar interests can share their experiences, discuss their problems and enthuse about their achievements.

Activities include talks on technical subjects, equipment sales, DF hunts, contests, informal meetings and demonstration stations. Membership is open to all who are interested in any of the many facets of Amateur Radio.

The Club's numerous and varied activities being

not restricted to those who hold transmitting licences. Members range in age from youngsters to senior citizens. Visitors and new members are always welcome.

The Club meet twice monthly at **Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER**, commencing at 1930. On the 2nd Thursday of the month, a guest speaker is usually invited along to give a talk and on the 4th Thursday, meetings are relatively informal. More information from the Meetings Secretary, **Nick Earl**, on **(01992) 463453/443644**.

More PMR446

Back in August, **Sharman multiCOM Ltd.** launched their multiCOM pro PMR446 personal 2-way communicator. This transceiver is compact and stylish, designed to appeal to a wide variety of business users and leisure users, as an inexpensive means of communication. Unlike mobile 'phones

and more expensive 2-way radio equipment, there are no hidden call costs or monthly bills.

Designed to be simple to operate, the transceiver has a claimed number of unique technologically advanced features such as: multi-channel and multi-signalling; voice scrambler (for added privacy); Voice Activated Transmissions (VOX), enabling hands-free operation; scanning of all channels for transmissions on

matching calling codes; programmable transmission time out to

avoid accidental transmission; battery status indicator; long battery life - up to 30 hours long battery life on premium AA alkaline or 20 hours on NiCad rechargeable pack and cloning - a function which allows units to be programmed with same settings without individual programming of each unit.

Each transceiver is supplied with a belt clip, NiCad battery pack and plug-in mains adapter. Optional accessories include two types of desk top chargers and a variety of external ear microphones and speaker microphones. Available at most communication dealers nationwide, the suggested retail price is £159.

Further details on multiCOM pro on **0161-834 9571**.

New MFJ Antenna Analyser

Following on from the great success of the MFJ-259B antenna analyser, MFJ have now developed model 269, which extends the frequency range to include u.h.f. and in addition to reading v.s.w.r. and frequency up to 70cm, the new analyser incorporates many additional features. It can measure coaxial cable losses and cable faults and enable measurements for antenna construction, all with a high degree of accuracy and accomplished very quickly.

This latest full feature and top of the range analyser is now available from **Waters & Stanton PLC**, and all approved outlets, at £299.95. Contact **Waters & Stanton at Spa House, 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 206835/204965, FAX: (01702) 205843** for more information.



WRN Steps Forward In Berlin

This year's International Funkausstellung in Berlin proved a huge success for British based broadcaster World Radio Network. At IFA this year, the emphasis was on digital and WRN once again confirmed their position as a leader in this field by taking part in a special (DVB) radio transmission to showcase this technology of the future. (WRN were the first company to broadcast over the Internet and from the outset they have been behind the drive to digital).

At a reception attended by press, broadcasters and embassies from all over Europe, WRN announced details of their new European Radio Network; these will be the first pan European radio stations broadcasting from, to and specifically for Europe. These stations will enable listeners to hear news from all over Europe direct from its source. There will be one in English, one in German and the fourth will provide a multilingual service. The German station will replace the current WRN3 and the English station will be an extension of the existing WRN1.

WRN exhibited within the Astra stand at IFA, and joined the Astra presenters on stage each day to give away prizes from many of the broadcasters who already benefit from WRN's transmission network covering America, Asia, Africa and Europe. Over 50,000 people a day attended the exhibition, many of whom made their way specifically to the WRN stand to pick up the latest copy of the programme schedules.



Britta Kellermeier, Press & Marketing Officer, Europe, giving away prizes on the Astra stand.

M2000A

PROJECT ECHO - Eltham Contacting Hams Overseas - is planned to be the major amateur radio event in the British Isles to celebrate the millennium.

As the millennium approaches, radio amateurs from the **Cray Valley Radio Society** will operate a DXpedition-style station from an English Heritage property, Ranger's House, which is located on the Greenwich Meridian. Contact will be made with

Specialised English

Programmes in *Specialised English* begin from FEBA Seychelles during the first week in November. They are the first Christian programmes of this type, helping listeners to develop their English and learn about the Gospel.

Specialised English uses a simple vocabulary of 1500 carefully chosen words and is spoken at a speed of 90 words per minute, about half the speed we normally speak. David Bast, a member of the team, explains why he became involved.

"I wanted to move towards some kind of programming that would capitalise on the desire people have to learn English," David says. Once, while travelling in China, he switched on the TV and discovered a programme teaching English. "That really started me thinking about this hunger so many people have. An estimated 500 million people world-wide speak English as a second or third language."

A possible problem in developing English programmes for non English speakers is the misconception that they could be imposing western culture listeners. In reality, English has become international, and Christianity is world-wide. The wrong idea has been minimised by producing the programmes internationally using non western presenters. It is also being explained that English is not the original language of the Bible.



(L to R) Jo Caswell, Mike Procter, Anne Procter and David Bast - together in Worthing, finalising the first Specialised English series.

selected locations around the globe as they cross their own meridian line into the 21st century.

The event has been given the full support of English Heritage and the Borough of Greenwich. With the support of the RSGB and the Radio Communications Agency, a very special call sign has been issued: **M2000A**.

Operation will commence on the 31st December 1999 and in the initial 24-hour period, it is planned to contact stations around the world starting with ZL and finishing with KH6, as they cross into the new millennium. The station will be open to the public and, being located only 3km from the Millennium Dome, this is intended to be a marvellous showcase for amateur radio.

Visiting operators are welcome, and a schedule is being made up in advance. Each operator has to be a member of the Cray Valley Radio Society. There is a special one year membership fee of £2.50, which will also allow operators of M2000A free access to Ranger's House.

Project Echo will also involve local schools in the Borough of Greenwich. Many schools will be sending parties of students to view the station and an exhibition with brief lectures about radio communications will be given. This will tie in with the technology stream of the national curriculum. A bookstall of books on amateur radio, from the RSGB, is being planned as part of the exhibition.

For further information please see the M2000A web site at www.qsl.net/m2000a To take out millennium membership of the Cray Valley Radio Society, contact **Bernie Harrad G8LDV, Tel: (01474) 566062, E-mail bernieharrad@tesco.net** Details of the Cray Valley Radio Society can be found on their web-site at www.btinternet.com/~g4wif/cvrs.htm or from the secretary **Richard Perzyna G8ITB, Tel: (01689) 818582.**

rallies

November 15: South Normanton & District ARC are holding their Mini Radio & Electronics Equipment Fair at New Street Community Centre, South Normanton near Alfreton, Derbyshire starting at 1800. Easy access from the M1, J28, or the A38. Everyone welcome, refreshments available. Limited number of tables available, strictly on a first come, first served basis so early booking is essential. Further details from (and to book tables) **Russell Bradley G0OKD on (01773) 863892** or E-mail **Duncan Walters G4DFV on tesla@cwcom.net**

November 21: The West Manchester Radio Club are holding their Red Rose Rally at Horwich Leisure Centre, Horwich, Bolton, off J6 M61. Doors open 1100, 1030 for disabled visitors. Admission by programme, which costs £1.50, £1 for OAP on the door. There will be the usual stands, plus refreshments and a Bring & Buy. **Don Aitchison G3BSA on (01942) 871620.**

November 21: The Bridgend & District Amateur Radio Club are holding their 13th Radio & Computer Rally at the Bridgend Recreation Centre, Bridgend, Mid-Glamorgan. Doors open from 1030, admission is £1.50. All the usual radio and computer traders, licensed bar, Bring & Buy, refreshments, family attractions and free parking. Plenty of room for visitors to mingle and browse, signposting will be from junction 35 of the M4. Talk-in on 145.550. More details from **Maurice GW0JZN on (01656) 864579, FAX: (01656) 864579.**

November 27/28: The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9 0AS. The Lee Valley Leisure Centre has modern facilities, well illuminated halls, extensive free parking and easy access by roads.

December 4: The Rochdale & DARS are holding their traditional radio rally (yes, on Saturday!) at St Vincent de Paul Catholic Church Hall, Caldershaw Road, off the A680 Edenfield Road, approx two miles west of Rochdale. Follow the orange arrows from M62 J20. Doors open 1100 (1045 for disabled visitors). There will be refreshments and a rest area. **John G7OAI, evenings, on (01706) 376204.**

Send your news to Zoë Shortland at the Editorial Offices

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



LM&S

When British Summer Time (BST) ends at midnight on Saturday October 30 clocks in the UK will be put back one hour to display Greenwich Mean Time (GMT). For most purposes, GMT is the same as Universal Time Co-ordinated (UTC), which is the time system used by International Broadcasters and referred to in this column.

To compensate for seasonal changes in propagation, quite a few of the s.w. broadcasters are likely to introduce new transmission schedules from that date. Some of the reports herein, which were compiled during August, may then be no longer applicable.

Long Wave Reports

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

The highlights of the month for **Simon Hockenull** (E.Bristol) came at 0100UTC on the 4th & 14th when he received the broadcasts from Ríkisutvarpid in Reykjavik via their 300kW station at Gufuskalar, W.Iceland on **189kHz** at a remarkable SINPO 35444.

Enhanced conditions were observed on the 30th by **Fred Pallant** in Storrington. Whilst searching the band during the evening, he picked up at 2033UTC a news bulletin in Italian, broadcast by Radiotelevisione Italiana (RAI) via their 10kW outlet at Caltanissetta, Italy on **189kHz**. The transmission rated 13442.

Medium Wave Reports

There were no reports of m.w. transatlantic reception at night during August, but the sky waves from quite a few of the m.w. stations in the Middle East, Africa, Europe and Scandinavia reached the UK after dark - see chart.

The extensive log compiled by **Eddie McKeown** (Newry) includes Trans World Radio on **864kHz**, which he rated 21222 at 0047. He sent a reception report to TWR, (PO Box 1020, Bristol BS99 1XS) and received a reply which indicates that their programmes are being relayed from St.Petersburg on **864**, also from Moldova on **1548kHz**.

Some interesting effects were observed during the solar eclipse on August 11. In Morden, **Sheila Hughes** monitored **639kHz** for RNE-1, which is shared by La Coruna (300kW) and five low power outlets. The combined transmission was heard at 1024UTC and rated 12222 before fading into the noise.

Over on the Isle of Wight **George Millmore** (Wootton) noticed that ... "West country stations faded to night time levels. By contrast Stoke-on-Trent came up to SIO 434". In Guildford, **Richard Reynolds** was surprised to hear BBC R.Guernsey on **1116** during the event because BBC R.Derby usually dominates that frequency at his location during daylight.

Perhaps the most significant effect was the way reception of the

transmission from RTL (Luxembourg) on **1440** changed - during the eclipse it was noted as a 'tremendous' signal by **Bernard Curtis** in Stalbridge; rated 45544 by **Simon Hockenull** (E.Bristol) and 45344 by **Susan Lea** in Woking but they were unable to detect it prior to and after the event!

Short Wave Reports

There were no reports to indicate how well the broadcasts from R.France Int in the **25MHz (11m)** band reach E/C.Africa on **25.820** (Fr 0900-1300) but they were received by several listeners in the UK. Typical ratings were 34423 at 0905 by **Vic Prier** in Colyton; 25222 at 0936 in Newry; 45534 at 0937 in E.Bristol; 34323 at 0955 in Morden; 25122 at 1020 in Guildford; 45444 at 1100 by **John Slater** in Scalloway, Shetland; 33433 at 1225 by **Robert Connolly** in Kilkeel; 54444 at 1250 in Stalbridge.

Many of the broadcasts in the **21MHz (13m)** band are beamed to distant countries but most of them can be received in the UK. Noted before noon were R.Australia via Shepparton **21.725** (Eng to Pacific areas 0200-0900), rated 25332 at 0804 by **Tony Hall** in Freshwater Bay, IoW; R.Prague, Czech Rep **21.745** (Cz, Eng to S.Asia 0830-0930) 35433 at 0912 by **Darren Beasley** in Bridgwater; BSKSA Saudi Arabia **21.705** (Ar 0600-?) 54444 at 0935 in Morden; BSKSA Saudi Arabia **21.495** (Ar [Holy Quran] to SE.Asia 0900-1200) 34233 at 0938 in Newry; RAI Rome **21.520** (It to Africa 0600-1300) 54544 at 1020 in E.Bristol; UAER, Dubai **21.605** (Eng to Eur 1030-1100) 55455 at 1030 by **Clare Pinder** in Appleby; Vatican R, Italy **21.850** (It, Fr, Eng to Asia? 1000-1029) 43333 at 1020 by **Robert Hughes** in Liverpool; Swiss R.Int via Sottens? **21.770** (Eng, Ger, Fr, It to SE.Asia, Far East 1100-1330) 55555 at 1130 by **Conway Longworth-Dames** in Brixham; R.Sweden, Stockholm **21.810** (Eng to N.America 1130-1200) 43333 at 1140 in Scalloway.

After mid-day Channel Africa via Meyerton, S.Africa **21.530** (Eng to Africa 1300-1455? Sat/Sun) was rated SIO 434 at 1300 by **Tom Smyth** in Co.Fermanagh; R.Australia via Shepparton **21.820** (Eng to Asia 0900-1400) 44434 at 1325 in Stalbridge; BBC via Cyprus **21.470** (Eng to Africa 1400-1700) 44444 at 1400 by **Stan Evans** in Herstmonceux; BBC via Ascension Is **21.490** (Eng to C.Africa 1500-1645) 44444 at 1516 by **Vera Brindley** in Woodhall Spa; BBC via Ascension Is **21.660** (Eng to Africa 1100-1700) 44444 at 1608 in Morpeth; UAER, Dubai **21.605** (Eng to Eur 1600-1640) 44333 at 1610 by Robert Beason in Nottingham; HCJB Quito, Ecuador **21.455** (Eng [u.s.b. + p.c.]) 34443 at 1615 in Kilkeel & 55434 at 1953 in Guildford; R.Netherlands via Bonaire, Ned.Antilles **21.590** (Eng, Du to Africa 1830-2025) 35544 at 1903 by **Fred Wilmschurst** in Northampton; Voz Christiana, Chile **21.500** (Sp to N.America 1100-2100?) 34423 at 1920 in Colyton.

The narrow **18MHz (15m)** band is allocated for single sideband (s.s.b) broadcasting in the future but it is being used at present by a few broadcasters with amplitude modulated (a.m) transmissions. Those noted came from R.Sweden, Stockholm **18.960** (Eng to N.America 1130-1200) rated 55444 at 1135 in Scalloway; R.Denmark via R.Norway **18.950** (Da to Asia 1230-1300) 45444 at 1255 in Northampton; Christian Science BC via WSHB Cypress Creek **18.915** (Fr, Eng to E/C.Africa 1600-?) 34433 at 1929 in Bridgwater.

Many of the broadcasts in the **17MHz (16m)** band reach our shores. Those noted before noon came from R.Australia via Shepparton **17.750** (Eng to Asia 0000-0500, 0600-0800, 0830-1100), rated 45554 at 0704 by **David Edwardson** in Wallsend; R.Romania Int **17.745** (Eng to F.East? 0700-0800) 55544 at 0705 in Northampton; Swiss R.Int via ? **17.685** (Fr, It, Eng, Ger to Africa 0600-0830) 55344 at 0736 in Newry; BBC via Ascension Is **17.830** (Eng to Africa 0700-2100) 44333 at 0750 in

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Donebach DLF	Germany	500	B,C*,D,E*,G
162	Allouis	France	2000	B,C,D,E*,FG
171	Nador Medi-1	Morocco	2000	E*
171	B'shakovo etc	Russia	1200	B*,C*,D,G*
177	Oranienburg	Germany	500	C*,D,E*,G
183	Saarlouis	Germany	2000	B,C,D,E*,FG
189	Gufuskalar	W.Iceland	150	A*
189	Caltanissetta	Italy	10	E*
198	Droitwich BBC	UK	500	B,C,D,FG
207	Munich DLF	Germany	500	B*,C*,D,E*,G*
207	Eidar	E.Iceland	100	A*
216	Roumoules RMC	S.France	1400	B*,C*,D*,E*,FG
225	Raszyn Resv	Poland	?	A*,B*,C*,D,G*
234	Beidweiler	Luxembourg	2000	B,C*,D,E*,FG
243	Kalundborg	Denmark	300	B,C*,D,E*,G
252	Tipaza	Algeria	1500	B*,D*,E*
252	Atlantic 252	Fire	500	B,C,D,E*,FG
261	Burg(R.Ropa)	Germany	85	B*,C*,D,E*,G*
270	Topolna	Czech Rep	1500	B*,C*,D,E*,G*
279	Sasnovy	Belarus	500	B*,D*,E*,G*

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

Listeners:-

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

Herstmonceux; R.Pakistan, Islamabad **17.835** (Eng to Eur 1100-1120) 34333 at 1103 in Freshwater Bay, IoW; R.Bulgaria, Sofia **17.500** (Eng to Eur 1100-1200) 54444 at 1115 by **Tom Winzor** in Plymouth.

During the afternoon R.Romania Int **17.720** (Eng to Eur, N.America 1300-1356) was SIO 555 at 1300 in Co.Fermanagh; V of Turkey, Ankara **17.830** (Eng to ? 1230-1325) 54354 at 1315 in Brixham; R.Tashkent, Uzbekistan **17.775** (Eng to S.Asia 1330-1400) 44444 at 1330 by **Gerald Guest** in Dudley; AWR via Slovakia **17.525** (Eng to Asia 1430-1500) 44333 at 1440 in Morden; R.Romania Int **17.735** (Eng to W.Eur 1700-1756) 53553 at 1744 in Bridgwater; Israel R, Jerusalem **17.545** (Heb [Home Sce rly] to W.Eur, N.America) 44434 at 1755 in Colyton.

Later, VOA via Morocco **17.895** (Eng to Africa 1600-1900) was rated 45444 at 1830 by **Harry Richards** in Barton-upon-Humber; R.Netherlands via Bonaire, Ned Antilles **17.605** (Eng to Africa 1730-2025) 33333 at 1838 in Nottingham; QBS Doha, Qatar **17.895** (Ar to M.East 1700-2100) 54444 at 1900 in Liverpool; WHRI via Maine, USA **17.650** (Eng to Eur, M.East, Africa 1600-0000?) 44444 at 1920 in Morpeth; Swiss R.Int via ? **17.580** (It, Ar, Eng, Ger, Fr to S.Africa 1830-2100) 43333 at 2010 in Stalbridge; HCJB Quito, Ecuador **17.660** (Eng to Eur 1900-2200) 23222 at ? by **Thomas Williams** (Truro) whilst in Camborne; RCI via Sackville **17.820** (Fr, Eng to Eur, Africa 1900-2200) 25433 at 2100 in E.Bristol; R.New Zealand **17.675** (Eng to Pacific areas 1958-0458) 24543 at 2138 in Guildford; WYFR Okeechobee, USA **17.845** (Eng to Eur, Africa 2000-2200) 34333 at 2148 in Woodhall Spa; R.Australia via Shepparton **17.750** (Eng to Asia 0000-0500, 0600-0800, 0830-1100) 22332 at 0115 in Kilkeel.

In the **15MHz (19m)** band R.Australia's early morning broadcasts via Shepparton have been reaching the UK on three frequencies: **15.240** (Eng to Pacific 0000-0800), rated 22122 at 0655 in Liverpool; **15.415** (Eng to Asia 0100-0400, 0600-0900) 43433 at 0730 in Herstmonceux; **15.515** (Eng to SW/SC.Pacific, N.America 0200-0900) 22222 at 0711 in Nottingham.

Other occupants of this band before noon include the BBC via Masirah Is, Oman **15.310** (Eng to S.Asia 0300-0800), rated 25552 at 0531 in Wallsend; R.Kuwait **15.110** (Eng to SE.Asia 0500-0800) 54444 at 0703 in Guildford; Swiss R.Int via ? **15.545** (Fr, It, Eng, Ger to Africa 0600-0830) 55454 at 0745 in Newry; R.Ext.Espana **15.585** (Sp to S.America? 0800-?) 45544 at 0922 in Northampton; Swiss R.Int via ? **15.315** (Ger, Fr, It, Eng to Eur 1000-1230) 34333 at 1011 in Bridgwater; V of Africa via Sabrata, Libya **15.415** (Eng to M.East, Eur 1140-1145?) 44333 at 1145 in Scalloway.

During the afternoon Israel R, Jerusalem **15.650** (Eng to Eur? 1400-1420) was 44444 at 1400 in Appleby; V of Greece, Athens **15.630** (Gr, Eng to Eur, N.America 1400-1450?) 44333 at 1410 in Morden; VOA via Woofferton, UK **15.205** (Eng to Eur, N.Africa, M.East 1500-1700) 35434 at 1514 in Freshwater Bay; VOA via ? **15.255** (Eng to Eur, N.Africa 1400-1800?) 45333 at 1525 in Barton-upon-Humber; China R.Int via ? **15.300** (Eng to Eur? 1700-1800) 43434 at 1700 in Dudley; R.Japan via Moyabi, Gabon **15.355** (Eng to Africa 1700-1800) 33323 at 1711 in Woodhall Spa.

Later, VOIRI Tehran, Iran **15.084** (Home Sce relay) was 45534 at 1850 in Colyton; VOA via Philippines? **15.180** (Eng to Pacific 1900-2000) 33323 at 1925 in Stalbridge; WWCR Nashville, USA **15.685** (Eng to N.America, Eur 1100-2200?) 44444 at 1935 in Morpeth; WYFR via Okeechobee **15.695** (Eng to Eur, Africa 1600-?) 44444 at 1950 in Plymouth; V of Indonesia, Jakarta **15.150** (Eng to Eur, Africa 2000-2100) 33433 at 2005 in E.Bristol; VOA via Botswana? **15.445** (Eng to Africa 1600-1800, 1900-2200) SIO 333 at 2058 by **Francis Hearne** in N.Bristol; BBC via Ascension Is **15.400** (Eng to Africa 0800-1130, 1500-2300) SIO 333 at 2200 in Co.Fermanagh; R.Taipei Int via WYFR **15.600** (Eng to Eur 2200-2300) 55555 at 2200 in Brixham; LJB, Libya **15.415** (Ar [Home Svce relay]) 43344 at 2215 by **Norman Thompson** in Oadby.

Reception from some areas has been very good in the **13MHz (22m)** band. Mentioned in the reports were R.Austria Int via Moosbrunn **13.730** (Eng to Eur 0730-0800), rated SIO

444 at 0741 in N.Bristol; Swiss R.Int via Sottens **13.685** (Eng, It, Ger, Fr to Australasia 0830-1030) 55555 at 0835 in Newry; R.Australia via Shepparton **13.605** (Eng to Pacific 0800-1200) 22222 at 0915 in Morden; BBC via Rampisham, UK **13.745** (Russ to E.Eur 1400-2030) 33343 at 1520 in Liverpool; VOA via Selebi-Phikwe, Botswana **13.710** (Eng to Africa 1600-2130?) 23443 at 1624 in Storrington; UAER, Dubai **13.675** (Eng to Eur 1600-1640) 55544 at 1630 in Northampton; R.Austria Int via Moosbrunn **13.730** (Eng to Eur, Africa, Asia 1630-1700) 55555 at 1634 in Bridgwater; R.Vlaanderen Int, Belgium **13.670** (Eng to Eur, N.Africa, M.East 1730-1800) SIO 545 at 1700 in Co.Fermanagh.

Later, the V of Turkey, Ankara **13.695** (Eng to Eur 1830-1918) was 54334 at 1830 in Dudley; Croatian R, Zargreb **13.830** (Cr, Eng to N.America 1230-2100) 33223 at 1921 in Nottingham; DW via Sines? **13.790** (Eng to W.Africa 1900-1950) 44344 at 1935 in Freshwater Bay; R.Damascus, Syria **13.610** (Eng to Eur 2005-2105) 32222 at 2005 in Appleby; Swiss R.Int via Fr.Guiana? **13.770** (It, Ar, Eng, Ger, Fr to S.Africa 2000-2130) 33333 at 2025 in Stalbridge; R.Havana Cuba **13.750** (Eng to Eur 2030-2130?) 34333 at 2050 in Barton-upon-Humber; V of Vietnam, Hanoi **13.740** (Eng to Eur 2030-2100) 53333 at 2055 in Herstmonceux; RCI via Sackville, Canada **13.650** (Fr, Eng to Eur, Africa 1900-2200) 43433 at 2105 in E.Bristol; WEWV Vandiver, USA **13.615** (Eng to N.America 1600-0000) 32333 at 2217 in Woodhall Spa; WINB Red Lion, USA **13.790** (Eng to Eur, Africa 1700?-2300?) 23322 at 2225 in Morpeth; WWCR Nashville, USA **13.845** (Eng to



Continued on page 15.

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener	Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	C,E,H,I	1260	Brunel CG, Bristol	I	1.60	E
585	R.Solway	B	2.00	D*	1260	SabrasSnd, Leicester	I	0.29	C,H,I
603	Capital G, Litt'brne	I	0.10	B*,C,E,I	1296	Radio XL, Birmingham	I	5.00	C,E,H,I
630	R.Bedfordshire(3CR)	B	0.20	B,C,E,H,I	1305	Premier via ?	I	0.50	C,E,I
630	R.Cornwall	B	2.00	E	1305	Touch AM, Newport	I	0.20	F
657	R.Clwyd	B	2.00	C,E,F*,G,H	1323	Capital G, Southwick	I	0.50	C,E
657	R.Cornwall	B	0.50	C,E,J	1323	SomersetSnd, Bristol	B	0.63	C,D*
666	CI Gold 666, Exeter	I	0.34	C,E,I	1332	Premier, Battersea	I	1.00	C,E
666	R.York	B	0.80	C,D*	1332	CI Gold 1332, Pt'bo	I	0.60	C,H,I
729	BBC Essex	B	0.20	B,C,E,H,I	1332	Wiltshire Sound	B	0.30	C,E
738	Hereford/Worcester	B	0.037	C,H,I	1359	Breeze, Chelmsford	I	0.28	C
756	The Magic 756, Powys	I	0.63	C,E,H,I	1359	CI Gold 1359, C'try	I	0.27	C,H,I
765	BBC Essex	B	0.50	B,C,D*,E,I	1359	R.Solent	B	0.85	E
774	R.Kent	B	0.70	C,E,I	1368	R.Lincolnshire	B	2.00	I
774	R.Leeds	B	0.50	C	1368	Southern Counties R	B	0.50	B*,C,E*
774	CI Gold 774, Glos	I	0.14	C,E,H	1368	Wiltshire Sound	B	0.10	C,E
792	CI Gold 792, Bedford	I	0.27	B,C,E,H,I	1377	Asian Sd, Rochdale	I	0.10	C*
801	R.Devon & Dorset	B	2.00	C,E	1413	CI Gold 1413, Reading	I	0.14	C,E,I
828	CI Gold 828, Luton	I	0.20	B,C,H,I	1413	R.Gloucester via ?	B	?	D*,I
828	ZCR CG, Bouremouth	I	0.27	E	1413	Premier via ?	I	0.50	C,E
837	Asian Netwk Leics	B	0.45	C,D*,E,H,I	1431	Breeze, Southend	I	0.35	A*,C
855	R.Devon & Dorset	B	1.00	E,I	1431	CI Gold, Reading	I	0.14	C,E,I
855	R.Norfolk, Postwick	B	1.50	C,H	1449	R.Peterboro/Cambis	B	0.15	C,E,H,I
855	Sunshine 855, Ludlow	I	0.15	C,B,I	1458	R.Cumbria	B	0.50	D*
873	R.Norfolk, W Lynn	B	0.30	C,E,H,I	1458	R.Devon & Dorset	B	2.00	I
936	Brunel CG, W Wilts	I	0.18	C,E,I	1458	1458 Lite AM Manch'	I	5.00	G*
936	Yks Dales R, Hawes	I	1.00	C	1458	Sunrise, London	I	50.00	C,E,H,I
945	CI Gold GEM, Derby	I	0.20	C,D*,H,I	1458	Asian Netwk Langley	B	5.00	C,I
945	Capital G, Bexhill	I	0.75	C,E	1476	CountySnd, Guildford	I	0.50	B,C,E,I
954	CI Gold 954, Torquay	I	0.32	C,E,I,J	1485	CI Gold, Newbury	I	1.00	C,I
954	CI Gold 954, H'ford	I	0.16	C	1485	R.Merseyside	B	1.20	B*,E,G*
963	Asian Sd, E.Lancs	I	0.80	H	1485	Southern Counties R	B	1.00	C,E
963	Liberty R, Hackney	I	1.00	C,E,I	1503	R.Stoke-on-Trent	B	1.00	A*,C,D*,E,E*,H,I
972	Liberty R, Southall	I	1.00	C,E,H,I	1521	Breeze, Reigate	I	0.64	B,C,E
990	R.Aberdeen	B	1.00	D*	1530	R.Essex, Southend	B	0.15	B,C,E
990	R.Devon, E.Devon	B	1.00	C,E	1530	CI Gold W Yorks	I	0.74	C,G*
990	Magie AM, Doncaster	I	0.25	H	1530	CI Gold Worcester	I	0.52	C,E,I
990	CI G, Wolverhampton	I	0.09	C,I	1548	R.Bristol	B	5.00	C,E
999	C. Gold GEM, Nott'ham	I	0.25	C,I	1548	Capital G, London	I	97.50	C,E
999	Magic 9-99 Pstin	I	0.80	D*	1557	R.Lancashire	B	0.25	B*
999	R.Solent	B	1.00	C,F	1557	CI Gold 1557, N.hant	I	0.76	C,H,I
999	Valley R, Aberdare	I	0.300	C	1557	Capital G, So'ton	I	0.50	C,E
1017	CI G, Shrewsbury	I	0.70	C,H,I	1584	London Turkish R	I	0.20	C,F
1026	R.Cambridgeshire	B	0.50	C,H,I	1584	R.Nottingham	B	1.00	C
1026	Downtown R, Belfast	I	1.70	G	1584	Tay, Perth	I	0.21	C
1026	R.Jersey	B	1.00	C,E,F	1602	R.Kent	B	0.25	C,D*,E
1035	RTL County 1035	I	1.00	C,E,I					
1035	N.Sound 2, Aberdeen	I	0.78	C*					
1116	R.Derby	B	1.20	B*,C,D*,H,I					
1116	R.Guernsey	B	0.50	C,E,F					
1116	Valley R, Ebbw Vale	I	0.50	C,D*					
1152	CI G Amber, Norwich	I	0.83	H					
1152	LBC 1152 AM	I	23.50	C,E,I					
1152	PlymSnd AM, Plymouth	I	0.32	J					
1152	CI G, Birmingham	I	3.00	C,H,I					
1161	R.Bedfordshire(3CR)	B	0.10	B,C,H,I					
1161	Brunel CI G, Swindon	I	0.16	C,D*,F					
1161	Southern Counties R	B	1.00	C,E					
1161	Tay AM, Dundee	I	1.40	C*					
1170	CI G Amber, Ipswich	I	0.28	H					
1170	Capital G, Portsmouth	I	0.50	C,E					
1170	1170AM, High Wycombe	I	0.25	C,I					
1242	Capital G, Maidstone	I	0.32	B*,C,E,H					
1251	C.G Amber, Bury StEd	I	0.76	C					

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

Listeners:-

- (A) Simon Hockenhill, E.Bristol.
- (B) Sheila Hughes, Morden.
- (C) Brian Keyte, Gt Bookham.
- (D) Eddie McKeown, Newry.
- (E) George Millmore, Wootton, IoW.
- (F) Richard Reynolds, Guildford.
- (G) Tom Smyth, Co.Fermanagh.
- (H) Norman Thompson, Dady.
- (I) Fred Wilmshurst, Northampton.
- (J) Tom Winzor, Plymouth.

£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.)

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- * Rotation Torque-222Kg
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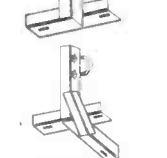
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Freq. Range 25-2.1 GHZ
Length 225 mm

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TURNSTILE 137

Freq. 137.5 MHz
Length 1000mm

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

Complete with mounting hardware.

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



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(Stainless Steel)
Freq. Range Receive 117-140MHz
Transmit 117-140MHz
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Connector-N TYPE

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

MWA-H.F. WIRE ANTENNA

Freq. Range 1.1-30MHz Length 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.)

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.)

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.)

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.)

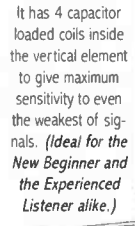
£34.95

High Performance Super Magnetic Mount Antenna comes with Two Interchangeable Whips. 73mm 700-2.1 GHZ 225mm 23-1300 MHz Complete with high specification coax and BNC plug. (The Ultimate small Magmount Antenna.)

£29.95

SUPER SCAN STICK

Freq. Range 0-2000MHz
Length 1000mm
It will receive all frequencies at all levels unlike a mono band antenna. It has 4 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals. (Ideal for the New Beginner and the Experienced Listener alike.)



£49.95

£39.95

SUPER SCAN STICK II

Freq. Range 0-2000 MHz.
Length 1500mm.
This is designed for external use. It will receive all frequencies. at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. (For the expert who wants that extra sensitivity)

£39.95

MULTISCAN STICK

Freq. Range Receive - 0-2000 MHz.
Transmit 144 - 146 MHz gain 2.5 Dbd
430 - 440 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 200

Freq. Range Receive - 0-2000 MHz.
Transmit 50 - 52 MHz gain 2.00Dbd
144 - 146 MHz gain 4.00 Dbh
430 - 440 MHz gain 6.00 Dbd
Length 2.5 m.
For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. (THE BEST)

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)

£29.95



£29.95

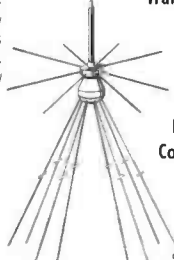
HF DISCONE

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

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

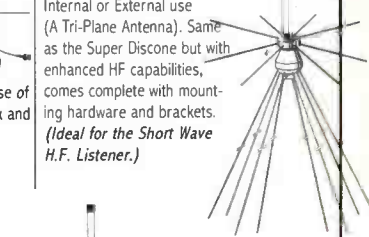


Highly sensitive, with an amazing range of transmitting frequencies, comes complete with mounting hardware & brackets (The Best There is).

£49.95

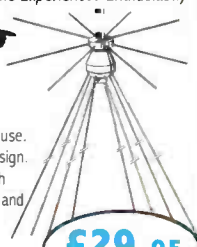
SUPER DISCONE

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



Africa 1400-0100) 43443 at 0010 in Kilkeel.

Noted in the **11MHz (25m)** band before noon were HCJB Quito, Ecuador **11.730** (Eng to Eur 0700-0900) rated 55544 at 0715 in Herstonceux; V of Mediterranean, Malta via Russia? **11.770** (Eng) 34333 at 0800 in Newry; FEBC Bocaue, Philippines **11.635** (Eng to Asia 0930-1100) 25333 at 0935 in Northampton; R.Korea via Sackville, Canada **11.715** (Eng to E.USA 1030-1100) 43222 at 1030 in Appleby; BBC via Skelton & Woofferton, UK **12.095** (Eng to Eur, N/W.Africa 0600-2000) 44444 at 1030 in Morden.

During the afternoon R.Jordan via Al Karanah **11.690** (Eng to W.Eur, E.USA 1100-1730) was 54444 at 1439 in Plymouth; R.Australia via Shepparton **11.660** (Various to Asia 1430-1700) 33333 at 1500 in Stalbridge; R.Kuwait via Kabd **11.990** (Ar 1615-1800, Eng 1800-2100 to Eur, N.America) 55455 at 1625 & 54454 at 1805 in Liverpool; V of Vietnam, Hanoi **12.070** (Eng to Eur 1700-1730) 44434 at 1706 in Woodhall Spa; AIR via Bangalore **11.620** (Eng, Hin to Eur 1745-2230) 45544 at 1745 in Brixham.

Later, R.Nederlands via Flevo **11.655** (Eng to Africa 1730-2025) was 43443 at 1804 in Bridgwater; Israel R, Jerusalem **11.585** (Heb [Home Svce relay] to Eur, N.America) 44333 at 1835 in Colyton; V of Mediterranean, Malta via Russia **12.060** (Eng to Eur 1900-2000) 32233 at 1910 in Nottingham; Vatican R, Italy **11.625** (Eng to Africa 2000-2030) 45444 at 2006 in

Freshwater Bay; R.Bulgaria, Sofia **11.720** (Eng to Eur 2100-2200) SIO 333 at 2129 in N.Bristol; R.Australia via Shepparton **11.880** (Eng to Pacific areas, N.America 1700-2200) 23433 at 2144 in E.Bristol; BBC via Masirah, Oman **11.955** (Eng to Asia 0000-0300) 43433 at 0115 in Kilkeel.

Some of the broadcasts in the **9MHz (31m)** band travel long distances to reach our shores. R.New Zealand's 100kW transmission from Rangitiki, N.Island on **9.700** (Eng to Pacific areas 0706-1015) rated 45343 at 0745 in Brixham. Later, R.Australia's broadcast to Asia via Shepparton on **9.500** (Eng 1430-2130) was 23222 at 1620 in Truro, 33333 at 2001 in Northampton & 33443 at 2040 in Storrington.

Also mentioned in the reports were R.Havana, Cuba **9.820** (Eng to N.America 0100?-0700), rated 32222 at 0630 in Appleby; TWR Monte Carlo, Monaco **9.870** (Eng to Eur 0700?-0850?) 55555 at 0716 in Plymouth; Christian Science BC via WSHB Cypress Creek, USA **9.860** (?), Eng to Eur? 0800-1000) 44434 at 0825 in Stalbridge; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 44444 at 0930 in Newry; R.Nederlands via Wertachtal **9.860** (Eng to Eur 1030-1225) 55555 at 1205 in Herstonceux; V of Russia **9.775** (Eng to Eur, Africa 1700-2100) 53543 at 1730 in Bridgwater; R.Vlaanderen Int, Belgium **9.925** (Eng to Eur, M.East 1730-1800) SIO 424 at 1730 in Co.Fermanagh.

Later, R.Pyongyang, Korea **9.335** (Eng to Eur 1800-1900) was noted as 44444 at 1830 in Scalloway; VOA via Morocco? **9.760**



Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener	Freq (kHz)	Station	Country	Power (kW)	Listener	Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Wurzburg(BR)	Germany	0.2	F*	837	CDPE via ?	Spain	?	F* G*	1242	Marseille	France	150	C* D*
531	Ain Beida	Algeria	600/300	G*	846	Rome	Italy	1200	C* F* G*	1242	Virgin via ?	UK	?	F*
531	Berg	Germany	20	F* G*	855	RNE1 via ?	Spain	?	C* F* G* J* K*	1251	Marcali	Hungary	500	F*
531	RNE5 via ?	Spain	?	G*	864	Paris	France	300	C* G, K	1251	Huisberg	Netherlands	10	F* G*
531	Beromunster	Switzerland	500	G	864	St.Petersburg(TWR)	Russia	?	F*	1251	Dubai	UAE	600	G*
540	Wavre	Belgium	150/50	F* G, K	864	Socuellamos(RNE1)	Spain	2	G*	1260	SER via ?	Spain	?	F* G*
540	Sidi Bennour	Morocco	600	C* F* G*	873	Frankfurt(AFN)	Germany	150	E, F, G*	1269	Neumunster(DLF)	Germany	600	F* G* K*
549	Les Trembles	Algeria	600	C* D*, F*, G*	873	Zaragoza(SER)	Spain	20	G*	1278	Dublin(Cork(RTE2))	Eire	10	E, F*, G*, I, K*
549	Thurnau (DLF)	Germany	200	F*, G*, K*	873	Enniskillen(R.U.I)	UK	1	E, F*, J*	1287	RFE via ?	Czech Rep.	400	F*, G*
558	RNE5 via ?	Spain	?	F* G*	882	CDPE via ?	Spain	?	F* G*	1287	Lerida(SER)	Spain	10	F*
567	Tullamore(RTE1)	Eire	500	B* C* D, E, G, I, K, L	882	Washford(BBCWales)	UK	100	E, G, I, K	1296	Valencia(CDPE)	Spain	10	G*
576	Muhlacker(SDR)	Germany	500	F*	891	Algiers	Algeria	600/300	F* G*	1305	RNE5 via ?	Spain	?	F*
576	Riga	Latvia	500	G*	891	Huisberg	Netherlands	20	G*	1314	Kvitsoy	Norway	1200	C* F*, G*, K*
576	Barcelona(RNE5)	Spain	50	G*	900	Brno(CRo2)	Czech Rep	25	F* G*	1323	W'brunn (V.Russia)	Germany	1000/150	F*
585	Paris(FIP)	France	8	D, G	900	Milan	Italy	600	C, F*, J*	1332	Rome	Italy	300	F* G*
585	Madrid(RNE1)	Spain	200	F* G* K*	900	CDPE via ?	Spain	?	G*	1341	Lisnagarvey(BBC)	N.Ireland	100	D* E* G*, I, K*
585	Dumfries(BBCScot)	UK	2	F*	909	B'mans Pt(BBC5)	UK	140	G, J*, K	1341	Tarasal(SER)	Spain	2	D* G*
594	Frankfurt(HR)	Germany	1000/400	F* G* K*	918	Domzale	Slovenia	600/100	D* F*, G*	1350	Cesvaine/Kuldiga	Latvia	50	G*
594	Oujda-1	Morocco	100	G*	918	Madrid(R Int)	Spain	20	D* G*	1359	Madrid(RNE-FS)	Spain	600	F* G*
603	Newcastle(BBC)	UK	2	C* E, F*	927	Wolvertem	Belgium	300	F*, G*, J*, K	1368	Foxdale(Manx R)	I.D.M.	20	D* E*, G*, H, J
612	Athlone(RTE2)	Eire	100	E, G, I, K	936	Bremen	Germany	100	F* G*	1377	Lille	France	300	F*, G*, K
612	Sebba Aioun	Morocco	300	G*	936	Venezia	Italy	20	G*	1386	Nairobi	Kenya	100	F*
621	Wavre	Belgium	80	F*, G, J, K	945	Toulouse	France	300	F*	1386	Boleshakovo	Russia	2500	C, F*, G*
621	Barcelona(DCR)	Spain	50	F*	954	Brno (Cro2)	Czech Rep.	200	F* G*	1395	TWR via Filake	Albania	500	F*
630	Vigra	Norway	100	F* G*	954	Madrid(CI)	Spain	20	F* G*	1395	Lopic	Netherlands	120/40	F*, G, K
630	Tunis-Djedida	Tunisia	600	G*	963	Pori	Finland	600	F*, G*, K*	1404	Brest	France	20	F*, G*, K*
639	Praha(Libice)	Czech	1500	F* G*	963	Hir Chonail	Eire	10	G*	1413	RNE5 via ?	Spain	?	F*
639	RNE1 via ?	Spain	?	C* D*, F*, G*, J	972	Tambourg(NDR)	Germany	300	F*, G*, K*	1422	Heusweiler(DLF)	Germany	1200/600	F*, G*, K*
648	Dordrecht(BBC)	UK	500	D, E, F*, G, J, K	981	Alger	Algeria	600/300	C* G*, K*	1440	Kyzylorda	Kazakhstan	?	G
657	Madrid(RNE5)	Spain	20	F* G*	981	Berlin	Germany	300	F* G*	1440	Marnach(RTL)	Luxembourg	1200	F*
657	Wrexham(BBCWales)	UK	2	C, E, F*, I, J*, K	990	R.Bilbao(SER)	Spain	10	G*	1440	Dammam	Saudi Arabia	1600	F*
666	Messkirch(Rohrd(SWF)	Germany	150	F*	990	Redmoss(BBC)	UK	1	F*	1449	Redmoss(BBC)	UK	2	C* G*
666	Sitkunai(R.Vilnius)	Lithuania	500	F*	990	Tywyn(BBC)	UK	1	E, I*	1467	Monte Carlo(TWR)	Monaco	1000/400	F*, G*, K*
666	Lisboa	Portugal	135	G*	990	Schwerin(RIAS)	Germany	20	F*	1467	Volvoograd	Russia	25	F*
675	Lopic(R10 Gold)	Holland	120	F*, G, J*	999	Madrid(CDPE)	Spain	50	F*, K*	1476	Wien-Bismberg	Austria	600	F*, K*
684	Sebba(RNE1)	Spain	500	C* G*, K*	1008	SER via ?	Canaries/Spain	?	F*	1485	SER via ?	Spain	?	D*
684	Avala(Beograd-1)	Yugoslavia	2000	F*	1008	Flevo(Hilv-5)	Holland	400	F*, G*, J*, K*	1494	Clermont-Ferrand	France	20	F*
693	Tortosa(RNE1)	Spain	2	F*	1017	Rheinsender(SWF)	Germany	600	F* G*	1494	St.Petersburg	Russia	1200	F* G*
693	Droitwich(BBC)	UK	150	G, J*, K	1017	RNE5 via ?	Spain	?	F*	1512	Wolvertem	Belgium	300	A, C, G, H, K*
693	Enniskillen(BBC)	UK	1	I	1035	Lisbon(Prog3)	Portugal	120	F*	1512	Jeddah	Saudi Arabia	1000	F*
702	TWR via Monte Carlo	Monaco	300	F* G*	1044	Dresden(MDR)	Germany	20	F* G*	1521	Kosice(Cizatice)	Slovakia	600	F*, G*
711	Rennes 1	France	300	F*, G, J*, K	1044	Sebba-Aioun	Morocco	300	G*	1530	Vatican R	Italy	150/450	E, F*, G*, K*
711	Laayoune	Morocco	600	G*	1044	SER via ?	Spain	?	G*	1539	Mainflingen(ERF)	Germany	350(700)	F*, G*, K*
720	Lisnagarvey(BBC4)	N.Ireland	10	G*, J*	1053	Talk R.UK via ?	UK	?	G, J*, K, L	1548	?(VDA)	Kuwait	600	F*
720	Norte	Portugal	100	F*	1062	Kalundberg	Denmark	250	F*, G*, K*	1575	Genova	Italy	50	F* G* K*
720	Lots Rd.Ldn(BBC4)	UK	0.5	E, G, I, K	1062	R.Uno via ?	Italy	?	F* G*	1575	SER via ?	Spain	5	G*
729	Cork(RTE1)	Eire	?	E, F*, G, I	1071	R.France via ?	France	?	F* G*	1593	Holzkirchen(VOA)	Germany	150	F*, G*, K*
729	RNE1 via ?	Spain	?	F*, G*, K*	1071	Talk Radio UK via ?	UK	?	K	1602	SER via ?	Spain	?	G*
738	Paris	France	4	G	1080	Talk Radio UK via ?	UK	?	F* G*	1602	Vitoria(EI)	Spain	10	F*, G*, K*
738	Barcelona(RNE1)	Spain	500	C* F*, G*	1080	SER via ?	Spain	?	F* G*	1611	Vatican R	Italy	15	E
747	Flevo(Hilv2)	Holland	400	F*, G, J*, K	1089	Talk Radio UK via ?	UK	?	G, I, K					
756	Braunschweig(DLF)	Germany	800/200	F*, G*, J*	1098	Nitr(Jarok)	Slovakia	1500	F*, G*, K*					
756	Bilbao(EI)	Spain	5	G*	1107	AFN via ?	Germany	10	F*					
756	Redruth(BBC)	UK	2	E	1107	Talk R.UK via ?	UK	?	G, I, K					
765	Sottens	Switzerland	500	F* G*	1125	La Louviere	Belgium	20	F*, G*, K*					
774	Enniskillen(BBC)	N.Ireland	1	F*, I	1125	Llandrindod Wells	UK	1	E					
774	RNE1 via ?	Spain	?	F*, G*, K*	1134	CDPE via ?	Spain	2	G*					
783	Leipzig(MDR)	Germany	100	F*, G*	1134	Zadar(Croatian R)	Yugoslavia	600/1200	C*, F*, G*, J*, K*					
792	Limoges	France	300	G, J*	1143	AFN via ?	Germany	1	F*, G*					
792	Sevilla(SER)	Spain	20	F*, G*	1143	CDPE via ?	Spain	2	F*, G*					
792	Londonderry(BBC)	UK	1	I	1161	Ain-Salah	Algeria	5	G*					
801	Munchen-Ismaning	Germany	300	F*, G*, J*	1179	Solvsborg	Sweden	600	C*, F*, G*, J*, K*					
801	RNE1 via ?	Spain	?	G*	1188	Kuurne	Belgium	5	F*, G*					
810	Volgograd	Russia	150	G*	1188	Reichenbach(MDR)	Germany	5	F*					
810	Madrid(SER)	Spain	20	F*, G*	1188	Szolnok	Hungary	135	G*					
810	Westerglen(BBCScot)	UK	100	E, G*, J*, K*	1197	Munich(VDA)	Germany	300	F*					
819	Batra	Egypt	450	G*	1197	Virgin via ?	UK	?	G, I*, J*, K					
819	Toulouse	France	50	F*, G*	1215	Virgin via ?	UK	?	G, I, K					
819	S.Sebastian(EI)	Spain	5	F*, G*	1224	Lelystad	Holland	50	F*					
828	Rotterdam	Holland	20	F*, G*	1233	Liege	Belgium	5	F*, G*					
837	Nancy	France	200	F*, G*, J*	1233	Virgin via ?	UK	?	F*, 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) Francis Heame, N.Bristol.
- (C) Simon Hockenhill, E.Bristol.
- (D) Sheila Hughes, Morden.
- (E) Brian Keyte, Gt.Bookham.
- (F) Eddie McKeown, Newry.
- (G) George Millmore, Wootton loW.
- (H) Clare Pinder, while in Appleby.
- (I) Tom Smyth, Co.Fermanagh.
- (J) Norman Thompson, Dabby.
- (K) Fred Wilmsworth, Northampton.
- (L) Tom Winzor, Plymouth.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
3.210	REF via Costa Rica	Costa Rica	0340	C
3.240	TWR Shona	Swaziland	0344	G
3.255	BBC via Meyerton	S.Africa	2109	B,G,H,J,K,M,P
3.270	Namibian BC,Windhoek	Namibia	1849	G,H,M
3.290	Namibian BC,Windhoek	Namibia	1854	H
3.300	R.Cultural	Guatemala	0119	G
3.306	ZBC Prog 2	Zimbabwe	1850	B,H
3.315	AIR Bhopal	India	0035	B
3.320	SABC (RSC) Meyerton	S.Africa	2142	B,C,G,H,M
3.335	CBS Taipei	Taiwan	2002	H
3.340	R.Uganda, Kampala	Uganda	0510	B
3.356	R.Botswana	Gaborone	2033	G,H,M
3.365	GBC R-2	Ghana	2100	B,H,J,K
3.365	AIR Delhi	India	1840	H
3.915	BBC via Kranji	Singapore	2120	B,D,G,J,K,N,P
3.955	BBC via Skelton	England	2030	A,B,D,F,G,K,N,P,Q
3.955	R.Taipei via Skelton	UK	1800	A,G
3.970	R.Korea via Skelton	England	2100	B,G,I,L,N,O,P
3.975	R.Budapest	Hungary	2130	D,G,I,J,N,P
3.985	Nexus, Milan	Italy	2100	B,G,I,P
3.995	DW via Julich	Germany	2130	B,F,G,P
4.755	R.Educ.CP Grande	Brazil	0025	B
4.765	R.Rural, Santarem	Brazil	0034	G
4.770	FRCN Kaduna	Nigeria	2012	B,C,E,F,G,H,I,J,K,M,P
4.775	TWR Manzini	Swaziland	0342	G
4.783	RTM Bamako	Mali	2045	B,G,J,K
4.790	Azad Kashmir R.	Pakistan	0030	B,G
4.800	LNBS Maseru	Lesotho	2140	B,G,K
4.815	R.diff TV Burkina	Ouagadougou	1918	B,H
4.820	R.Botswana, Gaborone	Botswana	2100	B,C,G,H,K,M
4.820	La Voz Evangelica	Honduras	0520	K
4.828	ZBC R-4	Zimbabwe	2015	H,K
4.830	R.Tachira	Venezuela	0200	A,B,G
4.835	ABC-Alice Springs	Australia	2130	L
4.835	R.Tezulutlan, Coban	Guatemala	0030	B
4.835	RTM Bamako	Mali	2129	B,F,G,H,K,M,P
4.840	AIR Bombay	India	0035	B,G
4.840	R.Valera, Trujillo	Venezuela	0120	A
4.845	ORTM Nouakchott	Mauritania	2032	H,K,M,P
4.850	R.Yaounde	Cameroon	2006	G,H,K,M,P
4.860	AIR Delhi	India	1910	F,G,H,M
4.885	R.Clube do Para	Brazil	0413	G
4.885	R.Difusora Acreana	Brazil	0045	B
4.885	KBC East Sca Nairobi	Kenya	1906	B,H,K,M
4.890	RFI Paris	via Gabon	0357	C,G,M
4.890	R.Port Moresby	New Guinea	2007	H
4.910	Tennant Creek	Australia	2135	K,L
4.915	R.Anhanguera	Brazil	0037	M
4.915	GBC-1, Accra	Ghana	2015	B,F,H,K,L,M,P
4.915	KBC Cent Sca Nairobi	Kenya	1824	H

Freq (MHz)	Station	Country	UTC	DXer
4.915	R.Cora de Peru, Lima	Peru	0440	C
4.920	R.Quito, Quito	Ecuador	0450	C,F,K,M
4.930	R.internacional	Honduras	0405	C
4.950	AIR Srinagar	India	0041	B,G,M
4.950	VOA via Sao Tome	Sao Tome	2013	E,F,G,H,I,M,P
4.955	R.Nac. de Colombia	Colombia	0340	B,C,G
4.960	VOA via Sao Tome	Sao Tome	0300	B,G
4.965	Christian Voice	Zambia	2136	B,F,H,K,M
4.975	R.Pacifico, Lima	Peru	0525	K
4.975	R.Uganda, Kampala	Uganda	2015	B,G,H,K,M,P
4.980	Ecoss del Torbes	Venezuela	0035	A,B,G,M,P
4.985	R.Brazil Central	Brazil	0032	M
5.005	R.Nacional, Bata	Eg Guinea	1900	H
5.009	R.TV Malagasy	Madagascar	1812	H,M
5.010	R.Garoua	Cameroon	2127	K
5.010	AIR Thiru puram	India	0030	B,G,M
5.020	La V du Sahel, Niamey	Niger	2020	B,H,K,M
5.025	ABC Katherine	Australia	2140	L
5.025	R.Parakou	Benin	2104	B,K
5.025	R.Rebelde, Habana	Cuba	0337	B,C,G,K,M
5.025	R.Uganda, Kampala	Uganda	1855	H,K,M
5.030	AWR Latin America	Costa Rica	0055	B
5.035	R.Bangui	C. Africa	2150	B
5.047	R.Togo, Lome	Togo	2134	B,H,K,M,P
5.050	Haixia 1, V of Strait	China	2122	K
5.050	R.Tanzania	Tanzania	2017	G,H,M
5.055	RFO Cayenne(Matoury)	French Guiana	0417	B,G,M
5.075	Caracol Bogota	Colombia	0410	B,C,F,G,K
5.100	R.Liberia, Totota	Liberia	2132	H,K,M,P

DXers:-

- (A) Robert Beason, Nottingham.
- (B) Robert Connolly, Killeel.
- (C) David Hall, Morpheth.
- (D) Simon Hockenfull, E.Bristol.
- (E) Robert Hughes, Liverpool.
- (F) Shelia Hughes, Morden.
- (G) Eddie McKeown, Newry.
- (H) Fred Pallant, Storrington.
- (I) Clare Pinder, while in Appleby.
- (J) Vic Prier, Colyton.
- (K) Richard Reynolds, Guildford.
- (L) Harry Richards, Barton-on-Humber.
- (M) John Slater, Scalloway.
- (N) Tom Smyth, Co.Fermanagh.
- (O) Norman Thompson, Dadby.
- (P) Fred Wilmshurst, Northampton.
- (Q) Tom Winzor, Plymouth.



(Eng to Eur, M.East, N.Africa 1700-2200?) 34333 at 1900 in Liverpool; VOIRI Tehran, Iran **9.022** (Ger, Fr, Eng to Eur 1730-2030) 54423 at 1915 in Colyton; R.Nederlands via Flevo **9.895** (Eng to Africa 1830-2025) 44333 at 1932 in Freshwater Bay; China R.Int via ? **9.535** (Eng to Eur 2000-2200?) 43333 at 2000 in Morden; Polish R, Warsaw **9.525** (Eng to Eur 1930-2030) 33323 at 2009 in E.Bristol; AIR via Bangalore **9.950** (Eng to Eur 2045-2230) 44333 at 2100 in Oadby; R.Bulgaria **9.400** (Fr, Eng to Eur 2000-2200) 55544 at 2115 in Northampton; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) SIO 333 at 2156 in N.Bristol; R.Sweden **9.430** (Eng to Eur, Africa, M.East 2130-2200) 44434 at 2156 in Woodhall Spa; R.Budapest, Hungary **9.560** (Eng to N.America 0100-0130) 54444 at 0115 in Killeel; R.Nac del Paraguay **9.735** (Sp 0800-0400) 25552 at 0239 in Wallsend; VOA via ? **9.575** (Eng to Africa 0330-0500) 35333 at 0335 in Barton-upon-Humber.

Quite a few of the broadcasts in the **7MHz (41m)** band are intended for listeners in Europe. Those noted came from R.Japan via Woofferton, UK **7.230** (Jap, Eng 0500-0700), rated 44444 at 0545 in Killeel & 43433 at 0645 in Herstmonceux; WYFR via Okeechobee, USA **7.355** (Eng 0600-0800, also to Africa) 54444 at 0623 in Plymouth; Sudwestfunk via Rohrdorf **7.265** (Ger 24hrs) 33323 at 0850 in Stalbridge; R.Slovakia Int **7.345** (Eng 1630-1657) 45434 at 1644 in Freshwater Bay; R.Ext.Espana **7.275** (Sp 1700-2230?) 55555 at 1700 in Brixham; Polish R, Warsaw **7.285** (Eng 1700-1800) 54554 at 1750 in Bridgwater; R.Thailand, Udon Thani **7.195** (Eng 1900-2000) 55444 at 1900 in Appleby; Polish R, Warsaw **7.285** (Eng 1930-2030) 22222 at 1950 in Nottingham; AIR via Bangalore **7.410** (Hi, Eng 1745-2230) 44333 at 2045 in Morden; RCI via Skelton, UK **7.235** (Fr, Eng 1900-2200) 45433 at 2110 in Northampton.

Some intended for other areas originate from R.Nederlands via Madagascar **7.120** (Eng to S/E.W.Africa 1730-2025), rated 32333 at 1800 in Colyton; VOA via Botswana **7.415** (Eng to Africa 1800-2230?) 53343 at 2110 in Liverpool; BBC via Kranji, Singapore **7.110** (Eng to Asia 2200-0045) SIO

555 at 2300 in Co.Fermanagh; WRNO Marrero, USA **7.355/7.415?** (Eng to N.America 2300-0400) 44322 at 0000 in Barton-upon-Humber; V of Nigeria, Ikorodu **7.255** (Eng to W.Africa) 43343 at 0605 in Newry; WJCR Upton, USA **7.490** (Eng to E.USA 24hrs) 34333 at 0730 in Scalloway; WRNO Marrero, USA **7.365** (Eng to N.America 0400-0900) 34333 at 0826 in Woodhall Spa.

The **6MHz (49m)** band carries many broadcasts for listeners in Europe. Those noted in the reports came from R.Japan via Skelton, UK **5.975** (Eng 0600-0700), rated 55555 at 0640 in Herstmonceux; TWR Monte Carlo, Monaco **6.045** (Eng 0700-0820) 44444 at 0710 in Liverpool; DW via Julich? **6.140** (Eng Service) SIO 222 at 0800 in Co.Fermanagh; R.Austria Int via Moosbrunn **6.155** (Various) 45533 at 1000 in E.Bristol; R.Nederlands via Julich **6.045** (Eng 1030-1225) 44444 at 1030 in Dudley; R.Vlaanderen Int, Brussels **5.985** (Du, Eng 1100-1156) 45554 at 1100 in Brixham; DW via Julich? **6.075** (Ger 1400-1600, 1800-2100?) 25333 at 1400 in Barton-upon-Humber; R.Prague, Czech Rep. **5.930** (Eng 1700-1727) 44444 at 1700 in Plymouth; R.Vlaanderen Int, Brussels **5.910** (Eng 1730-1756) 44444 at 1730 in Morden; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 34433 at 1830 in Colyton; RAI Rome **5.970** (Eng 1935-1955) 55444 at 1935 in Appleby; R.Sweden via Horby **6.065** (Eng 1930-2000) 55444 at 1952 in Freshwater Bay; Vatican R, Italy **5.883** (Various [Eng 1950-2010]) 44433 at 1955 in Scalloway; China R.Int via Russia? **6.950** (Ger, Eng 1900-2157) 44434 at 2005 in Nottingham; R.Budapest **6.025** (Eng 2100-2130) 53553 at 2109 in Bridgwater; RCI via Rampisham, UK **5.995** (Fr, Eng 1900-2100) 54445 at 2015 in Stalbridge; R.Sweden via Horby **6.065** (Eng 2130-2200) 54444 at 2145 in Northampton; R.Ukraine Int, Kiev **5.905/6.020?** (Eng 2100-2200) 34333 at 2152 in Woodhall Spa.

Also mentioned in the reports were ORTM Bamako, Mali **5.995** (Fr 0555-0748, 1757-0000) rated 54434 at 2150 in Guildford and the BBC via Antigua, W.Indies **5.975** (Eng to C/N.America 2100-0800) 43443 at 0050 in Killeel.

■ Gerry L. Dexter, c/o SWM EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW. E-MAIL: gdexter@pwpublishing.ltd.uk

Bandscan America

Here comes another new short wave broadcaster in the United States. As this is being written, WTJC has begun test broadcasts from Newport, North Carolina. The station is part of the Fundamental Broadcasting Network, which, in turn, is a mission of the Grace Missionary Baptist Church in the above mentioned city.

The programs will be a relay of the church's domestic broadcasts and reportedly will not sell time to other religious broadcasters. The station began tests in late August on 9.725, but will eventually settle on another, yet to be announced, frequency. The station operates a 50kW transmitter.

You can still tune in local stations in Argentina via the single sideband relays that are on the air periodically and with no discernible pattern. Feeling FM 108, Radio Rivadavia, Radio Mitre, Radio Continental and La Red appear on occasion on such frequencies as 5.400, 15.820, all lower sideband.

There is more to the recent opening of a China Radio International relay station in Cuba than meets the ear. Two Chinese monitoring stations were also installed in Cuba for the purpose of listening in on US military satellites (from a site in Santiago province) and US telephone calls (from a site in La Habana province). As far as we can tell, the US media, which has spent so much time and space covering China these past few months, has ignored or just plain missed this story.

Brazilian stations reported recently include the following: (frequencies may be slightly variable).

MHz	Station
2.380	Radio Educadora, Limeira
2.460	Radio Alvorada, Rio Branco
2.490	Radio 8 de Setembro, Descalvado
3.245	Radio Clube, Varginha
3.365	Radio Cultura, Araraquara
4.765	Radio Rural, Santarém
4.765	Radio Integração
4.775	Radio Liberal, Belém
4.785	Radio Caiari, Porto Velho
4.795	Radio Difusora Aquidauana
4.805	Radio Amazonas, Manaus
4.825	Radio Educadora, Bragança
4.825	Radio Cancao Nova, Cachoeira Paulista
4.845	Radio IPB AM, Campo Grande
4.865	Radio Verdes Florestas, Cruzeiro del Sul
4.875	Radio Roraima, Boa Vista
4.885	Radio Difusora Acreana
4.895	Radio Bare, Manaus
4.895	Radio IPB, Campo Grande
4.935	Radio Voz do Coracao Imaculado, Anapolis
4.935	Radio Capixaba, Vitoria
4.956	Radio Cultura, Campos
4.985	Radio Brazil Central, Goiania
5.015	Radio Cultura, Cuaiba
5.035	Radio Aparecida, Aparecida
5.955	Radio Gazeta, Sao Paulo
5.970	Radio Itatiaia, Belo Horizonte
5.980	Radio Guaraju, Florianopolis
6.010	Radio Inconfidencia, Belo Horizonte
6.040	Radio Clube Paranaense, Curitiba
6.050	Radio Guarani, Belo Horizonte
6.060	Radio Universo/Radio Tupi, Curitiba
6.080	CBN Anhanhuera, Goiania
6.105	Radio Cultura Filadelfia
6.135	Radio Aparecida, Aparecida
6.150	Radio Record, Sao Paulo
6.170	Radio Cultura, Sao Paulo
6.175	Radio Nacional da Amazonia, Rio
9.505	Radio Record, Sao Paulo
9.530	Radio Nova Visao, Santa Maria
9.596	Radio Universo/Radio Tupi, Curitiba
9.645	Radio Bandeirantes, Sao Paulo
11.705	Radio Nova Visao, Santa Maria
11.805	Radio Globo, Rio
11.815	Radio Brazil Central, Goiania
11.830	Radio Anhanguera, Goiania
11.895	Sistema LBV, Porto Alegre

Incidentally, the North American and European services of the Brazilian government station, Radiobras, have been silent for much of the summer - and still are at the time of writing. Apparently, the problem is politics, and at this point, it isn't at all certain whether the service will return.

Station News

New stations in the North American Expanded a.m. band (1610 - 1700kHz) include KAXY on 1660 in Waco, Texas, which will be in

operation by the time you read this. Their call letters on their 'standard' 1580 frequency are KRZL.

The frequency 9.620, long occupied by SODRE in Uruguay when they were long absent from short wave, has returned to the air, most of the time relaying its sister medium wave outlet, CX26, on 1050kHz or CX6 on 650. There is some possibility the station may eventually change frequency to provide better reception of its 500W signal. However, 9.620 has always been difficult for North American listeners.

Meantime, Radio Montecarlo/Radio Oriental has been reactivated on their regular 6.140, 9.595 and 11.735 frequencies. The latter is the more often heard in North America, usually in the early evenings.

The US Armed Forces Radio TV Service continues to be relayed on short wave. The relays, never intended to be permanent, have already continued for much longer than many s.w.l.s had expected. You can still hear the broadcasts on 4.2785 and 12.6895, transmitted from the Key West, Florida area, and 6.4585 coming from Puerto Rico. All broadcasts are in sideband.

Radio Miami International (WRMI) has begun using 7.465 for part of its evening broadcast. 9.955 continues to suffer jamming from Cuba, due to carrying broadcasts by anti-Castro groups but, initially at least, 7.465 has escaped the notice of Havana's harangues.

The Voice of America has discontinued the use of its short wave transmitters in Poro, the Philippines. That leaves Tinang as the only VoA relay in that country. (Poro's high power medium wave transmitter remains in service). Some of the transmissions formerly handled by the Poro site are now carried by the new facility at Tinian in the Northern Mariana Islands.

One of the newer stations in Honduras is HRMI - Voz de Misiones Internacionales, operating on 5.890 (and medium wave 1490kHz). The short wave runs until about 0435 sign off, although the schedule shows operation from 1200 to 0600. The Spanish language religious broadcaster is located in the town of Comayaguela. Reception reports should be sent to: **Apartado Postal 20583.**

Other Honduran stations currently being heard include La Voz Evangelica on 4.820 in Tegucigalpa, easily heard most evenings. Quite a bit harder is Radio Litoral, 4.830. This station carries programming in both Spanish and Miskito, and is located in La Ceiba. Another one is Radio Costenya, San Pedro Sula, 4.930 (formerly Radio Internacional).

A new one in Peru is Radio Coremarca on 5.6455, operating from Bambamarca. Sometime in the year 2000, KNLS in Alaska will add a second 100kW transmitter with associated antennas to its facility. Even with that addition, there will still be room to add a third transmitter at some point in the future.

Radio Kiribati has gotten its short wave facility going again, using 9.810 for broadcasts to residents of Christmas Island. The 1kW transmitter is on the air from 0530 to 0930.

Chile's Radio Voz Cristiana is scheduled from 0000 to 0100 on 6.070, 11.745, 15.375 and 21.550; 0100 to 1100 on 6.070, 11.690, 11.745, 15.375; 1100-1200 on 6.070, 11.690, 15.375 and 21.500; 1200-1300 on 9.635, 11.690, 15.375, 21.500; 1300-1400 on 9.635, 15.375, 21.500 and 21.550, 1400-2000 on 9.635, 17.680, 21.500, 21.550; 2000-2100 on 6.070, 17.680, 21.500 and 21.550 and 2100-0000 on 6.0870, 11.745, 17.680 and 21.550.

Here (on the right) are some Bolivian stations which have been logged recently (frequencies may vary slightly):



This QSL from La Voz de la Victor in Panama was issued in 1940! It's a reproduction from the collection of Adventist World Radio's Dr. Adrian Peterson.



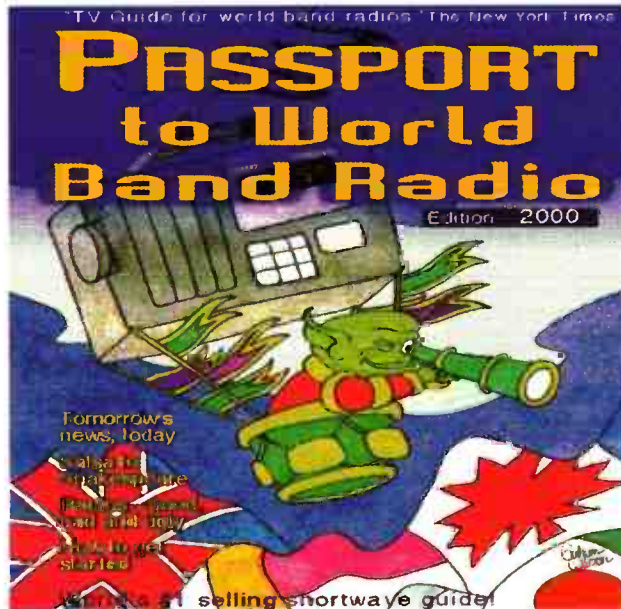
Family Radio - WYFR - issued this card last year, commemorating its 25th anniversary.

MHz	Station
3.310	Radio Mosoj Chaski, Cochabamba
3.493	Radio Emisora, Padilla
4.472	Radio Movima, Santa Ana
4.552	Radio Tropico, Trinidad
4.599	Radio Emisora Villamontes
4.649	Radio Santa Ana, Santa Ana
4.702	Radio Eco, San Barja
4.732	Radio La Palabra, Santa Ana de Yacuma
4.777	Radio Los Andes, Uyuni
4.855	Radio Centenario, Santa Cruz
4.927	Radio San Miguel, Riberalta
4.945	Radio Illimani, La Paz
4.965	Radio Juan XXIII, San Ignacio Velasco
5.927	Radiodifusora Minería, Oruro
5.952	Radio Pio XXII, Llalagua-SigloXX
6.025	Radio Illimani, La Paz
6.085	Radio San Gabriel, La Paz
6.105	Radio Panamericana, La Paz
6.135	Radio Santa Cruz, Santa Cruz
6.155	Radio Fides, La Paz

That covers things for this time. We'll have more in three months. In the meantime, best holiday wishes and good listening!

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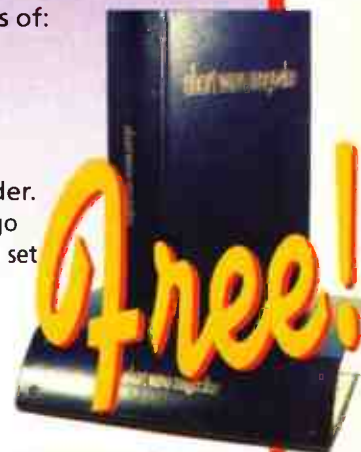
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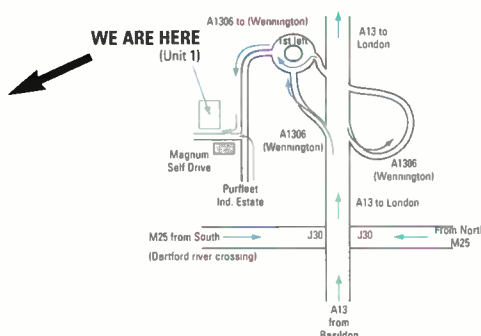
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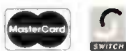
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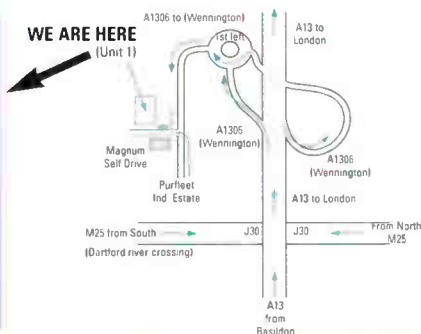
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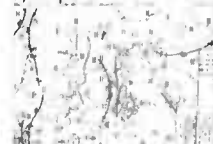
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Weather Satellites

It all started during a lunch hour... yes, that's when Lawrence Harris first heard about weather satellites. But it took a further 15 years before he found the opportunity to re-investigate them. Here he tells us how to 'get going'.

I believe I first heard the term 'weather satellite' around 1970 when a colleague of mine told me about an article that he had read. It explained how to tune into the satellites and 'get pictures from them'. He produced the magazine (the name of which I forget), and we had a read during the lunch hour.

The article explained that by modifying a standard v.h.f. receiver, it could be tuned to the 137MHz band, and, using a suitable antenna, signals could be received from 'the NOAA satellites'. By adding an extra circuit to provide a signal to an oscilloscope, a trace could be produced that represented the amplitude (brightness) of the visible-light image as the satellite passed over. To produce a complete picture, some extra work had to be done to enable the image lines to be retained. It sounded good.

John and I completed the receiver and set up an antenna - a simple dipole for 137MHz. Unfortunately,

this is where the story ends! John decided on a career change from government scientific research to becoming a tax inspector (!), and my workload increased because of staff cut-backs (yes, even in the early 1970s this was beginning).

The final stage of the project required electronic work, and although I was working at Britain's leading space research organisation, work commitments were increasing for everyone because of new space projects being undertaken with limited staff numbers. My personal project to receive weather pictures went on 'hold'. I don't know what happened to the receiver, but John might have paid for that and taken it with him!

It was a further 15 years before

I found the opportunity to re-investigate 'weather satellites'. By then, my career change took me from Didcot, in Oxfordshire, back to Plymouth, and a post teaching information technology.

Technology had moved forward so dramatically that by 1985 there was a constellation of 'geostationary weather satellites', and several polar orbiting ones - and there were new commercial products to receive the pictures! This was just the job for demonstrating new technology to student trainees at Plymouth Information Technology Centre (now no longer exists).

What Are Weather Satellites?

A brief reflection on how it all started should put weather satellites (WXSAT in radio enthusiasts parlance) in perspective. The first artificial satellite was *SPUTNIK-1*, launched by Russia on 4 October 1957 - a day I distinctly remember from age 12. The impact of its launch was electrifying - being at the height of the Cold War (which had many heights!).

SPUTNIK-1 transmitted a simple signal (so I have read from reports from those who tuned in), designed to allow as many people as possible to hear this proof of its existence. In subsequent months, then years, many satellites were launched and the USA created the National Aeronautics and Space Administration to co-ordinate its space research activities.

NASA publishes its *Satellite Situation Report* listing virtually every satellite launched since *SPUTNIK-1*. Many have re-entered the atmosphere, some remain in orbit, but no longer operate. There are satellites for communications, scientific research, navigation, resources, television and a multitude more - all in orbits optimised for their specific purpose.

Dozens, including WXSATs, can be heard using general purpose scanning receivers. The USA operates GOES and NOAA (to be explained shortly), the Commonwealth of Independent States (CIS - formerly Russia) operates METEORS and RESURS, Europe operates METEOSAT, China operates FENGYUN, Japan operates GMS and India operates INSAT - all monitoring the weather.

WXSATs are classified as either polar orbiters or geostationary, and many provide both high and low resolution images. All images originate from a radiometer - a telescope with detectors - that scans the earth below. The detectors are sensitive to visible light and specific portions of the infra-red spectrum, and produce a data stream from each detector band.

The radiometer produces five channels for high resolution pictures, and any two can be selected for subsequent transmission as the a.p.t. channels 'video A' and 'video B'. This low resolution data is smoothed h.r.p.t. with just one in three of the output data lines used.

Polar WXSATs

Most, but not all polar orbiters provide low resolution images. These are the ones that my colleague and I were endeavouring to pick up all those years ago. Perhaps you

Fig. 1: NOAA satellite.



Fig. 2: NOAA-14 image - side-by-side visible-light and infra-red spectral images from 1431UTC 10 September.



- Getting Going!

can see a significant point here?

The low resolution images - called a.p.t. (automatic picture transmission) - that were transmitted in the 137MHz v.h.f. band in the 1960s and 1970s, still have exactly the same format! Equipment that could be used to receive and display them, could still be used now. However, although the transmission format is the same, the hardware/software that is now available for anyone to buy, is more than a generation ahead.

This (polar) type of WXSAT operates from near-circular orbits. Television weather forecasts often feature pictures from the American orbiters, these are controlled by the National Oceanographic and Atmospheric Administration - NOAA. The specific satellites are *NOAA-12* and *NOAA-15* (both on 137.50MHz), and *NOAA-14* (on 137.62MHz). Each also transmits beacon information (non-image data) on 136.77 or 137.77MHz.

From 15 September, *NOAA-12's* a.p.t. has been switched off for an indefinite period while its footprint coincides with that of *NOAA-15* (the prime satellite). The 'footprint' is the area on earth where the signal can be received.

NOAA WXSATs transmit continuous image data in the form of a line every half-second. This line contains several components: the edge carries a short white-line minute marker, preceded and followed by black within the column. This section is followed by the low resolution image from the visible-light channel, occupying about half the (half-second) total line length.

The middle of the image line contains a calibration scale for enabling measurements of temperature and channel identification, followed by a second minute marker section, and then the content of an infra-red channel, and the final calibration section. Consequently, each half-second line of NOAA data carries a large amount of useful information with two spectral image components.

NOAA orbits are nominally sun-synchronous. Each satellite passes over the same location, at about the same time each day. In practice, passes are between 10 and 20 minutes earlier than the previous day, but the maximum elevation differs, and they essentially remain the same. *NOAA-14* passes north-bound during mid-afternoon, and south-bound about 12 hours later. *NOAA-15* passes south-bound around 0900 and north-bound about 12 hours later.

METEOR and RESURS satellites form the CIS group. *METEOR 3-5* transmits during that part of its orbit that is in sunlight, and *RESURS 01-4* transmits in a similar manner, though switching on a few minutes before the end of its 'night'. There is a long history of METEOR WXSAT reception. Originally, some satellites in the COSMOS series provided occasional a.p.t., apparently on an experimental basis.

The first METEOR series was *METEOR-1-x*, and during the mid-1980s, I frequently monitored *METEOR 1-30*, an a.p.t. WXSAT that produced some extremely impressive images. The *METEOR-2* series followed, and ran to *METEOR 2-21*. The latest operational METEOR is *3-5* (*3-6* failed some time ago).

The image content of METEOR and RESURS a.p.t. is different from the NOAAs. Each a.p.t. line lasts a half-second, as with the NOAA WXSATs - for compatibility. Only

one spectral image is present, so METEOR ground resolution is higher than that of the NOAAs. The scanner's frequency band covers 0.5 to 0.8 microns - a little different from the main visible-light band from the NOAA scanner.

The image line starts with a group of black-and-white bars. At one time, the number of these could identify the particular satellite. Image data follows, occupying most of the line. The final portion contains a set of white (or black) bars that can individually be 'on' or 'off', and ending with a grey scale.

Careful monitoring of the bars in the penultimate section shows them to be a binary representation of the numbers 0 to 63; the current number indicates the opening of the aperture of the image scanner and changes as the METEOR crosses differently illuminated zones. That remarkable piece of satellite sleuthing was discovered by the Kettering Group, a team of British experts on Russian satellites based in Kettering during earlier decades.

One characteristic of previous METEORs was the initial inclusion of infra-red images during the night. Such transmissions were often received during the early operational phase of new METEOR WXSATs, but sadly, these transmissions invariably ended within a few weeks or more - apparently due to instrument failure on the satellite.

METEOR 3-5 is not in sun-synchronous orbit. Its orbital plane precesses slowly, and eventually coincides with the earth's zone of twilight. At such times, the solar panels are near minimum illumination, so transmissions from the spacecraft may be terminated for a period of weeks.

RESURS 01-4 is in sun-synchronous orbit, passing south-bound around mid-day, and north-bound during late evening. Its a.p.t. content is almost identical to that of *METEOR 3-5*, but the aperture indicating bars are all blank, and the grey scale is reversed. Advance notice of METEOR and RESURS satellite operations is now published on the Internet.

SICH & OKEAN

As an added extra, there are three other satellites operated by Russia that provide brief transmissions. *SICH-1*, *OKEAN-4* (also called *OKEAN 1-7*) and the recently launched *OKEAN-O* can transmit a.p.t. on 137.40MHz. These satellites are oceanographic resource satellites and their transmissions are (effectively) unpredictable.



Fig. 3: *METEOR*
142UTC 17
September



Fig. 4: *RESURS*
1131UTC 13
September



Fig. 5: *OKEAN-O*
1905UTC 17
September

Radio - Technology Pull or Market Push?

Not that long ago, Paul Swansbury found himself discussing various radio 'wish lists' with like minded devotees. Did they come up with a dream receiver? Read on and see.



Not enough for Paul, but just what is the ideal radio?



How often, whilst reading a review or twiddling the knobs on a new piece of kit do you find yourself thinking "I wish they'd..." or "if only they'd...?" During last Christmas, I found myself discussing various radio related 'wish lists' with like minded devotees down the local hostelry.

Whilst desires and cravings grew roughly in proportion to the amount imbibed, I was struck with what I thought were reasonably sensible, down to earth suggestions regarding the design of communications receivers, both of the traditional short wave variety and the newer hand-held scanner types. Despite the comprehensive age range and backgrounds of the participants, there was frequent concurrence, which I believe is worth elaborating upon.

The purpose of this brief article is twofold. Firstly, I thought it worthwhile to relay a few of the thoughts and comments which passed that evening, partly for the interest of those whose business it is to affect the design of such equipment, and secondly, to stimulate further thought and comment amongst radio enthusiasts, about how we might be more pro-active in determining what comes off the manufacturer's conveyor-belt.

Passionate Discussions

One of the more passionate discussions that night centred upon equipment portability and the compromises one usually has to adopt when wishing to use receiving equipment at several different locations, for example when travelling or holidaying. One of our number is a rep. for a national electronics chain, who uses an AR8000 for his listening needs about the house, and in particular when travelling.

He likes to listen to the 2m and 70cm amateur repeaters, local marine traffic on v.h.f. and some short wave broadcasts from the more powerful programmers, especially during times of crisis, such as that in the Gulf just a while ago. For such listening needs, the use of a table-top receiver is ruled out, mainly due to practical portability issues (size, power supply required, etc.).

Generally, the AR8000 performs superbly, but if only... The crux of the matter was that the AR8000 represented a compromise, for a variety of reasons. Technically, the performance was fine for his needs, but in common with those who find their requirements falling between those associated with a table-top set and hand-held scanner, the practicalities of using the radio fell short of what was required. So what was required?

Portable Use

For such portable use, there is no need for the radio to be quite as compact as it is. Extra space in the cabinet would allow for a larger battery compartment, perhaps for 'C' cells, which would be much more practical when wanting to use the receiver both in the car and in a hotel (carrying and using leads/transformers to plug the set into the car lighter or hotel mains supply was felt to be inconvenient).

It is much easier to flick the switch with the radio on the passenger seat or on the hotel bedside table knowing that there are tens of hours of use in the radio, than to be forced to carry and connect a variety of leads to it before use. In addition, a slightly larger cabinet would allow the inclusion of a more powerful audio stage and speaker, giving better in car acoustics, as well as enabling the set

to carry its own internal telescopic antenna.

Attaching a telescopic antenna to the BNC in top of the radio worked fine for local repeaters and for the more powerful short wave broadcasts, so why not include it internally, with perhaps a switchable external BNC, for home use? Finally, with a larger case, the receiver might be much more stable in its resting position than present.



Dream Receiver

With the above as a basis, a whole series of ideas (admittedly, some not wholly realistic) surfaced. At the end of much discussion, it was felt that our collective 'dream receiver' for such a requirement as that described above was technically realisable, and should not necessarily cost more than that of the AR8000 in question. One of us suggested an intermediate stage, whereby the scanner might be 'plugged in' to a self contained console, allowing connection to an enlarged power supply, better speaker and whip antenna and variable gain antenna amplifier/attenuator, etc.

Another portability issue was raised by a younger member of the group, who owns a Target HF3. As has already been pointed out in a number of short wave publications, this excellent receiver does lend itself to portable use, but by incorporating rechargeable NiCad cells, allowing portability at the flick of a switch, the owner violates the guarantee agreement.

Is there a market for a portable version of the HF3, which does, after all, have better short wave performance when connected to either an amplified whip or a random wire antenna, than a lot of the similarly priced portables? The individual concerned actually takes his receiving equipment to relatively remote locations to escape the electrical noise associated with urban developments and simply would like to use the radio for a four to six hour period without having to carry along an outboard power supply.

So, there are a couple of examples, centred upon practical portability issues rather than clever electronics, whereby equipment might be made more usable for some applications by relatively simple modifications to the basic design. I myself look forward to the day when someone produces a radio having similar size and control layout to those of the Sony SW55, with extended coverage, intelligent search and memory scanning facilities up to 1200MHz.

What Do You Think?

If Icom can squeeze what they do into the IC-R2 for £140, then why not? The fundamental question must be "Is there a market for such a receiver?" I think that there is, provided the price falls within the band occupied by today's top of the line scanners.

If nothing else, the purpose of this article is to stimulate discussion about how we, the market, might influence radio design and manufacture, both ergonomically and electronically. One has only to look through earlier editions of this magazine to realise how the concepts behind receiver design have changed during the decades of this century, and it is enlightening to observe in the current edition of *Passport to World Band Radio* how so many features of yesterday's 'dream radio' have worked their way into modern receiver designs.

So, if the above strikes a chord, or if you feel that there's an area of our hobby which deserves more attention from the designers and manufacturers, please drop me a line via the Editorial Offices and let me know.

SWM

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Fig. 6: METEOSAT.

As I write this, I have just received a short transmission from OKEAN-4 containing a mix of images. Typical transmissions contain a visible-light image of a region recorded previously, or transmitted live, a radar and/or microwave scanner may be included - neatly formatted within the transmitted image.

Unexpectedly, later the same evening, as this was written, I received my first transmissions from OKEAN-O! Figure 5 shows the image, also carrying the number sequence along one side. This is a coded list of the operating equipment and the time of data acquisition. Busy day! Who says WXSAT transmissions are boring?

The content of OKEAN-type satellite images is not predictable without access to the transmissions schedule, and this is not now generally available.



Fig. 7: GOES WXSAT courtesy NOAA.

The American polar orbiters transmit high resolution pictures (h.r.p.t.) in real-time on 1698.00, 1707.00 or 1702.50MHz. METEOR satellites do not have a comparable facility. The Russians use other satellites for obtaining such imagery, though they also use NOAA data.

High Resolution Images

Geostationary WXSATs

Because of the laws of physics, the further from earth that a satellite orbits, the lower its orbital velocity. Satellites in low altitude earth orbits have periods of about 90 minutes, the Moon (earth's natural satellite) at 404,000km, takes 27 days. In between, as pointed out by Arthur C Clarke in his historic paper on geostationary orbits, there is a 'belt' where a satellite orbits once every 23 hours 56 minutes, and therefore remains 'stationary' as seen by someone on earth.

This is known as the Clarke belt, and the advantages of positioning WXSATs here - 35,787km above earth - were recognised in his paper. They remain over the same location, viewing the hemisphere 24 hours per day. Severe weather can be monitored and meteorological data collected.

Geostationary WXSATs include METEOSAT, GOES, GOMS, GMS, and FENGYUN. INSAT can also be included.

METEOSAT-5 and 7 are operated by EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites). METEOSAT-7 currently operates above the longitude of Greenwich as the operational European satellite. METEOSAT-5 is located at longitude 67°E for the INDOEX project. METEOSAT-6 is available as a backup for METEOSAT-7.

America operates GOES (Geostationary Operational Environmental Satellites), currently GOES-8 and -10,

positioned over the east and west coasts respectively. GMS-5 is located at 140°E longitude, and operated by Japan. GOMS (Geostationary Operational Meteorological

Satellite) is operated by CIS (formerly Russia), though the satellite has apparently failed.

FENG-YUN 2B is China's geostationary WXSAT (the first was destroyed during a rocket accident in 1994). India operates INSAT, a communications satellite carrying an imaging scanner.

Most geostationary WXSATs provide transmissions on 1691.0MHz for low resolution images called WEFAX (weather facsimile). High resolution images, called Primary Data, are transmitted on 1694.5MHz and WEFAX images originate from these.

Images Into Signals

Low resolution WXSAT image data - both a.p.t. (polar satellites) and WEFAX (geostationary satellites) - invoke essentially the same method of encoding originally developed in the early 1960s. A radiometer (a telescope with detectors) scans the earth below. The detectors are sensitive to visible light and specific portions of the infrared spectrum, and produce output voltages representing the instantaneous brightness of the scene below.

This signal then amplitude modulates a 2.4kHz sub-carrier. The resulting modulated sub-carrier then frequency modulates the 137MHz carrier (137.50MHz in the case of NOAA-15), is transmitted in real-time. This (a.p.t.) signal is transmitted continuously - day-and-night - by the NOAAs. The sub-carrier used by METEOR WXSATs is not always 2.4kHz - it can drift. This has consequences, as we shall see later.

Unlike any other form of utility modulation, the signal requires a minimum of about 30kHz of bandwidth to accommodate the spectrum spread. Add to that about 15kHz of Doppler shift due to the relative movement of the satellite towards and then away from the observer, and we need up to 45 or 50kHz bandwidth capability.

The signal encoding method is unique: an amplitude modulated signal that frequency modulates the main carrier. This is why purpose built receivers are almost essential if good quality images are to be reconstructed from the original data received from the satellite. Although the modulation method is similar, a.p.t. and WEFAX images have different content, but this is formatted by software.

The main difference between the two is that a.p.t. is a stream of data - from acquisition of signal to loss. The total picture can last from a few minutes on a low elevation pass, to about 20 minutes for a high METEOR pass. WEFAX frames are usually of fixed length, about three minutes and 40 seconds, starting with one synchronising tone and ending with another. Software does the work of recognising the tones of a.p.t. and WEFAX.

If you are familiar with FAX signals, you will know that they can be recognised by their repetitive characteristics. Similarly, one can recognise many other forms of communications signals by listening. The demodulated 2.4kHz tone can be heard from the receiver as a recognisable 'WXSAT' sound, and we can often identify the satellite.

Two Satellite Types - Two Systems

Summarising the WXSATs, we have METEOSAT-7 in geostationary orbit, transmitting continuous weather pictures on 1691.0MHz (and additional images on 1694.5MHz), and several polar orbiting WXSATs transmitting a.p.t. in the 137MHz band. It is possible to set up a system for receiving either or both. Each requires an antenna and receiver for the specific band. The

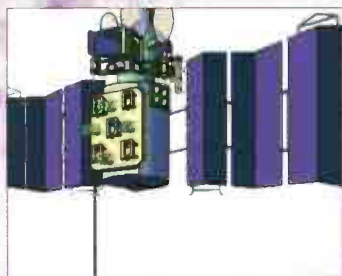
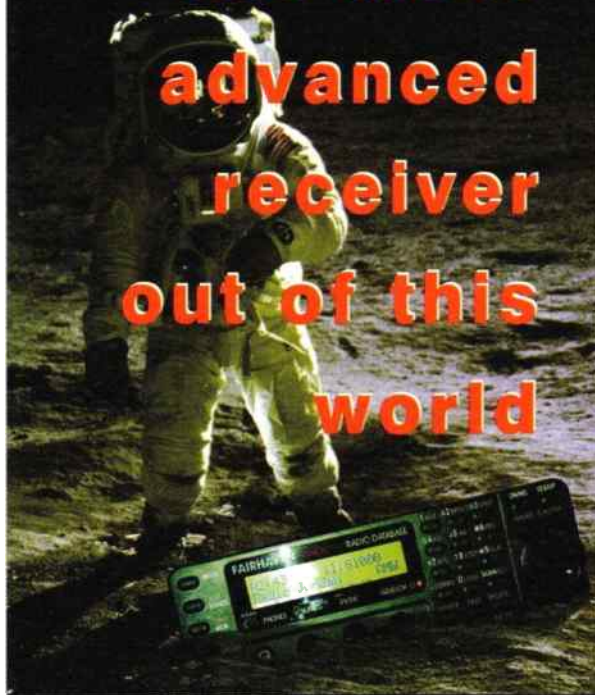


Fig. 8: ELEKTRA (GOMS) courtesy SMIS and Planeta.



Fig. 9: WEFAX receiving dish.

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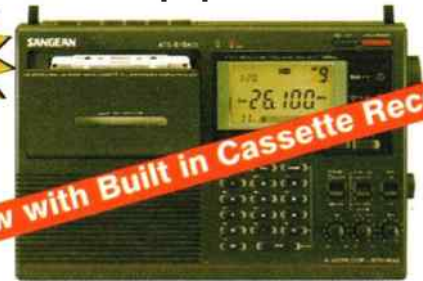
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Fig. 10: Close-up from METEOR 3-5 of North Africa 1344UTC 13 September.

process of decoding and displaying the final image is effectively identical for both systems (because of the signal compatibility).

Tuning In

It is not difficult to receive WXSAT signals. A general purpose scanner fed by a 137MHz antenna will suffice for monitoring the polar

satellites. You should hear several satellites (WXSATs and others) - including many which are not officially operating!

Listen out for the various ORBCOMM satellites transmitting in this band. You may also hear X3 (PROSPERO) on 137.56MHz and an old TRANSIT on 136.65MHz. Satellite monitoring can become a hobby in itself!

If you want to decode the received telemetry and produce pictures, you need a properly designed system. Buying a complete 'plug-in-and-go' (sometimes called a 'turn-key') set-up is definitely the quickest and can make sense because you are guaranteed compatibility.

Prices vary because of the differences in hardware capability, but most hobbyists use WEFAX or a.p.t. - as opposed to higher resolution imaging systems (PDUS and h.r.p.t.). For proper a.p.t. reception, a crossed-dipole, phased for right-circular polarisation, is required for the NOAAs. A simple dipole can be used, but may produce shorter periods of good telemetry.

The quadrifilar helix antenna has also gained recent popularity. The antenna can be mounted on a roof-top, though you should first test near ground level to ensure that it is working properly. Cabling should normally be

low-loss 50Ω, and I would recommend avoiding a pre-amp because these may amplify nearby unwanted signals.

For WEFAX (1691MHz) reception, the antenna used is either a 1m dish (fitted with horn or dipole), or a Yagi - the dish probably being the most common. A dish

diameter of 1.8m is officially recommended for WEFAX (also known as SDUS - Secondary Data User Station) in order to guarantee uninterrupted reception during problem periods. For most of the time, reception is satisfactory from much smaller dishes, but a high quality pre-amp and short low-loss cable run are essential for WEFAX.

For both systems, the above hardware should produce a good quality signal in the 137 or the 1691.0MHz band. Now we need to 'receive' it.

WXSAT Receivers

Typical radio scanners are not designed for extracting picture modulation from WXSAT signals. As described, WXSATs require an intermediate frequency bandwidth up to 50kHz, (including Doppler changes). Decoding pictures therefore requires a properly designed polar or geostationary WXSAT receiver.

An alternative option for a METEOSAT system is the possibility of using a down-converter to move the 1691MHz signal down to 137.50MHz, for feeding into a standard v.h.f. WXSAT receiver. This option is due to the complete compatibility between the modulation methods used by both image types (WEFAX and a.p.t.), enabling the use of one receiver for both systems, though not necessarily simultaneously! It does permit flexibility and economy during early WXSAT monitoring, though with compromises. See the section on 'System Costs' for the latest news.

Receiver facilities for the polar satellites vary with supplier. They may include sequential scanning for an a.p.t. signal, resistance to pager transmissions, and a computer interface to allow easy programming for data collection in your absence.

Decoding The Signal

I am convinced that the use of computers for decoding a.p.t./WEFAX signals from a proper receiver is the best way to complete your WXSAT station. The ability to upgrade software is important. Both types of receiver provide an output for subsequent decoding and PC computers currently permit the largest choice of decoding hardware/software.

Commercial products may include an interface card, though two manufacturers (including one American supplier) have produced systems not requiring an internal card. The decoding system receives the audio signal, software decodes it and displays the resultant image line-by-line, in real-time.

As explained, image format varies between satellites, so software options allow selection, as well as the direction of travel. Programming data capture (scheduling) should be provided.

A novel method of decoding such telemetry, developed during the last two or three years, relies on the availability of a suitable sound card in the computer. The signal can be recorded as a 'wav' file using software such as *wxsat*, or commercial software, and can be decoded either in real-time, using the same program, or later, using the recently developed *SatSignal*.

Whatever method is chosen (or experimented upon), the final result depends largely on the quality of the hardware used to obtain the signal.

The Results - Polar

We don't spend money just to have nice-looking boxes on the table! A properly set-up ground station should receive several images from each of the operational polar orbiters, every day. Each NOAA WXSAT (currently NOAA-14 and -15) should be received on each ascending and descending pass.

Ascending refers to the direction of travel when crossing the equator. They provide side-by-side images during sunlight passes - the visible-light image and a thermal infra-red. During the night, the visible channel (that would otherwise be blank) is exchanged for an adjacent infra-red band responsive to near water vapour.

METEOR satellites transmit a visible-light image that emphasises clouds and snow - appropriate for northern Russian latitudes. Except for deserts, land is not well seen. Resolution is better than that in NOAA images because METEOR pictures are not sub-divided.

On the downside, there are various faults in the images: jitter causes ill-defined edges to details within the image, and the aperture appears to 'stick', or at least some comparable fault results in streaks or

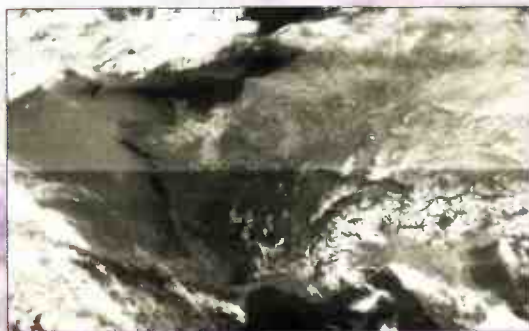


Fig. 11: Close-up from RESURS showing France 26 May.

bands, as shown in Fig. 9, an image of a section of the north African coastline.

The sub-carrier used by METEOR and RESURS WXSATs for carrying the image data, is not always exactly 2.4kHz. The variation results in some software being unable to provide a synchronised image.

In such cases, the length of the image may curve one way and then the other, as the Doppler effect manifests itself. This is seen in the wxsat program and prompted the writing of *SatSignal* by David Taylor, that processes wav file versions of METEOR/RESURS passes.

Seasonal effects are interesting: autumn scenes darken while the sun's elevation reduces and land temperature falls - all clearly seen on NOAA infra-red images. METEORS switch off earlier because they reach twilight while still above the horizon and visible-light pictures become difficult to interpret.

The cold waters of the Gulf of Bothnia freeze, and there is increasing snow coverage on the Swiss Alps. After the New Year, an improvement is gradually seen as the sun's elevation increases. The arrival of Spring sees melting ice and better illumination. By summer, hot land is clearly seen on all infra-red images.

Every image received from a polar orbiter can be improved using basic image enhancement techniques. Reception software usually includes the ability to enhance the darker areas of images, such as land in METEOR images, or winter scenes in NOAA images. The effect is often considerable - details completely invisible in the raw image can stand out after enhancement - see Fig. 9.

The Results - Geostationary

WEFAX images are transmitted from all geostationary WXSATs according to a published schedule, and include sections of the visible hemisphere. The infra-red (D2) and visible-light (C02) formats from METEOSAT-7 include Britain, and are transmitted twice each hour.

Animation sequences can also be produced from METEOSAT, and these are frequently shown on television. Whole disc images from all three sensors are transmitted regularly, as are images originating from GMS-5, (Japanese) and GOES-8 (USA). As a regular supplier of up-to-date images of this hemisphere, it is hard to beat METEOSAT WEFAX.

System Costs

The cost of a system depends on your choice of hardware. A complete METEOSAT receiving system, excluding computer, has, until now, cost around £600 - with variations. Cheaper systems are about to hit the market.

I mentioned the option of using a down-converter. RIG/Timestep are currently developing a unit that will probably retail at about £99. I expect to review this product shortly.

An Active Feed is a new device that allows the use of low cost offset dishes for receiving WEFAX - surplus ASTRA ones, perhaps! How much? Well, my information as this goes to press, is that a dish, active feed and down-converter may cost below £200! Watch my monthly 'Info in Orbit' for full details.

Receiving equipment for the polar orbiters can cost about £500. Combined systems are available, and discounts can be obtained under certain circumstances. These prices are guidelines, special offers and kit options may reduce the cost.

I would advise caution when considering kit construction. Proven systems can be bought in kit form from reputable organisations, such as the Remote Imaging

Group - indeed I reviewed their excellent RX2 receiver in a previous edition of *SWM*. (November 1998 to be precise - Ed.)

Do be aware that some electronics experience and test equipment is essential for success. Other kit suppliers may not be so accessible, or have such a genuine interest in your success, so do make careful enquiries before purchase.

The Future Of WEFAX

Major changes are planned for the next few years. METEOSAT WEFAX will eventually be replaced when the new digital system - Low Rate Image Transmission (LRIT) is introduced on the next generation of METEOSATs - METEOSAT Second Generation - or MSG-1. This is expected to become operational from early 2001.

My enquiry of EUMETSAT produced an encouraging response from Ms Sally Wannop of the EUMETSAT User Service, who confirmed that the METEOSAT Transitional Programme (the current HRI and WEFAX service) will be continued until at least the end of 2003. This allows for a significant amount of overlap with METEOSAT Second Generation (MSG) operations.

Suppliers

Remote Imaging Group - an international group of enthusiasts with membership open to all. Can supply a number of products with discounts. For a free information pack send a large s.a.e. to **RIG, 34 Ellerton Road, Surbiton, Surrey KT6 7TX**

Timestep Weather Systems - PO Box 2001, Newmarket CB8 8XB, Tel: (01440)-8200440. Currently the only supplier in Britain offering a complete range of hardware and software for the WXSAT hobbyist.

I welcome information from any manufacturer of WXSAT equipment who wishes to be listed in future articles.

Conclusion

It's much easier to be a 'couch potato' and spend your spare time watching television. Fortunately, many people take an interest in the world around them, and monitoring WXSATs provides a hobby that can prove intellectually stimulating, as well as being great fun.

With a reasonable set-up you can have the latest pictures of our planet that the Met Office themselves may not yet have looked at, or, in the case of METEOR, RESURS, OKEAN and SICH - will probably never even see!

Is it expensive? No, I don't believe so. Have a look at the results sent in by readers, and think about whether your television watching is really adding value to your life!

Credits

My thanks to NOAA, NASA and SMIS (Space Monitoring and Information Support of CIS) for the use of their images, and to Dave Cawley of Timestep for providing early details of products that are due to be released by the time this has been published.

SWM



Fig. 12: CTOT whole disc visible-light 17 September 1200UTC



Fig. 13: LY north America infra-red 18 September 1500UTC showing Atlantic hurricane Gert.

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73 from Dave G4KQH, Technical Manager.

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Info Readers' Pictures

Lawrence shares a few more of the pictures submitted by 'Info In Orbit' readers.

One of the interesting aspects of being a writer for *Short Wave Magazine* is the mail. Although not quite up to the numbers experienced by the Editor (200 per day!), I am always interested to hear about readers' experiences with WXSAT reception. Sometimes people report problems that can be discussed in the monthly column, but mostly they just enclose pictures.

To be realistic, some of the pictures submitted are not usable, often due to very poor contrast - perhaps caused by hardware or software needing adjustment - or to excessive noise throughout the image. If the image is on disk, I am often able to use an image processing program to improve the quality, and then put it in my 'possibles' file.

Obviously this is all very subjective, and at the end of the day, the limit of space curtails the large majority of images from being published. Readers may note that 'Info in Orbit' expanded to three pages some time ago, perhaps due to the number of pictures that I was submitting for use in the column. This number itself reflected the increasing number of pictures

that I receive.

This feature includes a few more of the pictures

submitted by readers during recent months, though interestingly I notice that no METEOSAT/GOES images were offered. The main interest seems to be receiving images from the polar orbiters.

NOAA-14 afternoon passes

provide really good contrast levels from about March

onwards. Some software has a 'multi-spectral' option; this uses the infra-red - thermal - image content to add artificial colour shades to the visible-light image. The result can be an acceptable colour image.

Brian Powell uses the RigSat 2 WXSAT receiver, with the program *wxsat*, and produced this picture of countries around the Baltic Sea.

The latest satellite to commence transmissions - albeit in short bursts - is OKEAN-O, a spacecraft intended to provide data in the visible, radar and microwave spectral bands and

for data collection and transmission from ground platforms. The spacecraft continues the Earth researches started by the OKEAN-O1, RESURS-O1 and SICH-1 spacecraft.

Picture content is not predictable without a

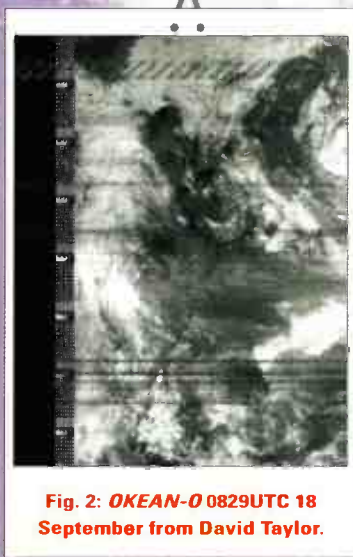


Fig. 2: OKEAN-O 0829UTC 18 September from David Taylor.



Fig. 3: Piano-keys from OKEAN-O from Barry McDougall.



Fig. 1: NOAA-14 30 May from Brian Powell.

transmission schedule, but can contain combinations of visible, radar and microwave images. Transmissions are likely to remain infrequent, but when they commenced around mid-September, they were being received daily on one early morning pass and during one evening pass; in each case the passes were high over western Europe, though fairly low over Britain.

The numbers along the side provide information identifying the operational instruments and the time of data measurement - in the form of the number of minutes that have elapsed since midnight in



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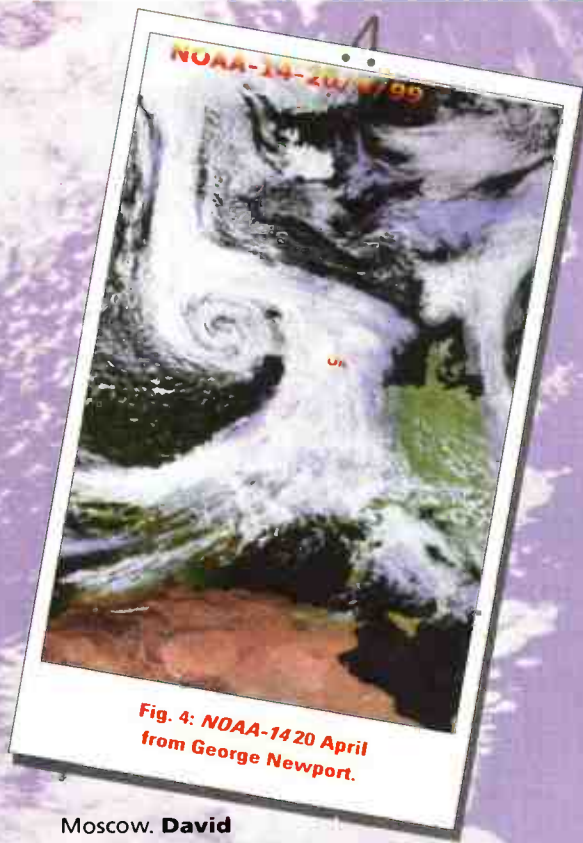


Fig. 4: NOAA-14 20 April from George Newport.

Moscow. **David Taylor**, the software author, sent in Fig. 2.

Barry McDougall uses the Paul Hayes QFH and says that it has improved his reception. Barry lives in a bungalow at the bottom of a hill, surrounded by tall trees and has never had much success until now. He uses the RigSat 2 receiver and a Pentium 166 computer, and at 0900UTC on Sunday 19 September, was one of those who caught the brief transmission from OKEAN-O. My own reception was limited to a noisy minute or so, though I clearly heard the 'piano-key' telemetry component featured in this image.

George Newport of Canterbury uses the Timestep PROscan receiver and

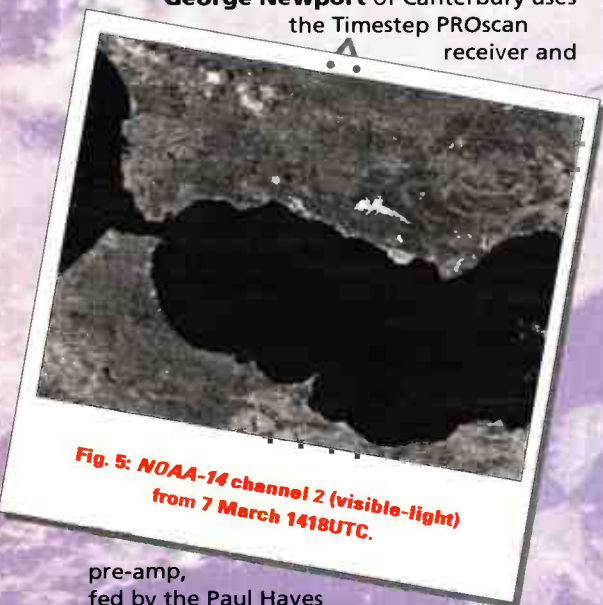


Fig. 5: NOAA-14 channel 2 (visible-light) from 7 March 1418UTC.

pre-amp, fed by the Paul Hayes QFH, and sent in a batch of colour prints from his WXSAT system. This picture shows one of several clearly-defined weather

systems that brought rain and cloudy days to Britain during Spring.

When looking at the spectacular colour productions it is worth remembering that computer software can perform wonders! None of the conventional WXSATs analyse the colour component of the scanned images; the spectral components include bands in the infra-red and one in the visible-light. So enjoy it anyway!

Peter Schoen of Helmbrechts in Germany sent a batch of prints from his high resolution picture telemetry NOAA WXSAT equipment, recorded earlier this year. The south coast of Spain is featured, and the Sierra Nevada mountains are clearly identified, and now I know where Andalusia is!



Fig. 6: RESURS 01-4 around 7 May from Alastair Campbell.

Alastair Campbell has probably returned from India since sending me some images from Jamnagar in the northeast of that country, where he lived for a few weeks. The images - from which I have selected one from RESURS -



Fig. 7: NOAA-14 North Italy in June from Roger Ray.

were received with a crossed-dipole and reflector, feeding an Icom PCR1000 receiver, and processed with WXSAT version 2.4 on a Toshiba laptop PC. From Alastair's location at that time, he was able to receive RESURS during a south-bound pass over the Persian Gulf. The glow in the Arabian Sea is probably a solar reflection.

Roger Ray has spent many hours collecting images from his high resolution (h.r.p.t.) system, and a number of these found their way on disk to my computer. The 'extra' resolution - when compared with a.p.t. transmissions from the same satellites - allows identification of individual lakes and hills, almost to the point where you can feel as if you were in a high flying aircraft. **SWM**



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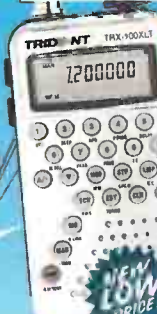
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Info in Orbit

The chimney pots have a new companion - the quadrifilar helix antenna! It was fitted to the short mast, just above a television antenna. New cable completed the job, and feeds down to the basement room where I hide from the world. I tested the QFH as much as one can near ground level. From its new perch, I can once again see to the east of the Nile - a view from *METEOR 3-5* that I have been denied for a couple of years due to corroded connections on the old antenna. Having brought this down to ground level, it was interesting to see the effects of weathering due to the salt carried by our westerlies.



Fig. 1: *OKEAN 1-7* transmission received at 15:15UTC 9 September by Les Hamilton.



Fig. 2: *MSG-1* courtesy EUMETSAT.



Fig. 3: *METOP* courtesy EUMETSAT.

Operational WXSATS

Transmission of a.p.t. on 137.50MHz from *NOAA-12* (the backup morning descending WXSAT) is being terminated for an indefinite period from 15 September. The footprint of *NOAA-12* periodically overlaps that of *NOAA-15* - the primary morning descending WXSAT. Both transmit on 137.50MHz, and the large majority of a.p.t. users around the world have fixed, omni-directional antennas, which would otherwise receive simultaneous transmissions, causing considerable interference.

Satellite tracking software shows the two satellites' footprints gradually overlapping, then separating, due to the small difference between their orbital periods. There will be no change to the 1700MHz band transmissions of h.r.p.t. (high resolution) data because this is received using tracked, narrow-beam dishes.

There have been some reports of poor quality reception from *RESURS-01-4* (a.p.t. on 137.85MHz) though my recent images seem normal. *METEOR 3-5* was switched back on at the end of August, resuming on 137.30MHz.

Strictly speaking, the *OKEAN* and *SICH* oceanographic research satellites are probably best not included in the WXSAT constellation (*NOAA*, *METEOR* and *RESURS*), but because they occasionally transmit on 137.40MHz, providing a data stream of a.p.t., it is difficult to exclude them from reports of activity.

OKEAN-O is the latest satellite in this class to have been launched, and we have been waiting for its first transmission. Not long after launch, I logged a transmission on 137.40MHz while both satellites were above my northern horizon. Although the transmission lasted several minutes, the resulting image quality was not good enough for me to identify the content, and therefore the satellite. It was most probably *OKEAN-4* (also known as 7-7).

Les Hamilton recorded a very high quality transmission from *OKEAN-4* - see Fig. 1. Les operates two systems for monitoring a.p.t.; a home-brew QFH antenna (of the van Lint design), fixed in his loft pointing due east (about 20° from vertical), feeds a Timestep Proscan receiver. His second system uses a Woodhouse Communication APT-2CP turnstile antenna mounted vertically in the loft, and feeding a RIG RX2 receiver.

Les was indoors when he heard the signal, so was able to start recording. He comments "It was certainly

by far the best *OKEAN-01-7* transmission I have seen for over two years, also the highest elevation active pass for a very long time." A neighbour's central heating added some interference, and near the end of the pass, another neighbour started up an unsuppressed lawn mower!

Despite these 'trials', Les produced a good image - after minimal editing. The transmission was of data previously recorded while the satellite tracked south-west along the Arctic coastline of Siberia. The most prominent features are the snow-covered New Siberian Islands and Lyakhov Island at 140°E longitude. My thanks to Les for the image and comments.

METEOSAT Second Generation

Current plans envisage the next *METEOSAT* satellite - *MSG-1* - to be operational in 2001. The present system, *WEFAX* (low resolution images) and *Primary Data* (high resolution

images) will remain available until the end of 2003, permitting a long transition period. The *MSG* control centre is being built in Darmstadt, and new consoles have already been installed - ready for late 2000. This part of the system is called the *Ground Segment*.

The satellite's critical design review was successful, following mechanical and thermal testing of models of the spacecraft. A major milestone will happen this October or November when the overall *MSG* system will be reviewed.

For current and potential manufacturers of

Fig. 4: *NOAA-15* 7 August 0918UTC from Barry McDougall.



Fig. 5: Scotland 19 May 1999 from Roger Ray.

equipment for the new all-digital data-producing spacecraft, EUMETSAT has published the specifications of its *Data Acquisition and Dissemination Facility* user stations on its web site. I will include more information in 'Info' as it becomes available.

NOAA 15 04.09.99 8:00 MESZ



Fig. 6: NOAA-15 4 September from Thomes Scheelen.

EUMETSAT has announced that it is putting more effort into training the user community in preparation for new satellites, including the EUMETSAT Polar System (EPS), a NOAA-type polar weather satellite scheduled for launch in 2003. All the EUMETSAT member states have confirmed national approval for the EPS programme, allowing the work to go ahead.

Correspondence

Pablo Diaz Moreda is an Air Traffic Control Supervisor at Madrid/Barajas Control Tower, and has an interest in all types of utilities, including satellite monitoring. Some editions back I mentioned David H. Ransom's web page that carries David's tracking software, together with other links. Pablo found this very useful and keeps *STS Orbit Plus* - latest version 9932 - updated with 2-line elements every few days.

Pablo also tracks some satellites daily - mainly *MIR*, *ISS* and some 'supposedly visible' ones, like *STAR SHINE*. Pablo points out that the *ARISS* (Amateur Radio on the *ISS*) web page advises that there is soon going to be some kind of beacon operating in the ham bands onboard the *ISS*! Visit the web site for more information:

<http://garc.gsfc.nasa.gov/~ariss/ariss.html>

Pablo is not the first person to suggest to me that 'Info in Orbit' could include more information about *MIR* and the *ISS*, as well as *WXSATS*. I am now increasing coverage of future Shuttle/*ISS* activities within the column. I welcome comments.

Barry McDougall G1NPN read my recent article on the QFH and obtained one. He lives in a bungalow at the bottom of a hill surrounded by tall trees, and

reports that the new antenna is giving the best pictures he has received. He sent an image received by his RIG RX2 receiver from NOAA-15 on 7 August.

Last month I included several h.r.p.t. images from **Roger Ray** of Telford. 'Info' has several Scottish readers, so I kept Fig. 5 for this month.

The picture shows clear skies over this picturesque part of the country that I have yet to visit.

Thomas Scheelen is associated with Sinus-Elektronik, a company in Sinsheim near Heidelberg in south-west Germany. He uses an Icom PCR1000 Receiver (set for 50kHz bandwidth), fed by a WSP 137 turnstile and pre-amp, under the roof. Thomas' location gives him access to *WXSAT* passes much further east than can be monitored from Britain.

Figure 6 has been artificially coloured using the program *wxsat* and shows a clear run southbound past the eastern Mediterranean sea. From Thomas' location, he may be able to receive passes further east.

Special Events

The afternoon of 27 August was an interesting experience for *GOES-8* monitors. America is in its 'hurricane season', and there were two of these in the Atlantic, both captured in this 1745UTC image. Hurricanes *Cindy* and *Dennis*, and tropical depression *Emily* were active in the Atlantic Ocean.

Dennis was furthest to the west, and resumed a west-north-west motion with winds sustained at 70 knots. Hurricane *Cindy* was well-developed, and its winds strengthened to 90 knots. Its north-west movement minimised its potential threat. *Emily* remained a weak tropical depression with winds sustained at 30 knots. Smoke from fires in central South America are vividly seen as a light brown haze.

An extra 'rarity' on this image is the disc of the Moon near the bottom right. For such pictures, the alignment of the earth and Moon has to be correct, and must also coincide with a scan.

Although NOAA-11, NOAA-12 and NOAA-15 are the operational a.p.t. *WXSATS*, transmissions of high resolution telemetry from NOAA-10 are being reported. **Peter Schoen** of Helmbrechts in Germany received a high resolution image from NOAA-10 at 1421UTC on 19 August. This was just a few days after the disastrous earthquake in Turkey that left a wide trail of destruction and killed thousands of people. Peter's NOAA-10 picture shows the oil refinery in Izmit burning.

An E-mail from **Paul Telco** referred to an image he received from NOAA-12 in early August showing



Fig. 8: NOAA-10 channel 2 image 19 August from Peter Schoen.



Fig. 9: NOAA-12 1 August 1726UTC from Paul Telco.



Fig. 7: GOES-8 full disc image 27 August 1745UTC - image courtesy NOAA and the Operational Significance Event Imagery support team.

Continued on Page 39...

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smoke plumes from oil rigs in the North Sea (Paul assumes it is the Ecofisk field). If you examine the source of the plumes, you can see a few pixels that may indicate flames of burning gas. Paul posts WXSAT images on his web site, together with links to other WXSAT sites.

Paul's site:
<http://www.telco1.demon.co.uk/astro.htm>

METEOSAT Primary Data (PDUS)

This series is about the sequence of transmissions received using a METEOSAT Primary Data User Station. Primary Data images are of the highest resolution normally available from METEOSAT. WEFAX images are produced by reducing the resolution and sectoring the original data for transmission in four minute slots.

The basic hardware required is similar to a WEFAX receiving system, but having higher specification. PDUS requires a larger dish - a minimum size of about 1.8m is essential - and the receiver (1694.5MHz) is more expensive. Like WEFAX, transmissions are scheduled, and an examination of the timetable shows that many formats are repeated at regular intervals. Previous articles have covered the sequence of transmissions up to the INDOEX transmission at 0416UTC.

When METEOSAT-7 is scanning the earth at local night, other operational geostationary WXSATs have

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 uses 137.30MHz.
- OKEAN-4 and SICH-1 use 137.40MHz
- 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.

different solar aspects. At 0000UTC, GMS (located near the longitude of Australia) enjoys sunshine. GOES WXSATs are located west of METEOSAT, so have their day a few hours later than Europe.

FENGYUN - the Chinese WXSAT - is east of METEOSAT and sees the sun rise 'earlier'. Consequently, while METEOSAT is producing infra-red images during the night, most of the other WXSATs provide visible-light images as well.

Following the 0416UTC INDOEX transmission are some WEFAX formats (LY, LR and ITOT). WEFAX transmissions are predominantly scheduled on channel A1 (1691.0MHz), with 'extra' formats provided on channel A2 - the PDUS channel - at selected times.

The routine BIW (combined infra-red and water vapour) transmission resumes at 0430UTC, followed by

Kepler Elements - WXSATs, MIR and Shuttle

- 1 If you want a computer disk file containing recent elements for the WXSATs, AMSATs and others of general interest, together with a large file holding elements for thousands of satellites please enclose 50p with a PC-formatted disk and stamped envelope. A print-out is included that identifies NASA catalogue numbers for the WXSATs. The disk file is ideal for automatic updating of tracking software.
- 2 I also send monthly Kepler print-outs to many people. To join the list please send a secure 'subscription' of £1 (plus four self-addressed, stamped envelopes) for four editions. Transmission frequencies are given for the operating satellites. This data originates from NASA.

the full-disc AIW - described in earlier articles. The three-hourly GMS (Japanese) formats J_XIJ_XVH are transmitted at 0446 and 0448UTC.

Shuttle Launch Schedule

At mid-September, the date for the next Hubble Servicing Mission STS-103 was announced as no earlier than 28 October, and that for STS-99 (the Shuttle Radar Topography Mission) for no earlier than 19 November. The orbit of STS-103 has a scheduled inclination of 57°, bringing it over Britain and other European countries. That of STS-99 is a 28° inclination orbit.

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

MIR

Although the MIR space station will be unmanned for some months, interest in its fate is likely to increase. Power constraints have resulted in the controllers powering down some of the on-board computers.

Russian spacecraft experts have requested that MIR be monitored visually when passing over during the evenings and mornings, to watch for signs of spacecraft tumble. There will be one further visit from cosmonauts in the new year to prepare the craft for final controlled re-entry in February or March.

On 27 August, Mir 27 Commander **Viktor**

Afanasyev, cosmonaut **Sergei Vasilyevich Avdeyev** and French Astronaut **Jean-Pierre Haignere** climbed into a Soyuz spacecraft and headed back to Earth. **Figure 10** shows the final view of MIR as they departed. Avdeyev had spent 389 consecutive days in space, and holds the record of 437.7 cumulated days in space.

International Space Station

The ISS is going to increase its profile (both physical and public) in the weeks and months to come.

Figure 11 shows wires and cables on the Unity module (in the foreground); these are telltale clues that the space walking astronauts of STS-88 had performed their first extravehicular activity (EVA) when this 35mm frame was exposed from the aft windows of *Endeavour*. The Zarya module can be seen mated to the top end of Unity.

Web Watch

Check out ARISS's web site <http://garc.gsfc.nasa.gov/~ariss/ariss.html> for up-to-date information. See more WXSAT images on Paul Telco's web site at <http://www.telco1.demon.co.uk/astro.htm>



Fig. 10: GMS visible-light transmission at 0446UTC from earlier this year.

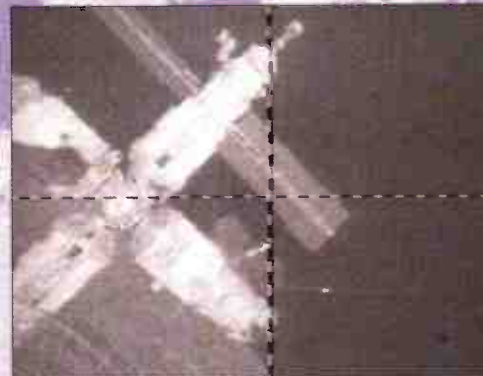


Fig. 11: View of MIR - image courtesy NASA and its affiliates, and Maximov Publications.



Fig. 12: STS-88 picture from 4 - 15 December 1998 mission, courtesy NASA.

ite With A Mission



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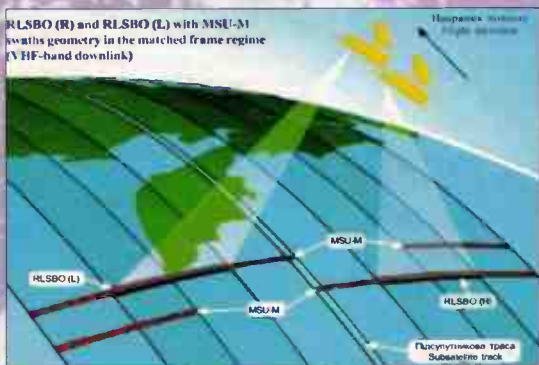


Fig. 5: Radar and MSU-M swaths.

APT/HRPT/WEFAX ground stations).

Alex confirmed that short transmission intervals are due to system design features. "MSUS permanent operation time must not exceed 30 minutes, with the following pause not less than 70 minutes. Side-Looking-Radar permanent operation time must not exceed 15m with the following pause not less than 30m..." and so on. I presume that in this context, the word 'permanent' means 'continuous'.

Alex commented that the satellites were designed for internal use in USSR meteorological service (ice cover in polar regions being the main scope). "Any Russian organisation may order a transmission and/or processed data via a certain bureaucratic procedure." PLANETA deputy director Dr. Zhupanov had told Alex that there were "few transmissions over North America in a framework of demonstrative joint projects in the past (though) something like that may happen in the future - it will depend on NESDIS initiatives."

Onboard Instrumentation

As with a.p.t. transmissions from the NOAA WXSATS, the transmission on 137.40MHz from OKEAN-O is just one of several downlinks. The spacecraft carries many instruments, and therefore provides various types of **Fig. 7: Scanner specifications: * along and across the track; ** with horizontal and vertical polarisations.**

MSU-M багатоканальний скануючий пристрій малого розрешення (2 комплекси - основний і резервний)	0.5 - 0.6 μm 0.6 - 0.7 μm 0.7 - 0.8 μm	1.7 x 1.5 km *	1975 km
MSU-M multispectral low-resolution scanning radiometer (2 units-primary and spare)	0.8 - 1.1 μm		
MSU-SK багатоканальний скануючий пристрій середнього розрешення (2 комплекси - MSU-SK1 з переднім оглядом і MSU-SK2 з заднім оглядом)	0.53 - 0.59 μm 0.59 - 0.72 μm 0.72 - 0.81 μm 0.81 - 1.0 μm 10.5 - 12.6 μm	245 x 157 m * 245 x 157 m * 245 x 157 m * 245 x 157 m * 820 x 590 m *	620 km
MSU-SK multispectral medium-resolution scanning radiometer (2 units - MSU-SK1 with forward looking and MSU-SK2 with backwards looking)			
MSU-V багатоканальний скануючий пристрій високого розрешення	0.48 - 0.52 μm 0.54 - 0.61 μm 0.63 - 0.73 μm 0.78 - 0.92 μm	50 m 50 m 50 m 50 m	195 km
MSU-V multispectral high-resolution scanning radiometer	0.92 - 0.99 μm 1.47 - 1.62 μm 2.06 - 2.38 μm 10.6 - 12.0 μm	50 m 100 m 300 m 250 m	
Defeta-2D багатоканальний скануючий мікрохвильовий радіометр	0.8 cm ** 1.35 cm **	17 x 22 km * 28 x 37 km *	1130 km
Defeta-2D multispectral scanning microwave radiometer	2.25 cm ** 4.3 cm **	49 x 65 km * 91 x 120 km *	

downlink - including high and low-rate data flow on 8.2GHz and the v.h.f. transmission on 137.40MHz.

Telemetry and control are performed using a Kondor-1 ground platform transmitting on 1533MHz, and a Kondor-3 receiving station on 460MHz. The satellite is equipped with Kondor-2 transmitting and receiving antennas - as indicated in Fig. 4. The on-board Information and Telemetry System uses a digital data stream transmitted on 600MHz.



Fig. 6: Geometry of the swaths in the 8.2GHz downlink.

OKEAN-O Single Frequency Units

Radar: the RLSBO is a side-looking radar. There are two units - RLSBO (R) with right-side looking and RLSBO (L) with left-side looking radar. The operating wavelength is 31mm, producing a ground resolution of 2.5 x 1.3km and a swath width of 455km. This instrument will allow the whole of earth's surface to be mapped by radar. It is 'power hungry', so radar scans have limited continuous operation time, as confirmed by Alex Ivanov's comment. This is the radar picture that we sometimes see in multi-spectral images from OKEAN-O, and its swath is illustrated in Fig. 5.



Fig. 8: OKEAN-O image 18 September 0829UTC from Marius Rensen.

R-225 microwave radiometer: this operates in the 22.5mm waveband and, from the satellite's orbital height, has a ground resolution of 130km.

R-600 microwave radiometer: this operates in the 60mm waveband and has a ground resolution of 135km. Data from these two radiometers is included in the 8.2GHz downlink - see Fig. 6.

OKEAN-O Multi-spectral Scanning Radiometers

MSU-M: this is a low resolution, multi-spectral scanner, and there is a backup unit - both shown in Fig. 4. The wavebands detected, the ground resolution (km) and the swath width of this

instrument is illustrated in Fig. 5 and detailed in Fig. 7. Any of these channels can be included in the a.p.t. downlink.

MSU-SK Multi-spectral, medium-resolution, scanning radiometer: there are two of these - MSU-SK1 has a forward-looking scanner and MSU-SK2 has a backwards-looking scanner. The wavebands detected, the ground resolution (km)

Fig. 9: OKEAN-O image 19 September 0901UTC from David Taylor.



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WXSAT Reception Competition

Competitive image acquisition was the theme of the recent RIG mailing list contest. Lawrence forgot to set up his gear. Here though are the winning entries.

If you are a WXSAT enthusiast and have access to the Internet, you may be aware that there are at least two WXSAT mailing lists - the original one called 'wxsat-l', and one recently set up for members of the Remote Imaging Group (RIG) called 'rig-l'. The latter is (lightly) moderated by **Julian Moss G4ILO**, during whose absence **Dave Cawley** recently organised a competition.

I joined the list a couple of days before the competition, and planned to submit the specified image - the main afternoon *NOAA-14* pass on 18 September. However, shortly before the pass, daughter Catherine, together with seven-month old grandson Joseph, arrived. I inadvertently forgot to set the program to record automatically, only remembering about half-way through the selected pass. My language remained totally appropriate for the presence of such young ears, but I did think unusual words!

Aim Of The Competition

First the aim of the competition - as announced: "Remember, the aim of the game is not to win, but to simply improve your system so that it is the best available." ... "The goal is to get good images and talk about reception systems, not to question the competition itself."

The rules were divided into two parts. Marks were awarded for the furthest southern part in the noise, in the clear, and where the image continued noise free for the UK.

Marks were also awarded or deducted for a variety of factors, including the total extent of the pass, its overall length in minutes, the noise-free duration, and certain other 'fun' factors that should be left to the imagination.

Fig. 1: From Alan Jarvis.



The Winner

The winner of part 1 (contest 2) was **Alan Jarvis** with 25 points (out of a maximum possible 30 points). The winner of part 2 (contest 3) was **Dave Remnant** with 24 points, achieved using an indoor crossed dipole antenna!

The overall winner (totalling both competitions) was **Dave Remnant** with 47 points. Competition entries were published on Paul Hayes' website http://web.ukonline.co.uk/phqfh/18th_sep_1999.htm where entries can be downloaded (average compressed file-size 150kb).

From the web site, it appears that there were 18 entries, made using a variety of equipment, set-up in various situations, and with every combination of antenna, and limited by various physical obstructions.

Alan Jarvis lives in Cardiff, and used a copper-pipe QFH loft-mounted antenna, pre-amp and PROscan receiver. Dave Remnant lives in Watford and uses a Timestep loft-mounted antenna, pre-amp and PROscan receiver.



Fig. 2: From Dave Remnant.

NOAA-14 Pass At 1445UTC On 18/9/99

As would be expected, coverage of the pass by Alan and David was similar. My personal thought was how excellent the image was from both entrants. Each has produced an image that seems virtually noise-free throughout.

Congratulations to the winner(s). Having looked at the hardware used by many of the entrants, I was interested to note how many were using a pre-amp. My early experiences of these were not encouraging, and I have not used one since.

I am now going to experiment to see if there is an improvement. I shall also try to identify and reduce the sources of interference that my images suffer. This was, after all, the main idea of the competition!

To Join

If you wish to join 'rig-l', visit the site at <http://www.onelist.com> and search for 'rig-l'; you can then subscribe free.

Dave Cawley is to be thanked for organising a most time-consuming competition whilst in the middle of attending rallies.

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Passive RF Parts That You Can Use

Part 2

Modified VSWR Bridge Combiner/Splitter

The diagrams Fig. 2.5 and Fig. 2.6 show 6dB combiner/splitter circuits based on the popular bridge used to measure voltage standing wave ratio (v.s.w.r.). Each of these

circuits use a bridge made of three resistors and one winding of a transformer. In both cases, the transformers have a 1:1 turns ratio. Also, in both cases $R_1 = R_2 = R_3 = R_o$. In 50Ω systems, therefore, the value of the resistors is 50Ω, and in 75Ω systems it is 75Ω. In Fig. 2.5 the transformer is not tapped. It is a straight 1:1 turns ratio toroid transformer. The circuit in Fig. 2.6, however, uses a centre tap on the primary of T1. Note that there is a difference in the location of the summation output between the two circuits. These circuits have been popular for combining two signal generator, e.g. a sweep generator and a marker generator.

A variation on the theme is shown in Fig. 2.7. This circuit is sometimes also used as a directional coupler and r.f. power applied to the input port appears at OUT-2 with only a insertion loss attenuation. A sample of the input signal appears at OUT-1. Alternatively, if r.f. power is applied to the input, but does not appear at the OUT-1 port due to cancellation.

For the case where the device has a -3.3dB output at OUT-2 and a -10dB output at OUT-1, and a 50Ω system impedance (R_o), the value of $R_1 = 108Ω$, and $R_2 = 23Ω$. The equations for this device are:

$$R_o = \sqrt{R_1 R_2} \quad [1]$$

$$C.F. = 20 \text{Log} \left(\frac{R_o}{R_1 + R_o} \right) \quad [2]$$

$$C.F. = 20 \text{Log} \left(\frac{R_o}{R_1 + R_o} \right) \quad [3]$$

Where:

R_o is the system impedance (e.g. 50Ω)

C.F. is the coupling factor

L is the insertion loss from IN to OUT-2

R_1 and R_2 are the values of R_1 and R_2

Taking the negative of Equation. [2] gives the insertion loss from IN to OUT-1.

90° Splitter/Combiner

Diagram Fig. 2.8 shows a 3dB splitter/combiner made of lumped L and C elements, and which produces a 0° output at OUT-1, and a 90° output at OUT-2. A closely coupled 1:1 transformer is used to supply two inductances, L1 and L2. This transformer is wound in the bifilar manner

Short Wave Magazine, November 1999

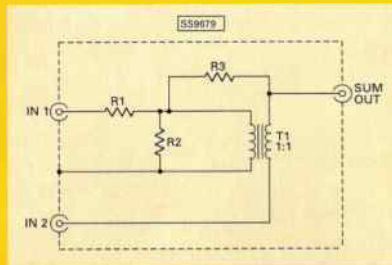


Fig. 2.5 The v.s.w.r. bridge combiner/splitter.

L is the inductance of L1 and L2
C is the capacitance of C1 and C2
 R_o is the system impedance (e.g. 50Ω)
 f_{3dB} is the 3dB coupling frequency
The bandwidth of this circuit is approximately 20% for 1dB amplitude balance.

Transmission Line Splitter/Combiners

The Wilkinson power splitter/combiner is shown in Fig. 2.9. This network can achieve 20dB isolation between the two output ports over a bandwidth that is approximately ±20% of the design frequency. It consists of two transmission lines, TL1 and TL2, and a bridging resistor (R), which has a value of $R = 2R_o = (2 \times 50Ω) = 100Ω$.

Transmission lines TL1 and TL2 are each quarter wavelength, and have a characteristic impedance equal to 1.414 times the system impedance. If the system impedance is 50Ω, then the value of the characteristic impedance needed for the transmission lines $(1.414)(50Ω) = 70.7Ω$.

The Wilkinson network can be implemented using coaxial cable at v.h.f. and below, although at higher frequencies printed circuit transmission line

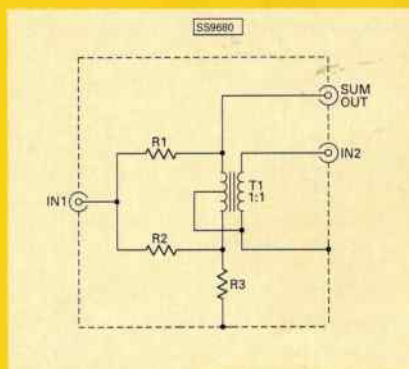


Fig. 2.6 Alternate v.s.w.r. combiner/splitter.

to ensure tight coupling. The values of inductance and capacitance, assuming that $L_1 = L_2 = L$, and $C_1 = C_2 = C$, are given by:

$$L = \frac{R_o}{2.828 \pi f_{3dB}} \quad [4]$$

$$C = \frac{1}{2.828 \pi f_{3dB} R_o} \quad [5]$$

Where:

L is the inductance of L1 and L2

C is the capacitance of C1 and C2

R_o is the system impedance (e.g. 50Ω)

f_{3dB} is the 3dB coupling frequency

The bandwidth of this circuit is approximately 20% for 1dB amplitude balance.

Where:

L is the inductance of L1 and L2

C is the capacitance of C1 and C2

R_o is the system impedance (e.g. 50Ω)

f_{3dB} is the 3dB coupling frequency

The bandwidth of this circuit is approximately 20% for 1dB amplitude balance.

Where:

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C is the capacitance of C1 and C2

R_o is the system impedance (e.g. 50Ω)

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C is the capacitance of C1 and C2

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The bandwidth of this circuit is approximately 20% for 1dB amplitude balance.

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Where:

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C is the capacitance of C1 and C2

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f_{3dB} is the 3dB coupling frequency

The bandwidth of this circuit is approximately 20% for 1dB amplitude balance.

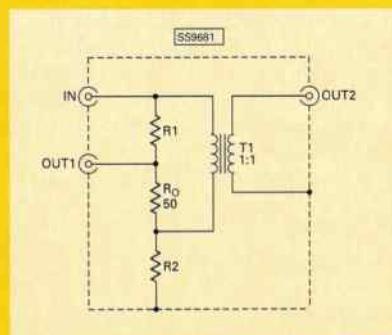


Fig. 2.7: Unequal output combiner/splitter.

This month Joe Carr K4IPV presents the final part of our guide to our guide to combiners and splitters, invaluable devices for sharing r.f. sources and terminals. Be they antennas or receivers, even TVs and video recorders.

More details of the Toroid cores referred to in this feature can be found in SWM August 1998. Back issues are available at £2.99 from the SWM Book Store, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Tel: (01202) 659930, FAX: (01202) 659950, E-mail: bookstore@pwpublishing.ltd.uk

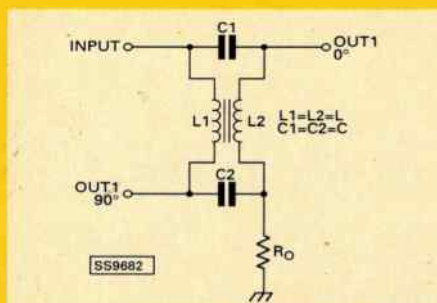


Fig. 2.8 Quadrature combiner/splitter.

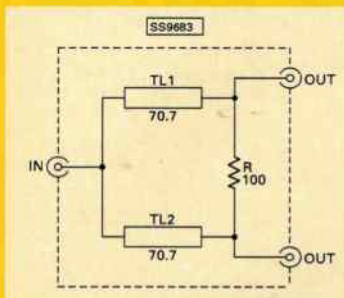


Fig. 2.9 Wilkinson combiner/splitter.

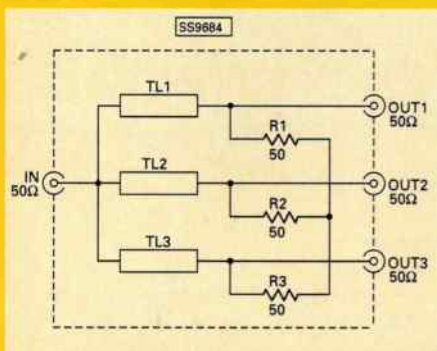


Fig. 2.10 N-way combiner/splitter.

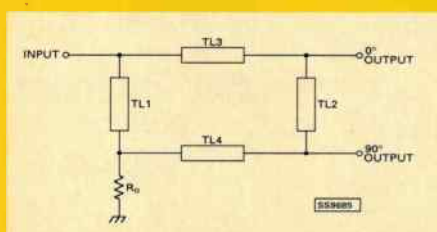


Fig. 2.11. Transmission line quadrature combiner/splitter.

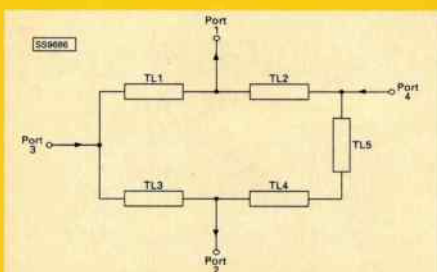


Fig. 2.12: 'Rat-race' combiner/splitter.

Table 1

Input	Use
Port 3	0° Splitter, -3 dB at Ports 1 and 2.
Port 4	180° Splitter, -3 dB, -90° at Port 1, and -270° at Port 2.

0.70 for Teflon™ dielectric cable. The physical length is:

$$\text{Length} = \frac{75\sqrt{VF}}{F_{\text{MHz}}} \text{ (m)} \quad [6]$$

An N-way version of the same idea is shown in Fig. 2.10. In this network a transmission line, TL1 - TL(n), and resistor are used in each branch. The resistor values are the value of R_0 . In the case shown, the values of resistors are 50Ω because it is designed for standard 50Ω systems. The characteristic impedance of the

transmission lines used in the network is:

$$Z_0 = R_0 \sqrt{N} \quad [7]$$

Where:

Z_0 is the characteristic impedance of the transmission lines

R_0 is the system standard impedance

N is the number of branches

In the case of a 50Ω system with three branches, the characteristic impedance of the lines is $(50 \times \sqrt{3}) = (50 \times 1.73) = 86.5\Omega$.

90° Transmission Line Splitter/Combiner

The network for producing 0-90° outputs, with -3 dB loss, using transmission line elements is shown in Fig. 2.11. The terminating resistor at one node of the bridge is the system impedance, R_0 (e.g. 50Ω).

Each transmission line segment is quarter wavelength ($\lambda/4$), so have physical lengths calculated from Equation.[6] above. The characteristic impedance of TL1 and TL2 is the system impedance, R_0 , while the impedance of TL3 and TL4 is $0.707R_0$. In the case of 50Ω systems, the impedance of TL3 and TL4 is 35Ω.

Hybrid Ring 'Rat-Race' Network

The 'Rat Race' network of Fig. 2.12 has a number of applications in communications. It consists of five transmission line segments, TL1 through TL5. At v.h.f., u.h.f. and microwave frequencies this form is often implemented in printed circuit board transmission lines.

Four of these transmission line segments (TL1-TL4) are quarter wavelength, while TL5 is half wavelength. The characteristic impedance of all lines is $1.414R_0$. Each quarter wavelength segment creates a 90° phase shift, while the half wavelength produces a 180° phase shift. When a quarter wavelength and half wavelength are combined, to form a three-quarter wavelength segment, the phase shift is 270°.

It is necessary to terminate all ports of the Rat Race network in the system characteristic impedance, R_0 , whether they are used or not. The bandwidth of this network is approximately 20%.

Different applications use different

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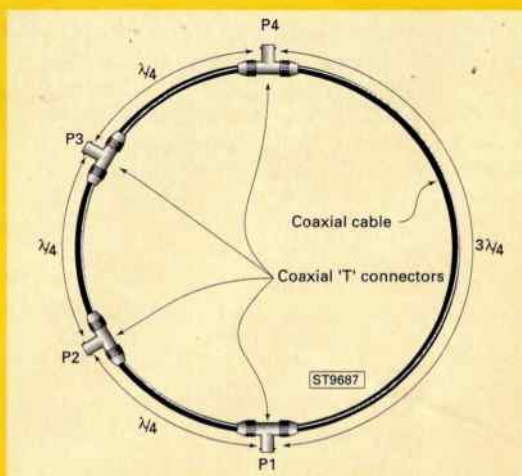


Fig. 2.13: Coaxial 'rat-race' combiner/splitter.

ports for input and output. Table 1 shows some of the relationships found in this network.

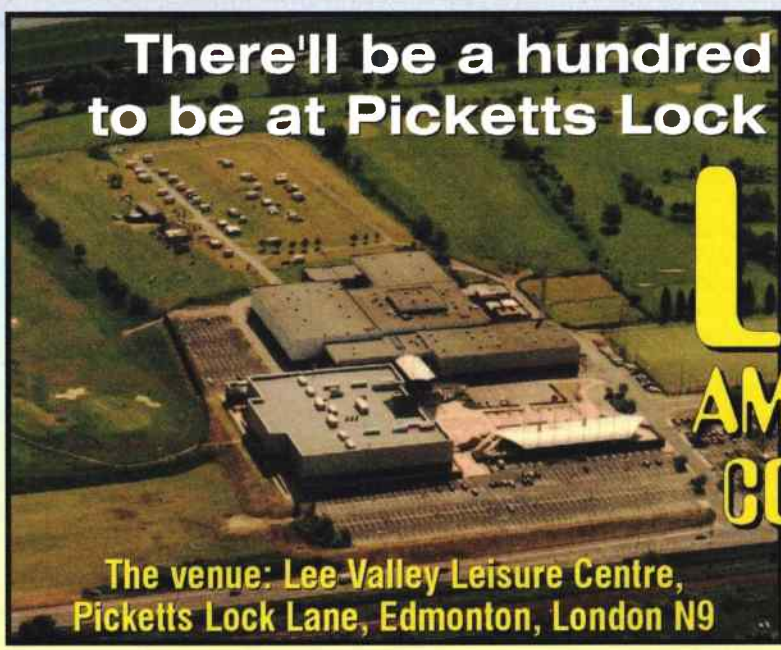
A coaxial cable version is shown in Fig. 2.13. This network is implemented using coaxial cable sections and 'T' connectors. In this case, there are three quarter wavelength sections (90°) and one three-quarter wavelength (270°) section. Applications of this network include those where a high degree of isolation is required between ports.

Conclusion

Use of r.f. combiners and splitters solve a number of problems, especially in the instrumentation of the r.f. laboratory. They will also solve a number of problems in antenna systems, receiver/transmitter systems and other situations.

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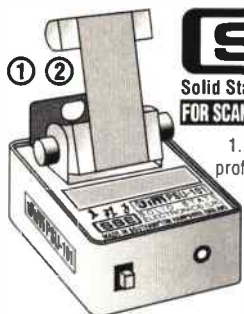
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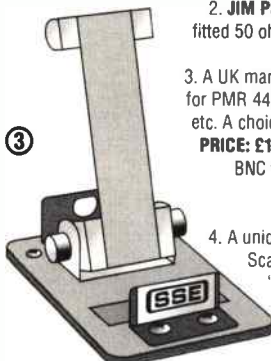
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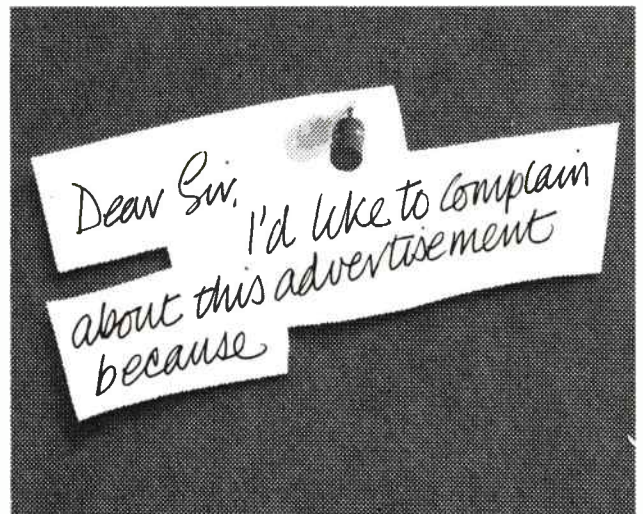
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RTTY Weather Information

Philip Mitchell explains how to become an expert weather forecaster for a minimum outlay, by utilising the wealth of data transmitted via h.f. radio teletype.

The World Meteorological Organisation (WMO) through its World Weather Watch (WWW) programme is committed to distribute accurate weather information to all member states within its organisation. One of the functions of the WWW is to provide an effective weather observation system and the distribution of the resultant data via the Main I Telecommunication Network (Fig. 1) for onward transmission by Regional Telecommunication Hubs (RTH) using cable, radio and satellite circuits.

The current active hubs are Beijing, Bracknell, Brasilia, Buenos Aires, Cairo, Dakar, Delhi, Jeddah, Nairobi, Offenbach (Germany), Prague, Sofia and Tokyo. Unconnected with RTH transmissions, Grengel meteo, the German Forces network, and Halifax meteo (Canadian Forces), Nova Scotia, Canada, also transmit weather data via RTTY in standard format, details of which are given later in this article.

Despite the termination in the past few years of several RTTY weather transmissions, including Bracknell GFL 22 - 26, there are still a number of these sources very much alive and kicking, as detailed in Table 1, but it does appear that the current trend is to switch to satellite links and for weather data to be available only on a subscription basis.

However, much high grade weather and related information still remains to be received and the object of this article is to identify these sources of RTTY weather transmissions with their subsequent interpretation in not too technical terms. Most reports received are in near real-time, hence in the majority of cases, the enhanced information is usually in advance of the abbreviated reports received from TV and radio sources.

The actual decoding of RTTY signals and equipment needed is detailed in Mike Richards' 'Decode' column in this magazine and in particular the 'Decode Special' in SWM back in September 1998. It is assumed that readers will therefore be in possession of the necessary hard and software for the resolving of weather RTTY transmissions, if not, then there's no time like the present to get going.

Current RTTY Weather Transmissions

Although Bracknell ceased RTTY transmissions in 1994, when responsibility was passed to the Royal

Table 1: Active RTTY Weather Transmissions.

Beijing, China	(75n) BLM66 4.794, BAA9 5.1805, BZC75 5.190 (50n), BJZ27 5.315 (75n)
Bucarest, Rumania	(50r) YRR6 4.002, YOG37 5.400
Grengel, Germany	(100n) DHJ51 3.8255, DHM44 4.903, DHM37 4.963, DHJ51 5.269, DHJ51 9.318, DHJ 11.125, DHJ51 13.526 (note that Grengel frequencies do vary from time to time - refer to actual transmissions for current frequencies).
Halifax, NS, Canada	(75r) CFH 6.4965, CFH 10.536
Hamburg, Germany	(50r) DDH 147.3, DDK 4.583, DDH7 7.646, DDK9 10.1008, DDH9 11.039, DDK8 11.638, DDH8 14.4673
Jeddah, Saudi Arabia	(100n) HZN 4.570, HZN 5.740, HZN 7.625, HZN 10.215, HZN 23.370
Nairobi, Kenya	(50n) 5YD 7.423, 5YE 9.041
Rome, Italy	(50n) IMB1 3.1725, IMB2 5.887, IMB3 11.453
Tehran, Iran	(50r) no callsign 10.686

Note: 75n = baud rate, n = normal phasing, r = reverse phasing. Callsign followed by frequency in MHz.

Navy and later transferred to satellite links and dial-up systems for end users in January 1998, most of the weather information given by this station can still be received from the German Weather Service, (Deutscher Wetterdienst), Hamburg. This station has always been a reliable source of detailed weather reports, and at present, there does not appear to be any plans for its termination.

Rome meteo also provides a good coverage of weather information for southern Europe and the Mediterranean and reception is good at most times during the day. Note that, unlike other RTTY meteo transmissions, when no data is being sent, it does not appear that Rome transmits a standby signal. Please refer to Table 1 for location and frequencies of currently active RTTY transmissions, all of which are in English.

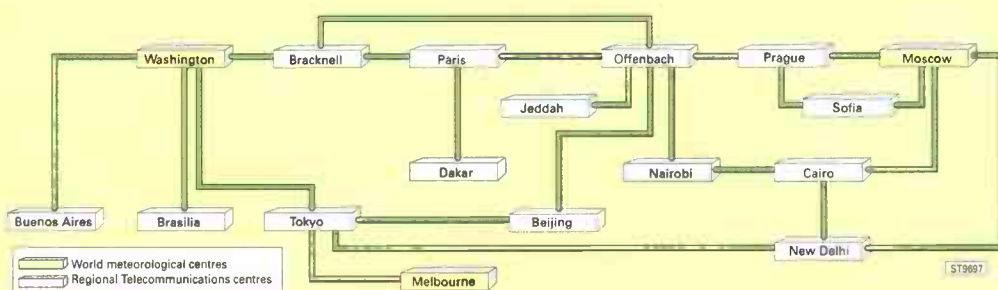
Although no guarantee can be given that some of these stations are permanent, most have been on air for some considerable time and frequencies do not appear to have altered, details of which are normally mentioned during the course of transmissions.

Best Times Of Reception

RTTY meteo stations currently in operation transmit on several frequencies, and with the exception of one Hamburg frequency of 147.3kHz in the long wave, all are in the h.f. portion of the spectrum. Reception during a 24 hour period of any radio transmission will vary considerably in signal strength due to propagation factors and time of day.

To ensure that uncorrupted text is decoded successfully from RTTY transmissions, there is a greater demand than normal for the reception of a signal to be as steady and as interference free as possible, therefore it is advisable to try each alternative frequency of the same transmission for best results. Take a note of the frequency that gives the best reception against a given time and date. Factors such as prevailing weather systems will affect reception at times. For example, a high pressure weather system can have

Fig. 1: Main Telecommunication Network. Note that Washington, Melbourne and Paris have no direct RT transmission facilities.



some adverse effects if that system is lying between transmitter and receiver. Outside of Europe, accurate propagation forecasts are listed each month in *Short Wave Magazine* giving best times of reception over a 24 hour period.

Transmission Schedules & Locations

Schedules of RTTY transmissions do appear to be rather sparse, but noting the times of content of a particular weather transmission will give a rough idea of content and relative timing. From experience of logging these stations, only approximate times can be arrived at against the type of data received, since this will be dependant on the amount of traffic at the time of reception. For example, warnings of severe weather, extended weather bulletins and the length of individual reports will extend or curtail the length of content over a given period.

Decoding Systems

Two types of systems can be adopted to decode RTTY transmissions, the most popular one being via computer software. But for those without a computer, there are hardware systems available, i.e. stand-alone decoders connected to the audio output from an h.f. receiver enabling hard copy of data printed (a) by decoder or (b) by suitable PC printer, dependant on type of decoder.

Although this latter tends to lack the flexibility of operation of a computer based system, they tend to be able to extract a more readable copy when receiving a transmission under poor conditions. Most hardware systems such as those made by ICS, Wavcom and Universal Radio (USA), Littlemore (UK) and Momentum (UK) combine RTTY with other data transmission decoding modes such as FAX, etc.

Out of the many software programs available, *Hamcomm* by Wilhelm Schroder DL5YEC, is probably the best known with the latest version 3.1a available initially as freeware on a trial basis. Modest computer requirements are about 1Mb of free space with the registered version that is able to run in full-screen mode under *Windows 95* and later.

A freeware program, *WXGraph* by Marcel PA3GG, run in conjunction with *Hamcomm*, will provide the amateur weatherman with a very comprehensive display of current European and North Atlantic weather conditions. *WXGraph* can be downloaded from the Internet direct from the 'Funet' archive at

<ftp.funet.fi/pub/ham/misc/wxgraph1.exe>

Later I will describe in more detail what kind of

Useful Reading

Klingenfuss Radio Data Code Manual now incorporating *Air and Meteo Code Manual*
Fax, Satellite and RTTY Weather Reports
Collins 'Weather' - Ultimate Guide to the Elements

Fig. 2: Message type AAXX as saved in Hamcomm HC.LOG.

```
09:56:52UTC 02366 [Sweden, 62°32'N 017°27'E Sundsvall/Hamosand]
09:56:53UTC 42889 [manned] [cloud height:1000-1500m] [visibility:75km]
09:56:54UTC 12307 [cloud cover:1/8 or less] [wind dir:230 deg, speed:7]
09:56:55UTC 10019 [air temp:+1.9]
09:56:56UTC 20013 [dew-point temp:+1.3]
09:56:57UTC 39975 [pressure at station level:997.5hPa]
09:56:58UTC 49980 [pressure at sea level:998.0hPa]
09:56:59UTC 53035 [pressure:increasing rapidly] [change in 3h:3.6hPa]
09:57:00UTC 81531 [low clouds:1/8 stratocumulus not formed by spreading out of cu.]
09:57:00UTC [mid clouds: altocumulus translucidus at a single level]
09:57:00UTC [high clouds:cirrus fibratus, sometimes unicusus]
09:57:00UTC 333 [section:3]
09:57:01UTC 81640 [clouds:1/8 or less, stratocumulus, 1200m]
09:57:58UTC NNNN [EOM]
09:58:00UTC = [start] 457 [message 457]
09:58:01UTC ZCZC [Synoptic reports at intermediate hours [SYNOP, SHIP]]
09:58:30UTC SIMM47 [Mediterranean area]
09:58:31UTC EDZW [Offenbach [MET-COM Centre]]
09:58:31UTC 200900 [day:20 UTC:0900]
09:58:33UTC AAXX [SYNOP]
09:58:34UTC 20094 [day:20 UTC:0900] [Wind speed obtained from anemometer (knots)]
09:58:35UTC 08001 [Spain, 43°22'N 008°25'W LA Caruna City]
09:58:37UTC 41356 [manned] [cloud height:200-300m] [visibility:6km]
09:58:38UTC 81304 [cloud cover:8/8] [wind dir:130 deg, speed:4]
09:58:38UTC 10116 [air temp:+11.6]
09:58:39UTC 20100 [dew point temp:+10.0]
09:58:40UTC 30063 [pressure at station level:1006.3hPa]
09:58:41UTC 40144 [pressure at sea level:1014.4hPa]
09:58:42UTC 52005 [pressure:increasing] [change in 3h:0.5hPa]
09:58:43UTC 76186 [past wx shower(s), rain]
09:58:44UTC [wx now: Rain, not freezing, continuous, slight]
09:58:44UTC 8672/ [low clouds:5/8 fractostratus or cumulus fractus pannus]
09:58:45UTC [mid clouds:altostratus opacus or nimbostratus]
09:58:45UTC =
```

— log closed Wed Jan 20 1999 09:58:58UTC —

weather information can be obtained and the interpretation of the decoded information with particular reference to the two software decoding solutions mentioned above.

Types Of Weather Messages

There are many types of weather messages originating from the World Weather Watch and the standard reference book *Radio Data Code Manual* by Klingenfuss will list and describe all of these. This article will however concentrate on those messages considered to be of particular use in providing the listener with a good overview of weather conditions existing in specific geographical locations in near real time.

The majority of messages fall into the category AAXX (Fig. 2) which give detailed weather data from fixed geographical land locations at the time and date as stated in the message. Complementing this type of message is BBXX (Fig. 3), although giving similar data in parts to type AAXX, originates from ships both at sea and in port, and fixed oil platforms.

Message type AAXX will always give the originating station in full, whilst message type BBXX indicates ships by a four character ident, e.g. FHQ1 and from oil rig platforms, a five digit code, e.g. 62414. Amongst ships at sea can be found the two remaining North Atlantic weather ships *Polar Front* callsign LDWR (in Norwegian waters) and *Cumulus* callsign GACA (in Atlantic waters).

Occasionally message types TTAA to TTDD will be received (Jeddah for example). These contain lengthy data in standard five figure blocks and relate to upper-level pressure, temperature, humidity and wind, and although these type of message can be processed by *Hamcomm*, there is no provision for translation into plain language.

Fig. 3: Message type BBXX as saved in Hamcomm.log

```
16:22:18UTC ZCZC [start] 558 [message 558]
16:22:20UTC SHVX41 [Synoptic reports at intermediate hours [SYNOP, SHIP]]
16:22:22UTC [Mobile ship or marine station in more than one Region]
16:22:22UTC EDZW [Offenbach [MET-COM Centre]]
16:22:22UTC 201500 [day:20 UTC:1500]
16:22:24UTC 88XX [SHIP]
16:22:11UTC LFSU [ship id]
16:24:12UTC 20154 [day:20 UTC:1500] [Wind speed obtained from anemometer (knots)]
16:24:14UTC 99565 [latitude:56.5]
16:24:15UTC 10032 [longitude:3.2] [latitude north, longitude east]
16:24:15UTC 41487 [manned] [cloud height:300-600m] [visibility:10km]
16:24:16UTC 42324 [cloud cover:4/8] [wind dir:230 deg, speed:24]
16:24:17UTC 10091 [air temp:+9.1]
16:24:18UTC 20091 [dew point temp:+9.1]
16:24:19UTC 40033 [pressure at sea level:1003.3hPa]
16:24:20UTC 52003 [pressure:increasing] [change in 3h:0.3hPa]
16:24:21UTC 70152 [past wx: drizzle, cloud cover > 1/2 of sky]
16:24:22UTC [wx now: Clouds generally dissolving or becoming less developed]
16:24:22UTC 82632 [low clouds:2/8 stratus, continuous layer or in ragged shreds]
16:24:23UTC [mid clouds:altocumulus translucidus at a single level]
16:24:23UTC [high clouds:cirrus spissatus, patches or entangled sheaves]
16:24:23UTC 22200 [ship direction: stationary, speed: 0 knots]
16:24:24UTC 06069 [sea surface temp: 6.9]
16:24:25UTC 10504 [wave period:05 seconds, height:1.75-2.25m]
16:24:26UTC 70072 [wind wave height:2.2m]
16:24:27UTC =
16:24:44UTC 62305 [ship id]
16:24:45UTC 20154 [day:20 UTC:1500] [Wind speed obtained from anemometer (knots)]
16:24:46UTC 99504 [latitude:50.4]
16:24:47UTC 10000 [longitude:0.0] [latitude north, longitude east]
16:24:48UTC 46/80 [automatic] [cloud height:no data] [visibility:20km]
16:24:49UTC /2019 [cloud cover:no data] [wind dir:200 deg, speed:19]
16:24:49UTC 10105 [air temp:+10.5]
16:24:50UTC 20092 [dew-point temp:+9.2]
16:24:51UTC 40139 [pressure at sea level:1013.9hPa]
16:24:52UTC 52018 [pressure:increasing] [change in 3h:1.8hPa]
16:24:53UTC 22200 [ship direction: stationary, speed: 0 knots]
16:24:54UTC 00102 [sea-surface temp: +10/ 2]
16:24:56UTC 10884 [wave period:08 seconds, height:1.75-2.25m]
16:24:56UTC 70022 [wind wave height:2.2m]
16:24:57UTC =
```

Fig. 4: Synoptic weather bulletin from Hamburg Meteo

```
15:57:16UTC ZCZC [start] 969 [message 969]
15:57:19UTC FXMMI60 [Miscellaneous forecasts]
15:57:20UTC [Mediterranean area]
15:57:20UTC EDZW [Offenbach [MET-COM Centre]]
15:57:21UTC 211200 [day 21 UTC:1200]
15:57:23UTC MEDIUM [EOM]
15:57:24UTC RANGE - WEATHER & SEA BULLETIN FOR THE
15:57:31UTC MEDITERRANEAN SEA ISSUED BY MARINE WEATHER SERVICE, HAMBURG
15:57:40UTC 21 01, 1999 12 UTC
15:57:44UTC GENERAL SYNOPTIC SITUATION:
15:57:49UTC HIGH 1031 SOUTH OF THE AZORES AT FIRST ON SATURDAY MOVING
15:57:58UTC TOWARDS SPAIN SLOWLY WEAKENING FROM MONDAY NEW HIGH
15:58:07UTC WEST OF THE AZORES SLOWLY MOVING EAST. LOW 1008 WEST
15:58:17UTC PORTUGAL MOVING SOUTHEAST, SATURDAY MOROCCO, THEREAFTER
15:58:26UTC MOVING SOUTHEAST, MONDAY LIBYA HIGH 1034 UKRAINE WEAKENING
15:58:37UTC SLOWLY, LATER A LITTLE MOVING WEST, TOWARDS MONDAY 1031
15:58:46UTC NORTH GREECE, WEAK RIDGE 1025 WEST ALPS, 1020 SPAIN FOR A
15:58:50UTC TIME WEAKENING, FROM MONDAY STRENGTHENING AND MOVING WEST
15:59:06UTC FORECAST OF THURSDAY, 21 01 1999 00 UTC
```

Continued on page 54...

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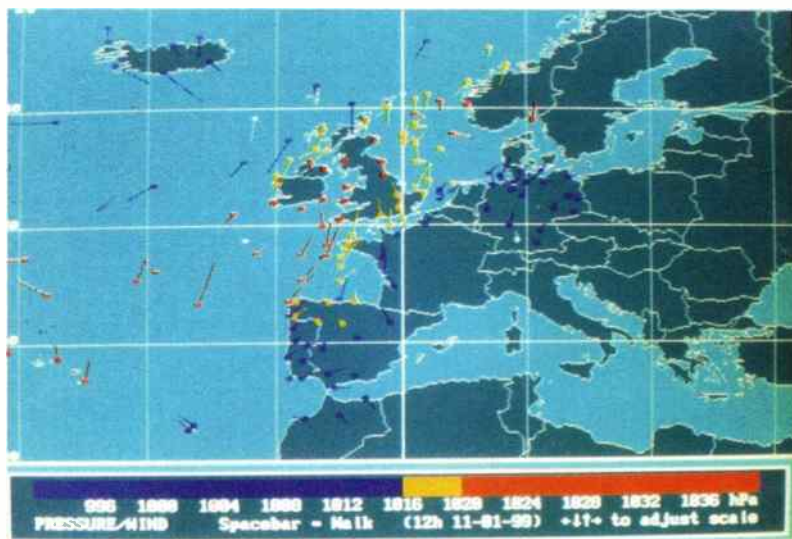


Fig. 5: WXGraph plots of pressure/wind distribution.

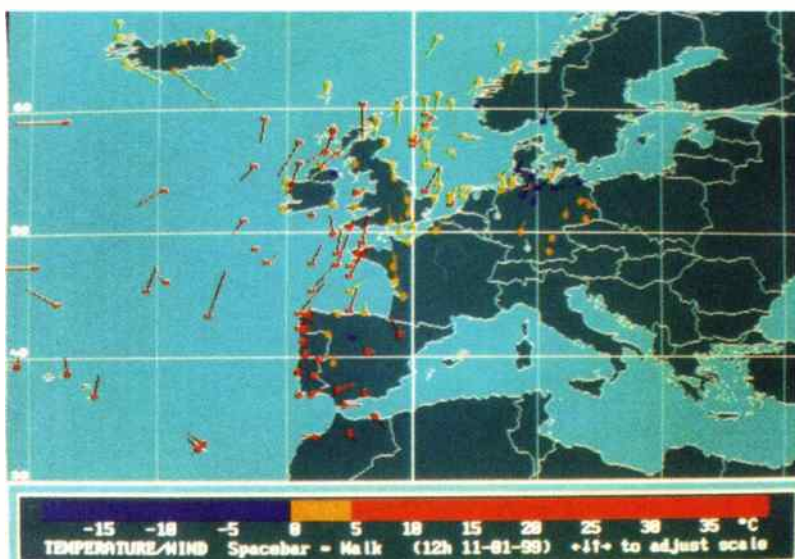
Reference to *Radio Data Code Manual* will however enable this to be done if one is interested in upper air data. Another source of detailed weather information can be found in the METAR (Met. Aviation Routine) report, that will convey actual weather conditions existing at originating stations. These are mostly airfields, both military and civil, the location of which is encoded with a four letter identifier, e.g. EGLL = London Heathrow.

The identifiers are decoded by the program in use such as *Hamcomm*. Similar in format to METAR messages, are TAF (Met. Aerodrome Forecast) reports that give a 12 hour forecast for same airfields. Occasionally, one might also receive message types AIREP (weather reports from aircraft in flight), TTAA, TTBB (upper air weather data) and SFLOC (location of atmospheric disturbances) although these latter reports are a rarity.

In addition to message types mentioned above, Hamburg meteo also transmits a general synopsis of weather and individual reports and forecasts at approximately mid-morning of European sea areas, see Fig. 4.

Reference can be made to **Table 1** and listing of Halifax, Nova Scotia (Canadian Forces Weather Station) that, in addition to standard RTTY messages, transmit plain language messages that do not require decoding. These messages are mainly warnings of exceptional weather and the location and movement of icebergs in Canadian waters. Note that Halifax is a non WWW designated station

Fig. 6: WXGraph plots of temperature/wind distribution.



that transmits FAX weather maps and RTTY weather reports alternately on the same frequencies.

Interpretation Of Decoded Information

The message type AAXX (synoptic report of surface observations from land station) is shown in **Fig. 2**, as received and saved in logfile HC.log. Most of the message is self-explanatory and if it appears that the format does not present the same appearance as that shown in **Fig. 2**, check the configuration file (HC31.cfg or similar) to *Hamcomm* to confirm this is set up correctly.

Notes of interpretation: Line 1, ZCZC = standard start signal for all RTTY messages. 457 = sequential message number (returns to 1 when 999 reached). From line 12, 333 (section 3) follows five figure groups relating to regional exchange of data, the first digit being the identifier as follows: 1xxxx = air temperature, 2xxxx = dewpoint temperature (humidity), 3xxxx = barometric pressure at station level, 4xxxx = pressure at sea level, 5xxxx = change in pressure, 6xxxx = precipitation, 7xxxx = past weather, 8xxxx = cloud data (can be split into several heights) and 9xxxx = maximum gust of wind. Dependant on whether they have been recorded at reporting station, not all of these observations are sometimes transmitted.

The message type BBXX (synoptic report from sea station) can be seen in **Fig. 3**, as received and decoded. Again, most of the information is self-explanatory and that data after line (N put in) 333 (section 3) is identical to message AAXX.

WXGraph

As mentioned previously, this freeware program can be very effectively and simply used in conjunction with *Hamcomm*, requires only 250Kb of disk space and will run on most DOS systems. It uses the decoded weather data that has been saved in the *Hamcomm* file HC.LOG and displays it graphically.

The individual plots consist of a dot for land-based stations and a square for sea borne locations with a tail indicating from which direction the wind is blowing and the length of tail indicating wind speed at that particular location. To access the detailed weather at each plotted station, a cursor can be positioned on any one of these locations.

Choosing the pressure/wind option (**Fig. 5**) and looking at the display overall will give an indication of pressure distribution and windspeed, whilst choosing the temperature/wind option (**Fig. 6**) will display temperature and windspeed variations across the area. So, those weather buffs amongst us will be able to obtain an accurate overview of weather status across Europe in near real time.

By starting another log, say six hours later, and repeating the operation, with a little skill it should be possible to assemble an accurate home-brew forecast weather map. All the data from weather messages AAXX and BBXX is retained on file within *WXGraph* in order of time and date e.g. 12100199.dat = 1200UTC, 10/01/99 and this programme can retain up to 89 of these files or they can be deleted if necessary, thus periods of exceptional weather can be kept on file for future reference.

WXGraph can be used with alternative programs provided they have a means of storing weather RTTY weather data in a .LOG file.

SWM

Scanning

At last, following a distinct lack of correspondence from any of you, a small deluge of letters and E-mails has arrived at my London HQ. Amongst them is one from **Martin Roberts** from Colwyn Bay. Martin says that his sister, who lives in Toronto, has recently sent him details of a Radio Shack PRO-2050, which lists trunk tracking as well as comprehensive standard scanning facilities amongst its features and sells for just \$349.99. Martin asks whether I know of a UK or European version of this. Well, by sheer co-incidence, I happened to be conducting some research on Radio Shack scanners at the time Martin's letter came in, and the short answer is, I'm afraid, "No".

You see, at the time of writing, all of Radio Shack's many trunk-tracking scanners (there seems to be an almost infinite supply of models, each differing just a little bit from the next) are limited to tracking trunked conversations in the 800MHz band only, though their conventional scanning facilities do extend well beyond this limitation. Most UK and European trunked bands (at least of the type this scanner is designed to track, namely Motorola SmartNet/SmartZone) are in other parts of the radio spectrum, typically 400 to 500MHz in the UK, on the other hand. This makes the Radio Shack trunk tracking scanners rather useless over here.

This situation will, I believe, change in the not too distant future, though. As I mentioned last month, Uniden has recently launched a trunk radio scanner that can track outside the 800MHz band. Since, if I'm not mistaken, Radio Shack's trunk tracking scanners are all based on Uniden designs/technology, it therefore seems reasonable to think that before long we'll see non-800MHz-specific Radio Shack trunk tracking scanners too.

Word Of Warning

A word of warning though, to anybody thinking of buying a scanner. During my research, I called a couple of Radio Shack stores in the US and asked to speak to their scanner expert. I explained that I wanted a trunk-tracking scanner that worked outside the 800MHz band, similar to the Uniden BC245XLT.

In each case, I was told that they had models that were much better than the Uniden, and did exactly what I wanted. On further investigation, however, I discovered that this was not the case at all, and that, as seems to happen all too often, the so called scanner expert in fact had no idea what he was talking about. In each case, I was actually being offered 800MHz-specific trunk tracking products.

My advice, then, to everybody who is thinking of buying a scanner anywhere in the world is not to do so unless you buy from a company that actually knows something about the products they sell. This is particularly important when buying from somewhere other than your home country, as you can't simply take or send it back to the shop the next day if you discover it doesn't do what you expected it to do.

Readers' Questions

On to the answer to a question posed by television and television licence-less **Richard Howard** a few months back. He wanted to know if, when he tuned into the audio component of a TV signal, a TV detector van might think he was illegally watching a television. Well, Richard won't be illegally watching TV, but he'll still need a licence to listen to the sound, please note! I had a number of letters and E-mails offering technical help on this, including those from **Paul Beaumont, Peter Hardy, Paul Unwin**; and a reader in Wales who wishes to remain anonymous.

Basically, Richard should go undetected. The TV Detector van quite simply looks for leakage from a TV's local oscillator, the audio/video i.f.s of 99% of models being at 33/39MHz. Alternatively, if checking that someone isn't using a colour TV on a back and white licence, they look for leakage from the 4.433MHz chroma oscillator. With scanners having i.f.s other than those of a TV, it is therefore highly unlikely that anybody would ever bother Mr Howard.

Steve Smith from Belfast also needed some help a couple of months back. He was searching for information on how to add a discriminator output to his Icom IC-R7000. Well, as well as being able to provide information about TV detector vans, Paul Unwin was also able to provide a possible answer for Steve too. He sent me a list of some of the most popular i.f. chips and the audio pin output you need to tap in order to get at an unfiltered audio signal.

Hopefully, one of these is used in the IC-R7000. If not, Paul has promised to try and find out the correct pin for the chip used in the Icom, as long as Steve can tell him the chip model number used. (I've just discovered that IC-R7000 uses a discrete set-up for demodulation. I'll give you more details next month). Incidentally, in order to get all this to work, you need to do a little more than just attach a wire to the indicated pin, and another to ground.

Paul recommends the use of thin coaxial microphone lead-type cable, with a 0.1µF capacitor in series with the centre conductor at the chip end. This capacitor blocks off any d.c. voltages from the scanner's audio output stages getting into whatever you are connecting to it, preventing possible damage.

Obviously, the screen part of the cable should go to a suitable ground point on the scanner. I should point out that this is a tricky modification, and may result in damage to your scanner. You may even damage your scanner by just trying to get into it to find out what discriminator chip you have installed. I would not, therefore, recommend you try this at home unless you are willing to risk the destruction of your scanner. This type of modification will also invalidate your warranty.



Table 1: Discriminator Modifications Audio Outputs.

IF Device	Pin No
TA-7787AF	9
MC-3357P	9
MC-3359P	10
TK-10930V	12-n.f.m. 13-a.m.
TK-10489M	11
NJM-3359D-A	10
MC-3361BP	9
TK-10421M-2	11
TK-10420	9
KB4419A	6
KA2243N/HA12413	10
TK-10427/-10420	19
TK-10421M-3LT	11
TK-10487	11
TA-7787AF	9
NJM-3359D-A	10
TK-10421D-2	9
3130-6056-502	10 or 16

Before I Go

Well, that's all I have time for again this month. Just before I go, though, I'd like to remind everybody that, to a very large extent, it is you, the reader, who shapes the content of this column. If you don't like what you see, write and let me know what you'd like me to cover instead. And, if you do like what you see, let me know anyway, as the odd letter of encouragement can cheer up an otherwise very dull day.

Of course, I can't sign off without my usual warning either. Listening to any radio transmission you are not licensed to receive (other than licence exempt services) is a criminal offence. In plain English, this means that if you are caught listening to something you should not be tuning in to, you risk a fine, confiscation of your equipment, and even imprisonment.

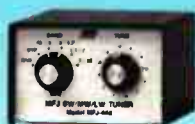
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QEP-400
£10



QS-400
£10



DESK STAND
£18



ICOM PCR-1000
£259



ICOM IC-R10
HI-SPEC SCANNING RECEIVER
£249



GRUNDIG YB-500
SPECIAL BULK PURCHASE
£99



TIMEWAVE DSP-599ZX DSP
£299



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DX Television

The influx of Sporadic-E signals continued throughout August, breaking the trend of recent years when activity ended abruptly early in the month. A welcome tropospheric lift at the end of the month brought in French and Benelux stations as far west as Bristol. Meteor-Shower activity occurred on the 12th, 13th and 14th and the total eclipse of the Sun brought in medium-wave stations.

DXTV Reports

Simon Hockenhill (Bristol) comments that most of the openings this season seem to have favoured the north-east through to the south-east with fewer instances of Spanish and Portuguese reception. However, Simon was fortunate enough to identify Portugal's 35W RTP-1 relay on E4, a station which has so far been absent. The station was identified on the 22nd at 1003 when a cartoon was received.

Vincent Richardson (Dolgarrog) reports a quieter month with the 21st and 23rd being the most productive days for Sporadic-E reception. Countries logged include Hungary (RTL Klub), Germany (ARD), the Czech Republic (TV Nova), Switzerland (SF-1), Lithuania (LRT), Norway (NRK-1), Croatia (HRT) and Italy (RAIUNO and TVA). Recent openings for **Martin Dale** (Stockport) have featured Italy (RAIUNO and TVA), Slovenia (SLO-1), Hungary (RTL Klub) and Spain (TVE-1).

The 22nd was one of the most productive days with intense activity on all channels. As the m.u.f. rose above Band I, **Peter Chalkley** (Luton) discovered a film on Channel IC at 1210UTC. The most likely contenders, in order, are Albania, Italy or an Italian private station.

On the 12th, 13th and 14th, the Geminids Meteor-Shower provided plenty of 'pings' from Norway (NRK-1), Sweden (SVT-1) and Denmark (DR-TV), according to **Stephen Michie** (Bristol). **Peter Barber** (Coventry) commented that the morning of the 13th was the most active period with the number of 'pings' well into double figures.

Mystery PM5544 Test Card

Stephen Michie queries a PM5544 test card, seen on Channel E3, on the 15th at 1114. This is unlikely to be Norway since text pages and programmes are the norm after 0715. **Roger Bunney** (Romsey) mentions the sighting of a PM5544 from the south-east on E4 by a Cambridgeshire DXer. No European station springs to mind. Not so long ago, PM5544 test cards were 'ten a penny'. Now they are so rare due to wall-to-wall programming that they enter the 'mystery' category!

FM Reports

Simon Hockenhill (Bristol) logged over a dozen Italian stations between 1040 and 1235 on the 22nd. A solitary Slovenian signal was heard on 88.00MHz during the opening. Signal levels topped S3 to S5 using a Roberts R979 receiver with 2m of wire attached to the telescopic rod antenna.

Also on the same day, RFI was heard on 25.820MHz via F2 backscatter from 0937. The signal is normally barely audible but reached level S4 until 0955.

Shortly after noon on the 22nd, Peter Chalkley heard Sky News on his scanner at 48.08MHz. Comparing the sound with the satellite broadcast, the audio heard on the scanner was slightly ahead of the satellite signal.

During the tropospheric conditions towards the end of August, **Tim Bucknall** (Congleton) visited Middleton

Top, near Matlock in Derbyshire, and was rewarded with several European f.m. stations coming through 'loud and clear'. The most distant was a French station at Lyon. The Derbyshire site is a haven for DXers. Benelux stations can be heard virtually under flat conditions.

Iain Menzies (Aberdeen) regularly monitors 87.6MHz on his car radio and he encountered some amazing Meteor-Shower 'bursts' in stereo between the 12th and 14th. Iain wonders whether other enthusiasts have had success identifying stations with RDS during Meteor-Shower activity.

During the total eclipse of the Sun on August 11th, Simon Hockenhill and Stephen Michie noticed that several medium-wave stations emerged. These included Lisnagarvey (BBC Ulster) on 1341kHz, Bordeaux 1206kHz, Lille 1377kHz, Lopik (Netherlands) 1395kHz, Hensweiler (Germany) 1422kHz and Luxembourg on 1440kHz.

Service Information

Over the past few months, Stephen Michie has gathered vital information which may help other enthusiasts identify the



Fig. 3: A typical PM5544 test card. This was used by Télé-Monte-Carlo (TMC) in Monaco.



Fig. 1: The mechanical clock caption used for many years in Russia by TSS.

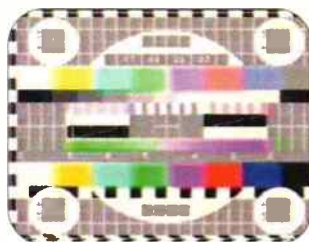


Fig. 2: The Russian-style G-204 electronically-generated test card.

Sporadic-E Log For August

The compilation log features reports from Simon Hockenhill, Stephen Michie, Vincent Richardson, Peter Chalkley and Peter Barber.

Day	Log
1	Sweden (SVT-1) E2 and E3; Slovenia (SLO-1) E3; Croatia (HRT) E4; Austria (ORF-1) E2a; Germany (ARD) E2 and E3; Switzerland (DRS/SF-1) E3; Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Spain (TVE-1) E3; Hungary (RTL KLUB) R2; Lithuania (YT-2) R2; Czech Republic (TV Nova) R2; Hungary (MTV-1) R1.
2	Spain E3; Slovenia E3.
3	Spain E2.
4	Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Spain E2 and E3; Corsica (Canal Plus) L2 and L4; Czech Republic (TV Nova) R1; Lithuania (YT-2) R1.
5	Italy (RAIUNO) IA and IB; Italy (TVA) IA.
6	Italy (RAIUNO) IA; Italy (TVA) IA; Czech Republic R1 and R2; Corsica L2; Hungary (RTL KLUB) R2; Slovenia E3; Denmark (DR-TV) E3; Germany E2; Switzerland E2; Norway (NRK-1) E2 and E3.
7	Italy (RAIUNO) IA.
8	Corsica L2.
10	Spain (TVE-1) E3 and E4.
11	Italy (RAIUNO) IA.
12	Denmark E3; Norway (NRK-1) E2; Sweden (SVT-1) E3.
13	Norway (NRK-1) E2; Denmark E3; Sweden E3; Italy (RAIUNO) IA and IB; Italy (TVA) IA; Slovenia E3; Portugal (RTP-1) E3; Spain E2, E3 and E4; Corsica L2.
14	Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Corsica L2 and L4; Spain E2, E3 and E4; RTP-1 E3; Denmark E3; Czech Republic R2.
15	Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Moldova (TVM) R2; Norway E2; Unidentified PM5534 E3 (see text).
16	Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Denmark E3.
17	Italy (RAIUNO) IA and IB; Corsica L2; Sweden E3.
18	Spain E4; Hungary (RTL KLUB) R2.
19	Denmark E3.
20	Italy (RAIUNO) IA and IB; Italy (TVA) IA.
21	Russia (PTV) R2; Estonia (ETV) R2; Lithuania (LRT) R2; Norway E2, E3 and E4; Finland (YLE-1) E3; Sweden E2, E3 and E4; Czech Republic R2; Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Slovenia E3; Switzerland E2; Austria (ORF-1) E2a; Hungary (RTL KLUB) R2; Ukraine (YT-1) R2; Rumania (TVR-1) R2; Unidentified '1' logo on R3.
22	Italy (RAIUNO) IA and IB; Italy (TVA) IA; Italy (VIDEO) E2; Unidentified film on IC; Spain E2, E3 and E4; Portugal (RTP-1) E3 and E4; Corsica L2; Sweden E2; Norway E2 and E3; Switzerland E2 and E3; Slovenia E3; Croatia E4; Serbia (RTS) E3; Hungary (RTL KLUB) R2; Austria (ORF-1) E4; Germany E2; Czech Republic R1 and R2; Ukraine (YT-2) R2; Rumania (TVR-1) R2; Lithuania (LRT) R2.
23	Norway E3.
24	Russia (RTV) R2; Spain E3.
26	Italy (RAIUNO) IA and IB; Italy (TVA) IA.
27	Norway E3.
29	Spain E2 and E3; Portugal E3.
31	Spain E2 and E3.

following countries:-

Ukraine: The striped '1' (or double '1' effect) logo originates from the 1st Network, YT-1. The Ukraine news caption resembles 'YTH' which is also used by Belarus and ORT Russia. The clock is similar to the old Russian 'TSS' caption but with a smaller face and the inclusion of the '1' logo in the top-right.

The YT-1 closedown sequence consists of a caption followed by a short display of the G-204 test card and colour bars (9-bar type) followed by transmitter switch-off.

The YT-2 closedown sequence ends with a white raster with a digital clock in the lower-right of the screen. But beware, Belarus uses a similar white raster but with the digital clock in the top-right. This is followed by a caption then by transmitter switch-off.

The '1+1' logo seems to be used during the morning and evenings only. At other times, a white 'YT-2' is displayed in the top-right of the screen.

Belarus: The old Russian 'TSS' clock has been seen but with a white background and black numerals.



Fig. 4: A thing of the past. Central TV recently introduced a whole series of expensive logos but these were all scrapped on September 6th when the station name was changed to London-based Carlton TV!



Fig. 5: Another example of expensive on-screen graphics. Can anyone explain what the significance is between the Identification Symbol and one of the latest channels, BBC Prime? It seems that any old graphic design will do these days for channel idents!

Other News

Netherlands: A new regional transmitter in the province of Noord-Holland will be on test from the end of November. The 200kW transmitter will be located at Wormer (North of Amsterdam) and will use Channel E55.

Greece: A new private station known as 'VIP' is on-air using Channel E2. Although not yet identified in the United Kingdom, this has been logged with amazing regularity in the Netherlands. A second private station called 'CLUB TV' has been received on Channel E3. Both stations are thought to be based in Athens.

Eire: Several Band III relays are to be phased out with viewers being urged (by means of on-screen superimposed captions) to re-tune to the new u.h.f. replacement channels towards the closure dates. The Merville Band III outlets ceased operation on May 10th, according to a Television Trade bulletin.

A Dutch DXer has claimed reception of the RTE-1 Gort transmitter on Channel 1B in early July! This is contrary to recent information concerning the closure of the transmitter which should have occurred earlier this summer.



Fig. 6: This month's lucky dip in the 'Down Memory Lane' spot. The logo used in the 50s by Granada TV.

Keep On Writing!

Please send your DXTV and f.m. reception reports, news 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.

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Airband

Abbreviations

AIC	Aeronautical Information Circular
CAA	Civil Aviation Authority
CD-ROM	Compact Disc - Read Only Memory
FL	flight level
h.f.	high frequency
MHz	megahertz
r.f.	radio frequency
v.h.f.	very high frequency
v.o.r.	very high frequency omnidirectional radio range

The eclipse in Cornwall (with apologies to Patrick Moore) was the nearest thing to a flop that anything can be and still attracted enough visitors to cause a traffic jam. Actually, Chris and I had the best view in Cornwall from our farm accommodation just south of Royal Naval Air Station, Culdrose.

I mention this because our room was as good as you'll find in any hotel and the welcome friendlier. Above all, if you request a room with a balcony, you have a grandstand view of all movements at Culdrose (binoculars needed for detailed observation). If you want a West Country holiday with aeronautical interest and a swimming pool, try Tregaddra Farm. Contact June Lugg on (01326) 240235 and remember me to her.

In fact, there were hardly any aircraft in our area for the eclipse, despite the desperate warnings from official sources. Culdrose was quiet, the expected numerous civil light aircraft never appeared. We did hear the television coverage Hercules in the distance, but it remained above local cloud cover.

One flight to see the totality was Goldair GDA69 from Biggin Hill, a Beech 200 G-REBK carrying Peter Mugridge (Epsom) who chartered it, and paying passengers sharing the £1000 per hour cost. At FL250 above the clouds there was a dramatic view at totality with Venus and a solar prominence visible.

Digressing, we saw totality through a lucky break in the clouds. I also received a distant medium wave broadcast station, normally only audible at night, suggesting a possible reduction in D-layer absorption.

Information Sources

I often explain how the official source of aeronautical information, published by the state, is the *UK Aeronautical Information Publication (AIP)* (formerly known as the *UK Air Pilot*). As it contains all the details, (including airways and aerodrome frequencies, supersonic routes, etc.) it's certainly worth having. Up until now, that's been expensive, although a copy might be available for inspection at many aerodromes or flying clubs.

If you have access to a computer with a CD-ROM drive, that's all changed! A trial version of the *AIP* is now on sale. Send a cheque or postal order for £5, payable to National Air Traffic Services Ltd., to: **AIS Publications (CD-ROM), Room 160, Control Tower Building, London Heathrow Airport, Hounslow, Middlesex TW6 1JJ**. I emphasise that you will receive only the current copy, but no updates are included when the information changes in future. A subscription service is available, but the price has not been announced yet. This information was distributed by the CAA with *AIC* issue of August 12.

Obviously not good if you want a copy of the entire massive document, you can access the *AIP* on the Internet at ais.org.uk as **Mike Powell** (Acton) reminds me. This might be a useful way to update the information on the CD-ROM, browsing through amendments and printing out only those that you actually require.

Also on the Internet

<http://realserver.brooklyn.cuny.edu:8080/ramgen/encoder/jfk.rm> is the Tower controller at New York (JFK). Although **Geoff Parr** (Ashford) says you can 'listen' to it, presumably if your computer includes a sound card, he doesn't say if you need specific software to decode the digital audio stream.

Another computer-readable source is *Lowdown*, a CD-ROM by Andy Heap and Paul Jackson. Concentrating on military subjects, I have no further information other than it was

brought to my attention by **Mick Murphy** (Dollis Hill). Could you send details as to contents and from where to obtain it, Mick?

If you want the list of flight numbers from **Len Woolley (3 Furze Gardens, Morwenstow, BUDE, Cornwall EX23 9SX)** you should write to him directly enquiring about the price of the necessary computer discs (supply a pre-paid reply envelope). Len often updates the information but there is too much detail to print here. That's why readers should enquire directly about any update service that Len might offer.

When **Andrew Green** (Barnsley) sent off for the *Chart of United Kingdom ATS Airspace Classifications* he discovered that it had been re-numbered ENR 6-5-2-1 in keeping with the new style *AIP*. Available from the CAA if you send a self-addressed reply envelope with sufficient postage (Andrew was told £2.20), you can find out how to get it by reference to my *Airband Factsheet*. It's three-quarters of the way down the first page. *Factsheet* Issue 10 shows the old chart number and needs amending.

Now you'll be asking where to get the *Factsheet* from. Not me, I haven't a photocopier! Send a self-addressed reply-paid envelope, to hold two A4 sheets, to the Broadstone Editorial Offices. Included are charts of the trans-Atlantic supersonic routes.

You now have a choice when obtaining the charts. A set is printed in the book *The Concorde Story* by Christopher Orlebar, which is recommended by **Keith Parry** (Swansea, close to the flight path). As Keith's just bought a copy, I assume it's in print and can be ordered through the usual bookshops or W.H. Smith.

Andrew Green also notes that another franchise deal has been struck. Belfast and Dublin are now served by a schedule operated by British Regional Airlines on behalf of British Airways. It seems as though the big airlines are taking control of the smaller ones, but this does give the smaller companies economic strength through such franchises. They often operate in the colours of, and sometimes with the call sign of the 'parent' company.

Follow-Ups

Brian Allum (Wokingham) was the only respondent to elaborate on the Goodyear airship that I mentioned in July. Brian nearly didn't reply, assuming I'd be inundated with information. So you see, never put it off - it was worthwhile, Brian!

Operating out of White Waltham, Brian tells me it would need to work Farnborough 125.25MHz. In the August issue, I mentioned its use as a camera platform at sporting events and Brian adds that it has attended the Cup Final (presumably soccer), Cowes Week and, he thinks, Ascot and Wimbledon.

You note ex-Eastern Bloc aircraft at White Waltham, Brian. I wonder if the 'large biplane' is an Antonov AN-2? Powered by a single radial engine, its take-off, cruise and approach speeds all seem about the same to me!

In August I asked which antenna was installed in Poole by **Chris Jordan**. He has two active antennas from C.M. Howes who advertise in *SWM*. The AA2 covers h.f. and the AAB 118 is for the v.h.f. segment around 118MHz.

Chris has to compromise as he lives in a flat, hence the need to choose an active antenna, i.e. one with inbuilt r.f. amplifier. Good results are obtained with the antennas stood in front of the window. Protecting the v.h.f. antenna by placing it in a plastic drainpipe radome makes it more portable without Chris noticing any performance loss. If a sample of the plastic gets warm when 'cooked' in a microwave oven (put in a cup of water too, for safety) it's too lousy for use as a radome!

How about embellishing this column with photos of larger aircraft? Good idea, **Quentin Cruise** (Aberystwyth), but our Chris can't get near enough to 'em! So, an appeal. Does anyone

Airband Factsheet

- Available from the *SWM* website - visit www.pwpublishing.ltd.uk/swm/airbandfactsheet.html
- Available from the *SWM* Editorial Offices - send stamped, self addressed envelope to **AIRBAND FACTSHEET, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

out there have official access to where she could take some such pictures? Please let me know!

Frequency & Operational News

Martin Sutton (CAA) passes on news of a new upper airway. UP612 runs from the Sumburgh v.o.r. beacon eastwards to a new reporting point SOMBU on the international boundary. A/C 95/1999, also from the CAA, shows that runway 08/26 has been withdrawn at Edinburgh.

You might already know that 131.8MHz is the air-to-air liaison frequency available to flights crossing the North Atlantic. They also monitor 121.5 the emergency frequency. In other remote parts including the South Atlantic, some of South America and Africa, air traffic control is not as comprehensive as over the North Atlantic. In these areas, aircraft often broadcast their positions on 126.9MHz in the hope of warning others of their presence. Please note that you would not expect any of the transmissions mentioned in this paragraph to reach the British Isles.

Declan Maguire (Co. Antrim) asks what 125.67MHz carries. It's the Southwest Sector of Scottish Airways but, at quiet times, it band-boxes onto Dean Cross Sector 129.225 so that one controller can work both frequencies. The CAA forbid me to say the actual location of individual repeaters, I'm afraid.

It's no secret that the *Red Arrows* co-ordinate their displays on 243.45MHz. The talk on this channel has often been broadcast in television documentaries about the *Reds!* Suitably entertained by their display was **Ian Forrest** (Otley).

I finish on the thought that radio can be a great comfort and benefit to the more isolated members of our community. One reader, who lives on the Lancashire coast near that place "...noted for fresh air and fun..." is confined to a wheelchair. I'm told that the radio hobby provides a great deal of pleasure and widens the horizons. We'll all agree with that.

Next Month

Next month I'll include a contribution from **Tom Evans** (Hull) and answer a query by **David McCurry** ('Derry). All other letters received up to September 8 have been answered and all requests for the readers' offer have been met up to that date.

By the beginning of September, I was scraping the bottom of the barrel so those who applied late for the offer might not have received exactly what they hoped for, but I tried my best. The next three deadlines (for topical information) are November 8, December 6 and January 10. Replies always appear in this column and it is regretted that no direct correspondence is possible.

Web Watch

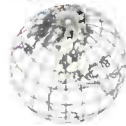
- AIS Publications are on line at ais.org.uk
- The Tower controller at New York (JFK) is online at <http://realserver.brooklyn.cuny.edu:8080/ramgen/encoder/jfk.rm>
- Airband Factsheet online at www.pwpublishing.ltd.uk/swm/airbandfactsheet.html



Hawker Hind & Hucks starter.
Christine Mlynek.



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AR3000A	Unique all mode extremely wide band base-mobile receiver 100kHz - 2036mhz with no gaps. RS232 port fitted.	£595.00
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DRAKE	SW8 RECIEVER WORLD BAND.....	£275.00	KENWOOD	TS-850 TRANSCEIVER 0-30MHz.....	£695.00	YAESU	FT-51R DUAL BAND HANDIE.....	£249.00
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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.

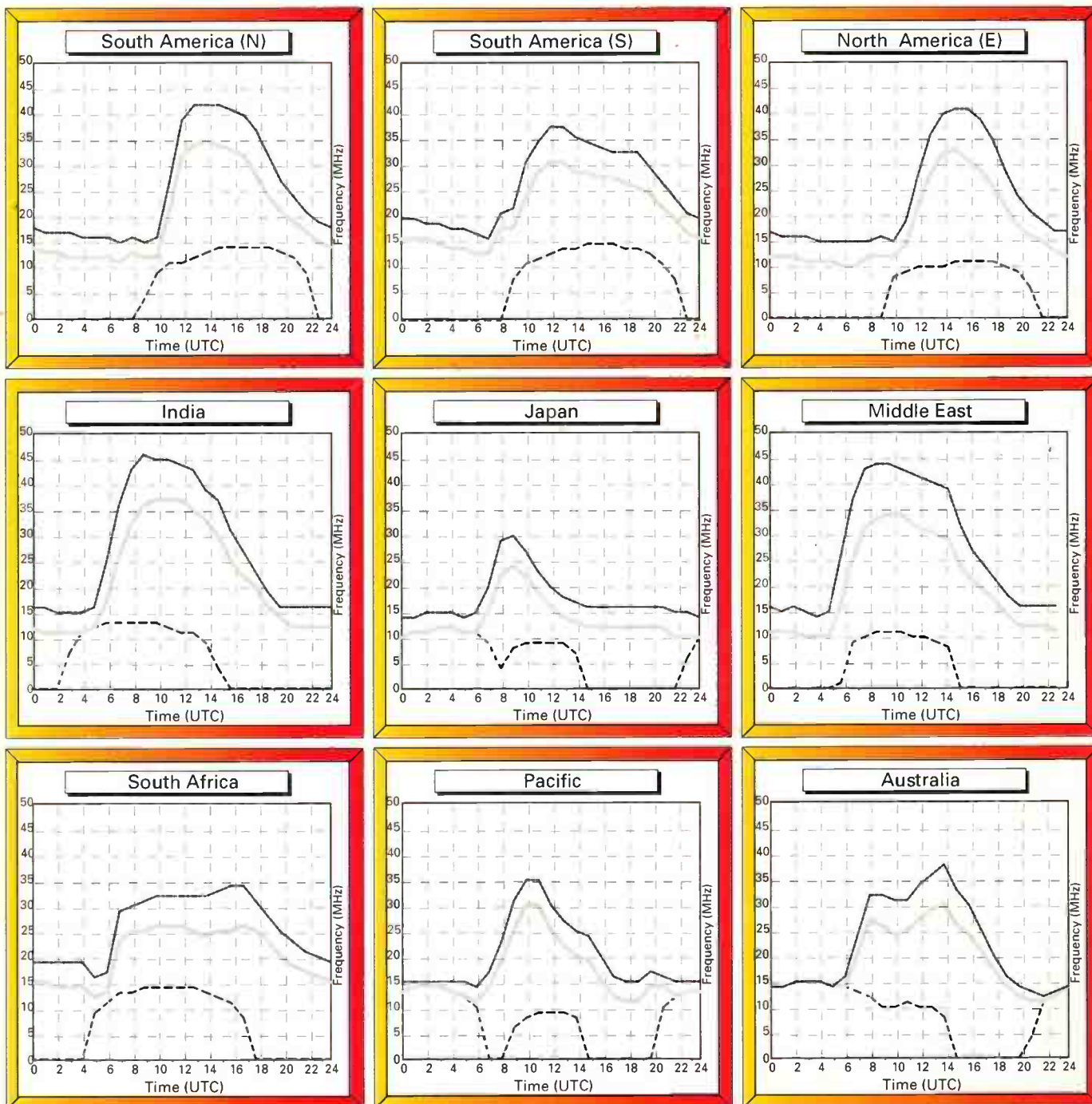
Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50%

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.

November 1999
Circuits to London

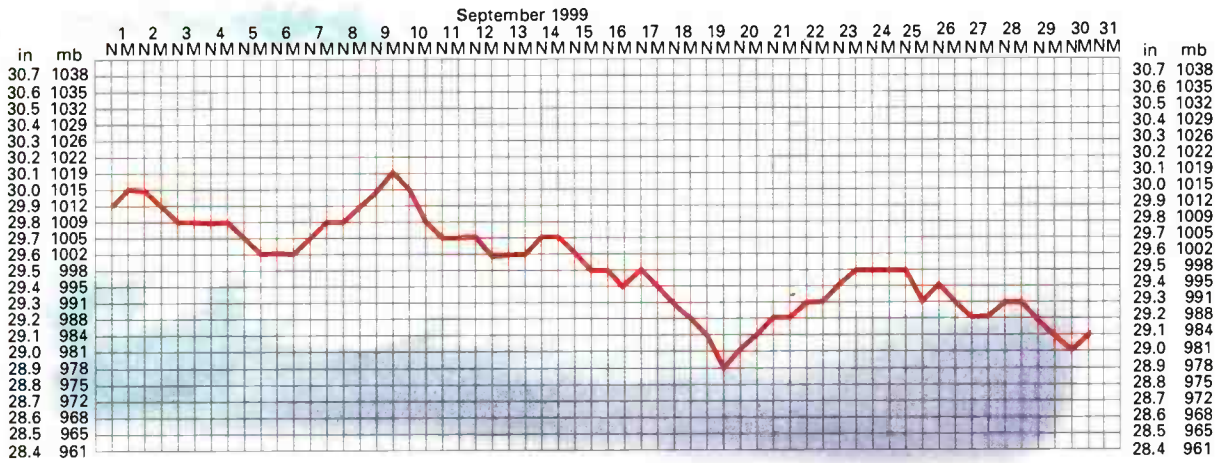


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■ KEVIN NICE G7TZC, SWM EDITORIAL OFFICES, BROADSTONE ■ E-MAIL: kevin@pwpublishing.ltd.uk

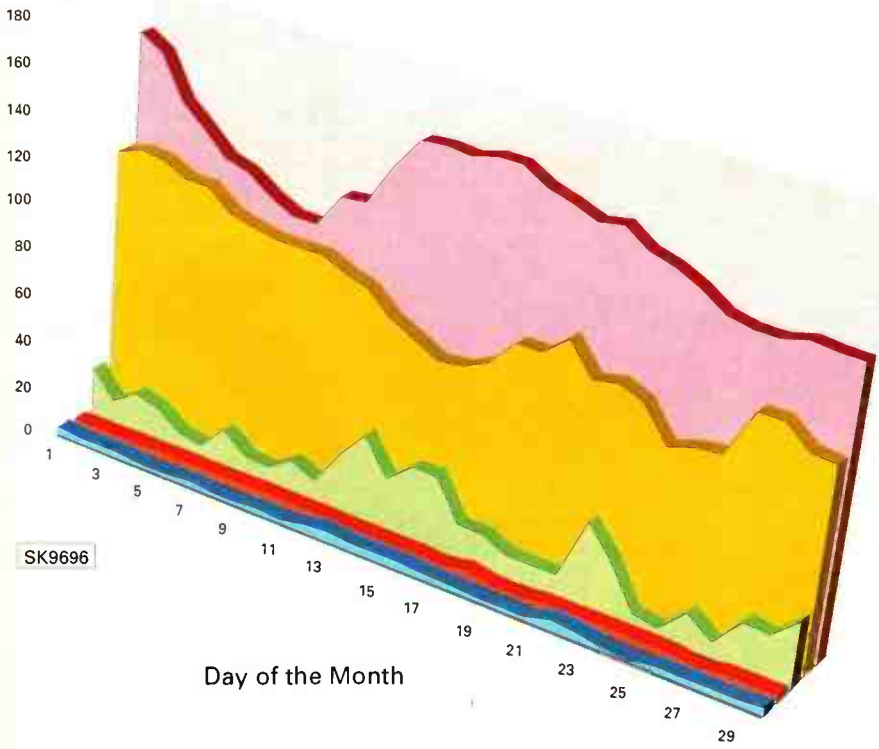
Propagation Extra

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



September Data

- 10.7cm Flux
- Eff. Sunspot No.
- K Index
- 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.

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YAESU FRG-100 Receiver

50kHz - 30MHz



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* 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 * BFO reverse for CW * Twin Clocks. Ask for leaflet.

AOR-3000A Receiver

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£699

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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.

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include USB, LSB, CW, AM, FM, Video out * 5Hz step accuracy * Over 13,000 memories with 20 Alphanumeric Characters * Noise Blanker * Text Search * Pass Band Tuning * Stereo CW Reception * Notch & Peak Filter etc.

AOR-7030 Receiver

0kHz - 32MHz



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NASA HF-4E Receiver

30kHz - 30MHz



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Exclusive to W & S

Computer Compatible
FREE Software Disk

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NRD-545 DSP Receiver

100kHz - 30MHz



Phone

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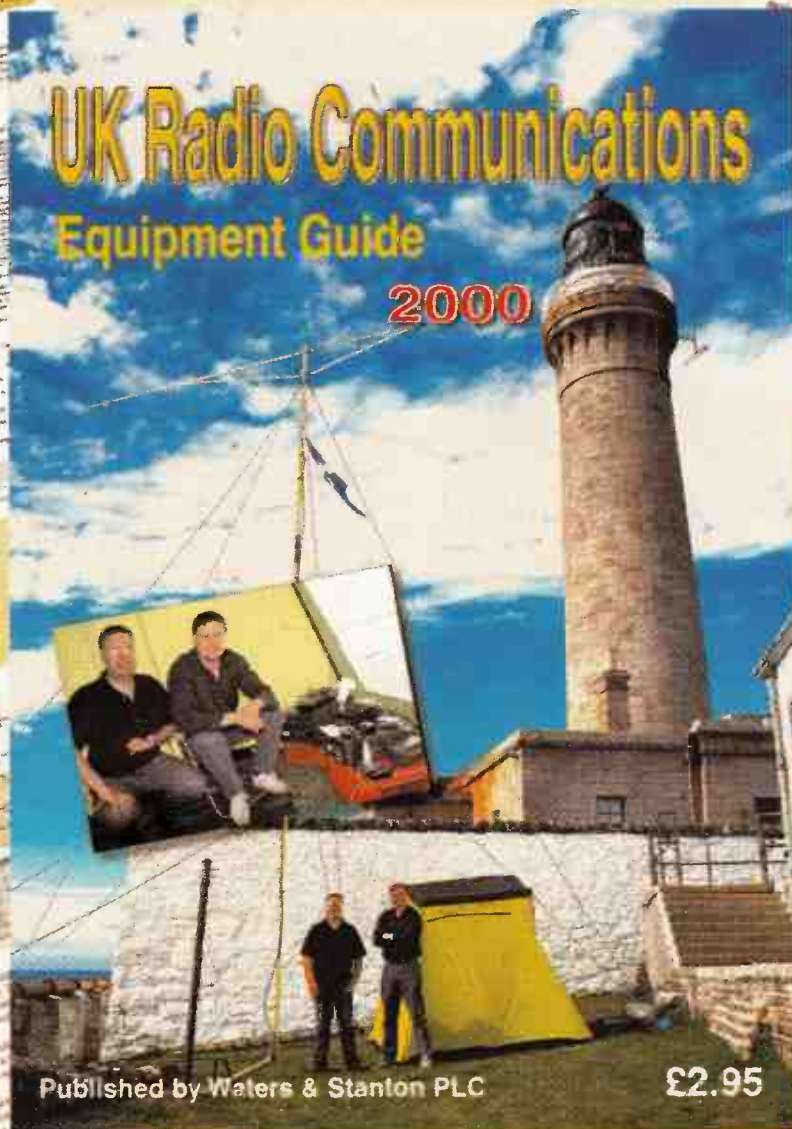
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Decode

DSP News

The latest processing program to come my way is the excellent *GNASP1* written by **Gerd Niephaus**. This brings sophisticated Digital Signal Processing to your PC in an easy to use format. Whilst it is primarily designed to provide audio filtering facilities, it has a really excellent spectrum display built-in that's really useful for signal analysis.

One of the great beauties of the program is that it uses standard PC hardware and so can be used with most modern PCs. The audio to be processed is simply connected to the 'Line-in' socket on the PC and you can listen to the resultant filtered audio on the PC's speaker system. You can also use the PC's 'Line-out' to feed the processed audio to an external decoder if you wish.

The program is supplied with a stack of different filter types and even included is the option to specify your own if you want! To be able to use *GNASP1* you will need a fairly modern PC with a Pentium 133MHz processor or better and around 32Mb or more RAM. You will also need *Windows '95* or later.

Although the program is fairly processor hungry, it takes remarkably little disk space - about 149Kb on my machine. Once you've downloaded the software, you just run the self-extracting installation file and you're ready to go. I've included a couple of screen shots so you can see what the program should look like when it's running.

You will note that there's a very interesting spectrum display included with the program. This was a real gem and dead easy to use. Once you run the program, you just select the filter type and the display changes to show the selected filter type plus the option to show a spectrum display of either the input signal, output signal or both!

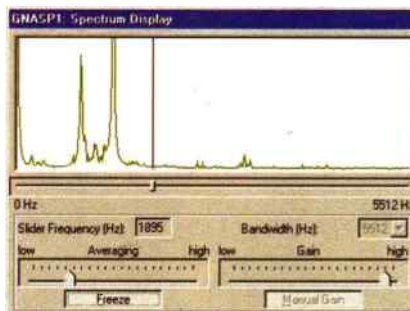
A word of warning here - if you've not got a very fast processor, you may find that it can't cope with the heavy demand of not only handling the filtering, but also updating the spectrum displays. One of the things I liked about the spectrum display was the very simple controls. Adjustment of the 'averaging' and gain could be done with on-screen sliders, which were really easy to use.

Let's just take a while to explain how to use the 'averaging'. This function causes the program to display the average spectrum of the incoming audio rather than a constantly varying, instantaneous value. The great benefit of this is that it reduces the spurious signals caused by noise and makes the wanted signal much easier to see.

To get the best effect, you will need to adjust the averaging to get the best compromise between reducing the noise and showing the wanted signal. This is where the *GNASP* sliders really come into their



GNASP Filter Selection.



GNASP Spectrum Display.

own. Whereas most spectrum programs require you to return to the configuration menu to change the averaging, with *GNASP*, you can do it while you watch the signal, which is much more effective.

Once you have a clear view of your signal, you can then hit the 'Freeze' button to hold the current display and use the adjustable frequency marker to analyse the frequency content of the signal. One classic

use is to measure the shift of an RTTY like signal. To do this, you just adjust the program to get a clear display of the two signal peaks and then freeze the signal and measure the frequency of the mark and space peaks.

The difference between these two frequencies is the shift of the signal. If you can find a constant strength signal, you can also use the program to check out the audio bandwidth of your receiver. Another bonus for the serious signal analysts is the facility to send the processed signal to a .WAV file.

By using this, you can make use of the programs filtering to tidy-up the signal ready for processing by another program such as

Spectrogram. If you'd like to get yourself a copy of this program, visit Gerd's web site at: <http://members.tripod.com/~gniephaus/>

Upgrade That PC

I'm sure you're all sick of hearing about the millennium bug but there are, believe it or not, a few advantages. Many large and some not so large companies are using the Millennium software/hardware review to upgrade their systems to the latest standards. In many cases, this means they are upgrading from quite respectable Pentium 133 or 166MHz machines up to Pentium II or III based units. This creates a wonderful opportunity to pick-up one of these very usable machines at an attractive price.

To give you a real example, I managed to pick-up a refurbished 133MHz Pentium PC complete with a brand new sound card, 32X CD-ROM and a second-hand Sony Trinitron 17in monitor. All this came for just £290! In my case, the PCs were made by DIGITAL and were being replaced by a financial company in the City. Although at just £290 there were no guarantees, the trick is to make sure you see the machine working when you buy it.

One way to be sure of what you're getting is to run one of the many PC diagnostic utilities. One of my favourites is the old version of *Wintune* from American *Windows* magazine. This will fit on a single floppy disk so it's easy to take with you and you can run it without

having to install any files on the PC's hard drive.

When you run this program, it carries out a series of speed tests on the hardware and then compares the results with other PCs with the same speed processor. Not only can you use the program to make sure you've got the memory and processor the seller's claiming, but you can check the performance is up to scratch. Overall it's a great test to give you confidence and if the seller won't let you run it - don't buy the PC.

You can get free versions of *Wintune* from the *Windows* magazine web site at <http://www.winmag.com> It's also wise to make sure the PC is a well-known make to start with.

Top quality PCs and peripherals like the Digital and Sony will have been designed for many years' of continuous operation, so they are likely to keep going for a few more years of domestic use. Probably the best place to look for these bargains is the local *Free Ads* or similar. If you're not too familiar with PCs, it may also be worth taking a knowledgeable friend with you.

Data Over the Mains

Great news for utility listeners - the controversial trial of sending data over the mains has been abandoned. 'Inside Cable & Telecoms Europe' reports that the reason given by Nortel is that the technology is unlikely to be commercially viable given the high speed options being offered by other operators. This news should effectively eliminate the very real risk of interference posed by this new technology.

Help Needed

Steve Greenhough has written asking for help with a problem he's experiencing when using *JVFAX*. He's using the program with a 486SX laptop PC running at 20MHz with 4Mb RAM. Although the program starts FAX reception OK, after an indeterminate period, the program loses synch and effectively puts the edge part-way across the image. This can't be corrected in the normal way with the 'Roll' option as its only part of the picture that's affected.

It's difficult to suggest a cure without a close look at the machine, but it would appear that something is causing a glitch in the clock. The most likely cause is another program that's grabbing processor cycles and messing-up the internal timings. The fact that the edge of the picture just moves across the page, but the picture then remains stable, indicates that it's not caused by a drift in the clock frequency.

Probably the best way to work towards a solution is to start by creating an MSDOS boot disk. To do this you just put a blank floppy in drive A: and type `FORMAT A:/S`. This will not only format the disk, but also transfer the vital system files that are required to boot the computer. Once you have this, you should then start the computer and immediately insert the newly formatted floppy disk in drive A. Your computer should then look at this disk for its initial set-up thereby avoiding the normal configuration.

At the end of this process, you will be presented with the standard MSDOS prompt. You can then use the normal commands to change to your hard drive and *JVFAX* directory to run *JVFAX*. By going through this process, you effectively bypass your existing `AUTOEXEC.BAT` and `CONFIG.SYS` files which may well be loading things that are corrupting your FAX program. If your FAX program now runs OK, you will need to take a close look at your `AUTOEXEC.BAT` and `CONFIG.SYS` files to see what's going on.



Sneak Preview of *Mscan 3.1*.

If you're not too familiar with the content of these files, you would be well advised to see if you can find a knowledgeable colleague to help you. If you want to have a go yourself, the very first rule is to make a back-up copy of both files and store them on a separate floppy disk in a safe place!

To start modifying your `AUTOEXEC.BAT` or `CONFIG.SYS` file you simply open the files with a basic text editor and look for lines that appear to be loading or running a program. When doing this, I suggest you start from the end of the

file and when you want to eliminate a line or command, don't delete it, just put a ; at the start of the line. This causes MSDOS to ignore the line and makes it much easier to experiment.

As you make each change, you will need to re-boot your computer and see if the problem's been resolved. Don't be tempted to knock out more than one line at a time or you will soon lose your way and end-up not really proving anything. Whilst carrying-out this cleansing, you may notice obvious errors such as references to programs you've long since stopped using that can now be deleted. Although this cleansing takes some patience, it's not difficult and the basic housekeeping will often result in much improved performance from your PC.

New Software

At the time of writing I've just heard from AMDAT that a new version (3.1) of *MSCAN* is now available. The latest version boasts a wide range of new features including enhanced reception with better quality and improved synchronisation. There's also improved printing with margins and an auto-scaling option so that the image will better fit the paper. You can also move images onto the clipboard for export into other applications. This could be great for improving the image prior to printing. If you want to know more, you will either have to await the next 'Decode' or pay a visit to AMDAT's web site at <http://www.amdat.bristol-uk.com/>

Readers' Special Offers

If you'd like a copy of *Hamcomm/JVFAX*, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just £12.00, all inclusive. Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter.

Please direct all orders and enquiries about this disk set to **PDSL Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL, Tel: (01892) 663298** and request library volume: H008739abcde. IBM PC Software (1.44Mb disks):

- Disk A - *JVFAX 7.1, HAMCOMM 3.1* and *WXFAX 3.2*.
- Disk B - DSP Starter plus Texas device selection software.
- Disk C - *NuMorse 1.3*.
- Disk D - *UltraPak 4.0*.
- Disk E - *Mscan 1.3* and *2.0*.

Web Watch

If you'd like a copy of *Spectrogram*, check out Gerd's web site at <http://members.tripod.com/~gniaphaus/> You can get free versions of *Wintune* from the *Windows* magazine web site at <http://www.winmag.com> Find out about the new version (3.1) of *MSCAN* from AMDAT's web site at <http://www.amdat.bristol-uk.com/>

Satellite TV News

In another column that I write for the *What Satellite TV* magazine, I commented that a month with considerable satellite activity usually hinted at tragedy and/or disaster - unfortunate perhaps that when satellite enthusiasts are busy chasing elusive news feeds and other discrete transmissions that the content often reveals the suffering of mankind.

The latter weeks of August saw perhaps Europe's largest peacetime disaster when an earthquake shook much of Northern Turkey to ruin and with it a very large death toll. By early September, 18000 lives were known to have been lost, though earlier estimates reckoned on approaching 40000, including those never to be found.

George Gaskin (Dorking) notes that on August 17th the first scenes of devastation were seen coming up out of Turkey. *Eutelsat II-F4 @ 10°E* was seen with "scenes of helicopters carrying casualties from a football stadium. The city being shown looks like a giant has stamped on it. Houses, blocks of flats imploded, outer walls OK but totally inwards collapse. The sheer power of nature. My heart goes out to these people...true heroism as people crawl into the rubble - Turkey must surely now need international help.

"IHA News Agency, showing scenes of muscle survival, pulling people out of places where death seemed the only possibility, but they were also removing many corpses". Emotional descriptions of news footage that Roy witnessed on his equipment. Remember that much of the UK news is 'censored' and often scenes of graphic reality are cut out from UK viewers, unlike that of many European networks which opt to show everything...and I mean nothing is cut out!

Turkey is extremely active in the satellite field and news feeds were uplinked out of the area on satellites across much of the sky - *Turksat 1C @ 42°E*; *Eutelsat II-F3 @ 36°E*; *Kopernikus2 @ 28.5°E*; *Eutelsats W2 @ 16°E*, *II-F4 @ 10°E* and *W2 @ 7°E*. All readers' reports show that digital once more carried news material out of the region with a whole range of unusual parameters; SR 3055, FEC 7/8; 6598, 3/4; 3254, 1/2; 4687' 3/4; 2400, 5/6; 3600, 5/6 and the more regular 5632, 3/4 and 6110, 3/4. For those inserting PIDs and uncertain over certain wild/OB feeds, the vision-308 and audio-256 seems to feature commonly.

I noticed that 'ABC NEWS ISTANBUL' were 'up' for days on 36°E with a test pattern (11.621GHz-H @ 5632; FEC 3/4) though all news feedent seem to dump into encrypted mode. A 'WDR FLY AWAY 1' unit appeared via 7°E (11.105GHz-H. 6116; 3/4) with recorded inserts of a wrecked hospital and a live evening (darkness) report into the German news programme on Monday 23rd August. Checking out the broadcast services on *Turksat-1C* the morning after the earthquake revealed most of the channels were relaying news broadcasts and live scenes of rescue, that is apart from one channel that still played out cartoons!!

A maritime disaster with the potential of another 'Titanic' was averted in the Dover Straits off the East Kent Coast when the liner *Norwegian Dream* collided with a Taiwan container ship *Ever Decent* in darkness during the early hours of August 24th. The latter caught fire which burned for several days, the liner meanwhile limped to Dover Harbour with severe damage to her bows. It was indeed fortunate that the seas were flat calm...none of the 2500 passengers lives were lost.

It was a quick SISLink dash down the motorway from London to the East Kent coast for a breakfast time SNG news insert (I

missed the ident) at 11.580GHz-H (SR 5632; FEC 3/4) on 36°E. By the evening, the mishap had become more stage managed with two satellite uplink trucks at Dover Docks with an additional 11.079GHz-H, 5632; 3/4 uplinking for the BBC news and magazine programmes at 1830 - actually 'SIS-2UKI-27'.

Unfortunately, one of the circuits was encrypted (blank screen) though the other truck 'in the clear' offered us the news reporter to camera with the shattered liner's bow as a dramatic background.

Grim times continue with the death of eight travel company (Air Tours) employees at Glasgow Airport, afternoon of September 3rd. A Cessna light aircraft ferrying the employees fell out of the sky on take-off whilst attempting a return to the runway and exploded into fire on impact. The BBC's 'BBC-UKI-234' SNG truck was rapidly on the scene with live pictures fed back into BBC network both for local use and 'lives' for the nationwide news.

Interviews with the Strath-Clyde police, airport management, etc. followed and during the proceedings, across the background of a shot there motored away a couple of SISLink SNG trucks. The BBC analogue feed was carried via *Telecom 2C @ 3°E* (12.604GHz-V, clear PAL).

On a more personal note, our friend **Cyril Willis** (Kings Lynn), a well known TVDX and satellite DXer who was rushed into hospital for a major operation some weeks ago, has now returned home and is improving rapidly. Active now with both analogue and digital for his satellite reception, we've had several interesting reports of recent sightings.

New Skies Satellite (*Intelsat K*) at 21.5°W carried a spectacular firework display, August 26th, using 11.462GHz-H with the familiar SR 6110 @ 3/4, apparently on the waters of Hamburg. A few days later, Cyril and myself witnessed a stirring corporate offered by Thomas Cook over *Telecom 2C @ 3°E*, September 1st - and analogue, 12.584GHz-H with audio 6.60/7.20MHz.

Apparently Thomas Cook were changing their retail image (as perceived by customers) with a new trading name, improved brochuring and reprogrammed staff offering more friendly pro-active customer relationships. Rehearsals were carried prior to 1800 and then the full presentation carried to six regional UK centres where staff had been gathered. Reverse audio circuits allowed staff to question Head Office management on their particular concerns.

Sports fan **Dean Rogers** (SE2) has been keeping his Humax FTA receiver busy and football enthusiasts are advised to check out *Eutelsat W2 @ 16°E* for matches ex Belgium, Portugal and Italy. All using the familiar SR 5632; FEC 3/4 12.549GHz-H;



Sirius @ 5°E carries this digital test card for Kingston TLI.



The Reuters NSS-K lease carried live digital pictures ex NBC ch.4 of the shootings at the LA Jewish Community Centre School, here the police gather to discuss tactics.



The LA shootings, there is signal drop-out on the live helicopter link feeding back to the TV studio base receiver - usually around 2.5GHz.



Test card from the PGA golf tournaments, USA via NSS-K digital @ 21.5°W.



This New York facility regularly appears on both PAS-3R @ 43°W analogue and NSS-K 21.5° capacity (MCR = Master Control; IFB = Interrupted Fold Back - a keyed reverse studio sound guide for the remote reporter's ear piece).



12.528-H; 12.517-H with Italy on 11.005-H. Exciting powerboat racing from Austria was seen on *Eutelsat II-F4*, 10°E -11.140GHz-H, SR 6111; FEC 3/4 September 5th. Interesting to see that BT were uplinking the OB, a Formula 1 Power Boat event and intended for an

The Middle East Broadcasting Washington office says goodnight to London after a late night news recording.

American sports network with commentary + FX on track 1, FX only on track 2.

A little disappointment in that the Ryder Cup Golf matches this year are going to Pay-Per-View on Sky Box Office - previously it had been available as a subscription channel - now current subscribers have to pay **additionally** for the sports action. Dean has also seen a new sports channel, 'Dubai Sports Channel' and is carried from the 13°E *Hot Bird* slot - check out 12.654GHz-H (SR 27500; FEC 3/4) - I understand that 'Radio Dubai Sports' is also found on this slot.

Sports with a difference was viewed with 'interest' on August 26/27th when dusky bronzed busty females played a form of volleyball in the golden sands of a Spanish beach, the OB linking via Retevison capacity on *PAS-3R/6* @ 43°W. I saw the Nivea sponsored contest on the 26th using 12.698GHz-H whereas Roy Carman on the 27th found them using 12.704GHz-H, apparently the 'European Beach Volley Ball Championships' and in clear analogue PAL - odd perhaps that many Spanish sporting OBs are being carried on American satellites rather than their home-grown *Hispasat* bird - it usually hinges around cost!

It is becoming apparent - compared with say a year ago - that there is a decided swing into digital transmission with the greater number of sightings in digital and analogue decidedly in decline. Enthusiasts' transition into digital - which can be painful compared to the ease of analogue - has eased with faster and friendlier digital receivers and over a few weeks operational techniques becomes fairly routine. Prices are falling with a new Free To Air RSD 300 for example down to £180 including VAT, now might be a good time to buy into a digital receiver.

Orbital News

It's bad news for the American Iridium LEO (low earth orbiting) satellite operator who operate a global mobile comms network with hand-held 'phones. They declared themselves bankrupt August 16th with the slight embarrassment of \$US 1.5billion which is owed to the banks who are seeking a return on their outstanding loans. Iridium undercalculated with the anticipated subscriber take-up of 500,000 subscribers which in reality reached only 20,000.

Main loss maker is Motorola with an 18% interest in the project. Hard on the heels of Iridium is another global mobile operator that intends opening this Autumn ('99) with 48 orbital satellites. Globalstar have partnered Vodafone AirTouch UK and other well known operators in their respective European countries though there must be doubts as to the financial success after Iridium.

There is anguish amongst Gibraltarians over the GBC terminating the retransmission of the BBC Prime TV channel. Previously GBC relayed Prime as part of their programme package but after the recent investments/modernisation of GBC, Prime has been dropped in favour of locally produced programming. GBC argue that Gibraltarians can view both BBC 1, 2 via digital satellite (ex Astra) if they really want the BBC! Prime are however unhappy and are seeking means of preventing Gib locals viewing the BBC domestic channels offshore. Apparently Prime charged GBC £250,00 annually for the service whereas Prime is free in parts of Africa.

The German Kirch media group are to relaunch both the Premiere and DF1 PAY-TV services in October '99 hoping to increase satellite viewing subscribers and to aid the push from analogue to digital. Currently 1.2m view in analogue as against 0.8m digital, Kirch intend to be all-digital from late Autumn 2001.

The cultural channel ARTE and French channel La Cinquieme have taken a 25% share ownership in the French language international channel TV5. The two channels merge early next year when the new French broadcasting bill comes into force. Their combined ownership exceeds that of the French government's own Sofirad group. The Kirch and Italian Mediaset group are planning combined expansion across Europe within

the broadcasting field taking commercial interests in several commercial TV stations in Greece, Portugal and Poland and have designs on several French channels such as M6, Canal+ and TF-1.

The media dispute between Czech broadcaster Nova and their contracted programme provider CME continues which may encourage the media giant SBS in pulling out of their planned CME buyout reckoned at +EUK 400m. SBS incidentally has just opened a new commercial TV station - TV-3 - in Switzerland.

There are several new channels reported on-air. 'Abu Dhabi Sports Channel' is airing via *Nilesat 101* @ 7°W at 11.880GHz-H @ SR 27500; FEC 3/4. An independent TV station has gone on air 1st September last from Pristina, Kosovo, having received technical support from the EBU. 'Nezavisna TV' airs two hours daily via *Eutelsat W2* @ 16°E - any reports?

'Televizija Jugoslavija' is downlinking from *Amos-1* @ 4°W (11.421GHz-H SR 3440; FEC 3/4). The Yugoslav Federal Government founded the new service which is aired 24 hours daily and is planned to distribute the channel terrestrially around the country aiming for 85% population coverage. *Amos-1* only puts an e.i.r.p. of around 32dBW across the central UK so larger dishes will be needed for adequate reception.

The Kingston TLI group have opened an 'Intelsat Standard A earth station' at their Chalfont Grove, UK site for working the Indian Ocean *Intelsat 602* satellite @ 62°E. This will enable improved routing into India, central/SE Asia and Africa for general telecomms and 'Internet backbone connectivity'.

Good news for Turkish/Kurdish folk in Australasia with news that the TRT International have initiated a FTA (free to air) service relayed by the *Optus B3* satellite, linked into the region via C-Band *Thaicom 3* digital capacity. MediaSat, Sydney as service provider administers the new service which will air FTA for at least two years. The Optus signal @ 12.336GHz-V (SR 30,000; FEC 2/3) offers EIRPs of between 40-45dBW across Australia - dishes from 0.9-1.6m @ 1dB noise LNB and in New Zealand 43-47dBW - dishes 0.75-1.2m @ 1dB noise.

Several receivers refused to lock up as the PowerVu variant of MPEG-2 was in use but modification of the data stream and in conjunction with correct PID insertion most receivers are now 'happy'. Typical costs including the whole system, dish, receiver, cabling and installation is quoted around \$Au850.

There's a suggestion that subscription based services may be carried within a digital package in due course, likely Turkish PAY-TV movies. The Turkish consulate in Melbourne reckon that there are some 40,000 potential viewers for the service. Media pundits feel that the use of Humax F1-C1 IRD receivers for the Turkish \$850 package deal - which incorporate an CA slot (CA = conditional access) tends to confirm that future services will opt into PAY-TV working, perhaps based around several Turkish language movie channels.



The Turkish earthquake and ABC maintained their digital test card and news link on Eutelsat II F3 @ 36°E.



A possible American religious broadcast, note the middle caption!



The BBC reporter awaits a live insert into the news at Dover dockside and views the damaged bows of the Norwegian Dream, a digital SNG uplink via 36°E.



The CNN early morning satellite insert on 36°E, a digital eclipse experience.

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HF ACARS

During the Summer I had a long E-mail conversation with a reader concerning the appearance of signals carrying h.f. ACARS data. HF ACARS is a digital system, and could probably be covered in Mike Richards' Decode column, but as it is a h.f. signal, and it is a utility station, I thought that it just about qualified for this column. I trawled the Internet to see what I could find by way of active frequencies and information about the system.

A report in a business aviation magazine earlier this year (thanks to the person who sent me some photocopied pages) says that ARINC has completed deployment of the first phase of the high-frequency datalink (HFDL) ground station network, which supports the GLOBALink/HF datalink service. The ten stations provide nearly global coverage. GLOBALink/HF is an air-ground datalink service using h.f. frequencies to enable ACARS-equipped aircraft to communicate with the ground where v.h.f. communications are not available. HFDL also allows communications above 80° latitude, where satellite services provide little or no coverage.

As the article says, the h.f. ACARS system (as it is usually known as) consists of a network of stations around the world, each with a series of assigned frequencies. At the moment, there are 10 sites up and running, but the plan is to have at least 14 sites to allow total global coverage.

A look at the listing on this page shows that the only part of the globe which is not really covered is South America. The purpose of the system is to extend the coverage of the v.h.f. ACARS system, so there is no real need for extensive h.f. coverage in the major built-up areas of the world.

In use, each active ground station transmits a signal every 30 seconds or so, so that aircraft wishing to use the system can automatically find the best frequency for their location. These signals are transmitted on three frequencies, and are known by the odd name of squitters. These squitters are more technically known as data bursts, but I think that the word squitter describes them perfectly.

Try listening to some of the frequencies listed, to see if you can hear the squitter signals. Not all the stations are active throughout the day, but for listeners in Europe, Reykjavik in Iceland (Station H03) is usually quite audible over most of western Europe on 11.184MHz. Once you become familiar with the signal sound of the squitters, you should be able to tell when a real ACARS down-link is taking place.

Unfortunately, these are quite rare at the moment, and there is no commercially available software to decode h.f. ACARS signals, which means that these signals are still quite a minority interest.

Architect

Just before I sent this column off to the Editorial Offices, several listeners in the UK reported that they had been hearing a possible new Architect station. There has been an RAF presence in the Balkan region for the past few years, and it would seem that this is set to continue for some time yet. Probably in connection with this, 'Pristina Flightwatch' has been heard on 11.247MHz passing weather information either as an all stations call or to specific flights. Does

anyone know when this service started, or if they are operating on any other frequencies?

The well-known Cyprus Flightwatch, also on 11.247MHz, continues its broadcasts at H+15 and H+45 throughout the day, and is now including a large number of bases in the Balkans and Italy as part of its broadcast.

Russian VOLMET

With the Autumn and Winter months approaching, you may be preparing for colder weather. You may even think that the temperature in your area is very cold, however, you may like to try some of the following stations to see how their weather compares with you.

On this page you will find a large list of Russian VOLMET stations and frequencies. They are not all Russian, as some of them are in the Independent States, however they have historically been known as Russian for reasons of convenience.

Each station transmits on the listed frequencies usually throughout the day (H24), sunrise to sunset (HJ) or sunset to sunrise (HN). Remember that these timings refer to local sunrise and sunset, and for some of the transmitters in the far eastern areas of the country these may not correspond to your own local timings. During set periods of each hour, the stations will transmit weather actuals for the listed airports. Some of the transmissions are in Russian language, and some are in English.

The listing is incomplete, as can be seen from the missing time-slots. One unfortunate problem with some of these transmissions is that the announcers drop their voice as they announce the name of the airport, making a positive identification very difficult.

If anyone can add to the list, please write in or E-mail me with details. If you are able to listen at different times of the day, try listening to a few different frequencies to see if you can find the best signal.

Web Watch

ARINC - <http://www.arinc.com>

HF ACARS -

<http://www.blackcatsystems.com/radio/hfACARS.htm>

WUN -

<http://www.wunclub.com/~igfaq/signals.html> -

Digital Signals FAQ v5.0.

Russian VOLMET Stations (all freqs in MHz u.s.b.).

Frequency: 3.407 (HN), 6.730 (H24), 8.819 (H24), 11.279 (HJ)
Times: H+00,30 Tbilisi, Mineralnye-Vody, Sukhumi, Yerevan
 H+05,35 Aktyubinsk
 H+10,40
 H+15,45 Almaty
 H+20,50 Tashkent, Dushanbe, Samarkand, Bishkek
 H+25,55 Baku, Tbilisi, Sochi, Mineralnye Vody, Teheran, Turkmenbashi

Frequency: 3.116 (HN), 5.691 (H24), 8.861 (H24), 13.267 (HJ)
Times: H+00,30
 H+05,35
 H+10,40
 H+15,45 Khabarovsk, Petropavlovsk-Kam., Juzno-Sakhalinsk
 H+20,50
 H+25,55 Irkutsk, Bralsk, Ulan-Ude, Chila, Krasnoyarsk

Frequency: 2.941 (HN), 6.617 (H24), 8.939 (H24), 11.297 (HJ)
Times: H+00,30
 H+05,35 St. Petersburg, Murmansk, Petrozavodsk, Besovets
 H+10,40 Moscow, St. Petersburg, Kiev
 H+15,45
 H+20,50 Kiev, Kishinev, Lvov, Odessa, Simferopol
 H+25,55 Rostov, Mineralnye-Vody, Krasnodar, Sochi, Stavropol

Frequency: 4.663 (HN), 10.090 (H24), 13.279 (HJ)
Times: H+00,30
 H+05,35
 H+10,40 Tashkent, Almaty, Dushanbe, Samarkand, Aktyubinsk
 H+15,45
 H+20,40 Novosibirsk, Khabarovsk, Irkutsk
 H+25,55 Moscow, Kiev, St. Petersburg, Tver

Frequency: 2.869 (HN), 6.693 (H24), 8.888 (H24), 11.318 (HJ)
Times: H+00,30 Syktyvkar
 H+05,35
 H+10,40 Novosibirsk, Khabarovsk, Krasnoyarsk
 H+15,45 Samara, Kazan, Orenburg
 H+20,50
 H+25,55

Frequency: 5.691 (H24), 8.861 (H24)
Times: H+10,40 Yakutsk, Nerungi

HF ACARS Stations & Frequencies (all freqs in MHz u.s.b.).

Designation	Location	Frequency
H01	Dixon, California	8.927, 13.276, 17.919, 21.934
H02	Molokai, Hawaii	11.348, 17.934
H03	Reykjavik, Iceland	11.184, 15.025
H04	River Head, New York	8.912, 11.312, 17.919, 21.934
H05	Auckland, New Zealand	6.535, 11.327
H06	Hat Yai, Thailand	5.655, 13.309
H07	Shannon, Ireland	8.843, 11.384
H08	Johannesburg, South Africa	8.834, 13.321, 21.949
H09	details unknown	
H10	Annapolis, Maryland	8.885
H11	details unknown	
H12	Anchorage, Alaska	11.354

■ **PETER BOND** c/o EDITORIAL OFFICES, BROADSTONE
 ■ **E-MAIL:** milair@pwpublishing.ltd.uk

MilAir

Northern Lights

I had expected Northern Lights to be a fairly low key exercise after much of the annual budget was spent in Kosovo, but it actually proved to be most interesting listening, especially on the u.h.f. airwaves. Despite the combined efforts of fate, mechanical breakdown and the elements, I eventually managed a day trip to St. Mawgan on 21st September to photograph and listen in to the exercise.

This report is based on that day out and listening in at various times between the 20th and 24th September. I am writing this during the last day of the exercise, so I have had little chance to speak to others to check any unconfirmed information. Consequently, I have made the odd educated assumption.

Based aircraft at St. Mawgan during my visit were six F-16s from the Dutch Air Force/Leeuwarden Wing and at least four RAF Hawks from 100 Squadron. The F-16s flew two missions using the callsigns **CROW** and **POLLY** in the morning and **NASTY** in the afternoon, these callsigns were also noted on other days.

Anyone listening to London Military and expecting to hear them climb out was to be disappointed, after leaving the St. Mawgan Approach frequency **357.2**, they went direct to a tactical frequency working under Magic Control located on board the AWACS. I missed the tactical frequency used in the morning, but the afternoon frequency was **234.725**, I have this listed as a Navy tactical frequency noted twice in 1996, but not since.

No TAD was mentioned, so I have presumed that this was a frequency allocation, specifically for the exercise. Over four days I noted the AWACS, (calling MAGIC 97 and 98), making further tactical communications using the following frequencies: **275.75** TAD 073/Boulmer, **312.05** TAD 135/Portreath, **389.975** TAD 054/UK South and **263.45**. This last frequency is also new to me and I believe it is the new TAD 501 replacing 374.85.

Mission times for the F-16s were about 70 minutes, they linked up with Leeming Tornados from 11 Squadron who used the callsigns **NITRO**, **RAZOR** and **ROOSTER** during the exercise. The callsign **FOXY** 1 to 4 was also heard, which I also believe to be 11 Squadron?

The main targets were French Mirage 2000s who they seemed to engage with some considerable success. During Tuesday's encounter, they called in a 'Grand Slam' to Magic Control and were asked to confirm if all four Mirages had been 'Splashed', (shot down). This they positively confirmed, only to then have a disgruntled French voice chirp up that only three were splashed, not four!!! Hmmm - how did the French have their tactical engagement, frequency? The Hawks flew several missions each day with the callsign **DARWIN** noted in use on the 21st and 23rd, plus **JUPITER** on the 22nd and **JASPER** on the 23rd.

Air Refuelling over the three days was carried out by **TARTAN** 01 and 02 who I assume were 101 Squadron VC-10s from Brize Norton. Whilst positioning for refuelling with **RAZOR** 1 and 3 on the 20th, communications were carried out with **TARTAN**

01 on **278.075**.

My first thoughts was that this was a new Air to Air or Air Refuelling frequency, but to my surprise, I then heard it in use several times on the 22nd/23rd with ATC route information being passed and I consequently positively identified it as a new **London Military South** frequency.

As I had been away, I had not been listening in during the previous two weeks and so a quick check with those in the know, confirmed that 278.075 had been heard in use as London Military since the 8th September. A quick check back through my notes for the exercise showed that the Southwest primary frequency 277.125 had not been noted in the past four days and so it is a fair bet that this is the frequency that 278.075 has replaced. Whether 277.125 has been withdrawn or relegated to a standby remains to be seen.

Being a C-135 fan, the rare presence of NKC-135A 55-3132, taking part in proceedings was a real bonus, I would have liked to have gone to Mildenhall to take some photographs, but a 1052km round trip in a day was just not realistic! Using the ATC callsign **AGAR 32** and the tactical callsign **BIG CROW** the second oldest flying C-135 was in the

skies over the Southwest on most days of the exercise. They did seem to suffer a few communications problems as on more than one occasion they seemed to have trouble contacting the exercise control frequencies.

On the 21st I heard the aircraft's tactical controller call St. Mawgan on 260.0, (Operations) and 360.55 (Radar) attempting to get a contact frequency. (The pilot meanwhile was talking to London on 278.025). The tactical controller was then told to call Scottish Military on 249.475, which not surprisingly they were unable to do as they were located more than 800km distant from that control area - most puzzling ?

London Military frequencies heard in use transmitting from Davidstow Moor (about 16km from St.Mawgan), were: 133.3, 135.15, 254.225, 262.975, 278.025, 283.525, 285.175, 296.975, 299.975. Whilst other London Military frequencies noted were: 249.475, 270.0, 275.35, 299.975.

Airfield Attacks

Several airfield attacks had been expected each day but according to the locals, only one took place on the Monday in the form of German Phantoms. On the Tuesday there was only one whilst I was present, this was two passes made in the afternoon by a pair of German Navy Tornado's from MFG-2. The first pass was a bit tame, but the second was much more photogenic!



(Above) Czech air force LET-410, 'observing' the Northern Lights exercise.



(Left) Dutch air force F-16 recovers to St. Mawgan after the morning mission.

Interesting Visitor

One interesting visitor on the 21st, which apparently made several visits to St. Mawgan, was a Czech Air Force LET-410. The aircraft arrived calling Charlie Echo Foxtrot 155 and was apparently carrying Czech personnel who were observing the exercise.

Also noted visiting were a couple of Jetstreams and a Nimrod who used the callsign 'Delta Three Echo'. According to local sources this was one of two Nimrods which were involved in the exercise.

All in all, an interesting few days listening with the bonus of some new frequencies.

New Web Site

I have received a communication from Photavia Press, publishers of the airband frequency guide, **AIRWAVES 99**. They dropped me a line to say that they will have a new Internet web site up and running from early October. Not only will it include information about the company and its products, but will also contain a variety of airband, aviation and communications information. This information will continue to be expanded in the future. To find them on the web, point your browser at: www.photav.demon.co.uk

See you next month - don't forget to send in that MilAir information.

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ShackWare

Hello, and a warm welcome to 'ShackWare', the bi-monthly column devoted to computers in the shack (and, specifically, older computers that you can find at car boot sales and the like).

Last time I devoted almost the entire column to the kind of radio-oriented software and hardware available for 8-bit computers. These, for those who don't know, are essentially the home computers of the 80s, such as the ubiquitous Spectrum, Atari, Commodore, BBC *et al*, which have at their heart an 8-bit processor - usually a 6502 or Z80 (though occasionally an exotic beast such as the 6809 featured in the Dragon and Tandy).

Almost all these machines are available from car boot sales, jumble sales and second-hand shops for just a pound or two and often, with floppy disk drives, monitors and all kinds of other peripherals. Sometimes, neighbours or relatives will be discarding their old machines and are happy to give them away for free. And, while severely limited when compared with today's all-singing PCs, they still make useful shack workhorses, running night and day, all year round, decoding RTTY transmissions perhaps, or monitoring FAX stations.

Of course, the real advantage is that having made little or no investment in the machine, stressing and ultimately breaking it by leaving it switched on all the time is not such a heartbreaking affair!

My Favourite

In the last 'ShackWare' I talked about my own particular favourite, the Atari series, as well as the ever-popular Spectrum. This time around, I want to kick off with the BBC computer - even now, a very capable beast armed with a veritable flotilla of high-tech I/O ports and some very exciting radio software.

Arguably the best software for the BBC is that produced by Technical Software, which takes full advantage of the machine's superior hardware (relative to other 8-bit computers) to provide decoding of all the popular data modes, including the on-screen decoding of FAX.

Probably the most lavish of all Technical Software's output is

the marvellous RX-8 which, as its name implies, decodes no less than eight data modes including FAX, RTTY, c.w., AMTOR/SITOR (including FEC) and packet radio via a dedicated interface. RX-8 was shipped on an EPROM so it's instantly available to you once installed in the machine.

The software comes with truly excellent instructions detailing all the modes available and how to tune and get the best from them, and the resulting data can be saved to disk for further examination.

The BBC computer also provides an easy path into weather satellite decoding too. My own BBC set-up was bought second-hand for £75 from the 'Bring & Buy' at the Picket's Lock show and included the machine, colour monitor and disk drive, a Timestep receiver, dedicated interface, turnstile antenna complete with pre-amp and all the necessary software on EPROM - a fantastic buy! I'd already been decoding WXSATs for several years via PCs, but I just couldn't resist this set-up when I saw it for sale few years ago.

Cirkit's cheap WXSAT receiver and interface in kit form suit the BBC too, and make for an excellent introduction for those new to the hobby and who want to get a bit of practice in building kits and using a soldering iron.

And so to acquisition. BBCs, disk drives, the popular CUB Microvitec monitor and various peripherals are often seen at boot sales, sometimes an entire table full as a college department, primary school or library has a clear out. While slightly more expensive than some other home computers, expect to pay pounds rather than hundreds or even tens of pounds. As for radio software, an ad in the various on-line forums is a good start or make use of the reader ads at the back of *SWM*. Happy hunting!

Interesting E-mail

Finally, I had a really interesting E-mail from **Hugh Neal M1CXN** who, in the mid-80s, worked for Atari's UK importer, Silica Shop and who has some interesting anecdotes...

"At the time, my knowledge of the Atari computers was second to none," writes Hugh, "and I still have an immaculate, boxed, Atari 800 with the full 48K, for which I'm trying to source a disk drive. I've had no luck at boot sales though there's plenty of Spectrum and Commodore stuff!"

"Two interesting points: at the time, the Atari 800 was the only computer that could safely be stood on, a tribute to its cast aluminium chassis (which keeps electronic hash to a minimum - JG) though this made it expensive to produce and hastened the introduction of the 600XL and 800XL. Second point is that the very first pre-production ST in the UK was built into an 800XL case with a huge dongle hanging out the back held in place with 'gaffer' tape!"

Hugh goes on to describe his own shack set-up consisting of a JRC NRD-345 and a 'mongrel' PC self-built and costing less than £200.

And that's it for this time. Your letters are the lifeblood of the column so keep 'em coming. Until next time, good listening.

Web Watch

Multimode -
www.access.digex.net/~cps/sss14.html
 Details on the FT-920 spectrum analyser
www.campbell84.freemove.co.uk

Your Letters

First up this time is **Steven Preston** of Fulham SW6 with a plea for Mac software. Take it away Steven...

"Can you please suggest or supply decode software for the Macintosh? c.w./RTTY and FAX would be great. I've got a JRC NRD-545 receiver and a 3400C Powerbook as well as access to desktop Macs."

No problem, Steven. Though not as well served as the PC when it comes to radio (or, indeed, any other kind of) software, the truly excellent Mac *MultiMode* by enthusiast **Chris Smolinski N3JLY** is just the thing you're looking for. As Chris says, "Why did I write it? I've always been disgusted with the lack of decent ham/radio software for the Mac. Why should the Windows boys have all the fun? I've written several other Mac radio related programs in the past (check my web page for details), and have often had requests for a c.w./RTTY/FAX/etc. decoder for the Mac."

The program accepts input from your receiver via the Mac's own built-in sound port and A to D circuitry and decodes all the popular data modes and some of the more exotic ones too such as RTTY, FAX, SITOR-A and B (for NAVTEX transmissions) as well as ACARS, WWVB time transmissions and more. Chris says he'd "...like to add full support for other modes such as SSTV (if users) send me a cassette tape with a clean recording of that mode, so I have some audio to use for testing purposes."

You can get *MultiMode* from www.access.digex.net/~cps/sss14.html or me, by sending an s.a.e. and a suitably formatted disk.

Incidentally, here's a tip for Mac users whose machines require those expensive 4.5V half AA-sized batteries (without which screen output is stopped completely) which cost anywhere between £6 and a whopping £15 to replace!

My own LC475's battery ran out recently and I was determined not to shell out around ten quid to get the machine up and running again. I phoned around and was quoted various prices and finally found that Maplin had the battery for sale for £6 - except my local branch was out of stock.

Anyway, to cut a long story short, here's what I did. Opened the machine (a simple task requiring no tools), lifted off the battery cover and popped out the battery. Reasoning that though rated at 4.5V, it was probably operating at far less than this after a year or so of use. I had a rummage in my junk box and fished out an AA battery holder with space for two batteries and a couple of little crocodile clips. I soldered the clips to a length of two-core

cable and the cable to the battery holder, installed two ordinary AAs (giving 3V) and, first checking for correct polarisation, snapped the crocodile clips into place on the computer's battery terminals.

I crossed my fingers, switched on and waited...and within a few seconds, I was rewarded with the screen kicking into life once more and the computer booting as normal. Flushed with success, I switched off, opened it up again, installed a couple of NiCad rechargeables (giving around 2.5V the pair), switched on and ...success once more!

So now there's a couple of NiCads under the hood and they've been there for several months even though, as a journalist, I use the machine constantly. It works fine. Give it a go and save yourself a few quid.

Following my mention of Amiga owner **Anthony Johnson's** difficulty in finding suitable radio software to support his machine, **Dave Haynes** of London N10 writes with the generous offer of "...an ERA Microreader which Anthony is welcome to have for the cost of the postage." If Anthony writes to Dave care of me I'll pass on his letter - and thanks for that, Dave.

David Holdsworth of Reedham, Norfolk, and his BBC make another appearance in this instalment. Edward Bellerby (edward.bellerby@sheldon80.swinternet.co.uk) E-mailed me to say that he has the AEA Fax3 demodulator and that if David contacts him he feels sure they can come to some arrangement. Edward writes "The Fax3 software works well with a slightly more sophisticated demodulator too. I use the Uniface 1000 which I bought as a kit to receive satellite images.

Unfortunately, living on the seventh floor of a block of flats, I hear satellites for about three minutes a day!" A sorry tale and one with which I can sympathise. As a student in the 80s, a friend and I built the Cirkit WXSAT receiver and a Maplin turnstile antenna. We managed to get the turnstile out into the open but, living in halls, in an upper storey, hearing anything at all was another matter entirely!

Regular readers will remember **Colin Campbell's** excellent home-brew software to control the PCR1000. Colin has E-mailed to say that he is no longer working on that project and has moved on to create a spectrum analyser for the Yaesu FT-920.

"The program is freeware and allows frequency scans of any two portions of the spectrum covered by the FT-920," writes Colin. "I find it invaluable for checking the 10m and 6m bands."

Thanks for that Colin. The interested can download the program direct from Colin's web page at www.campbell84.freemove.co.uk

Book Profiles

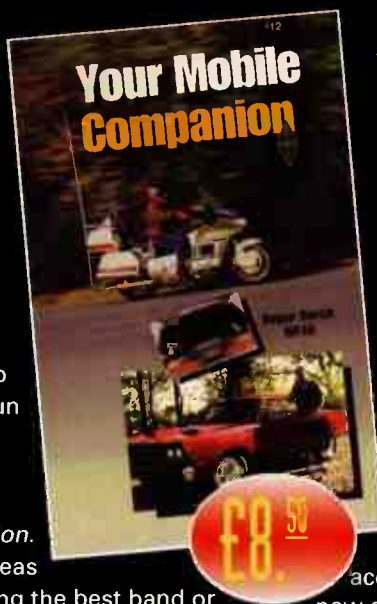
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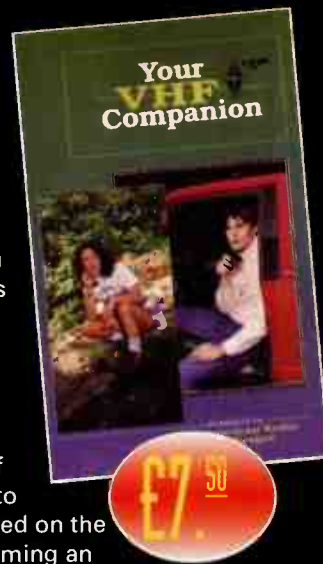


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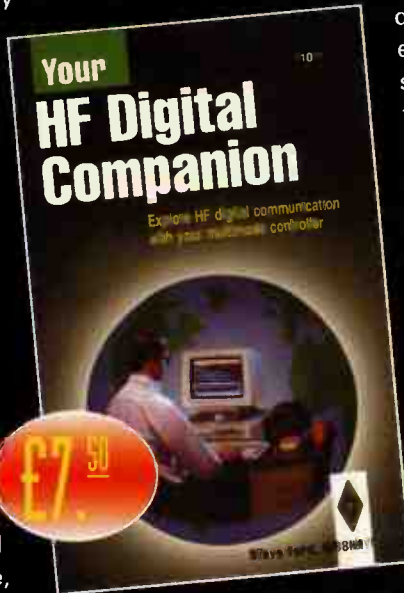
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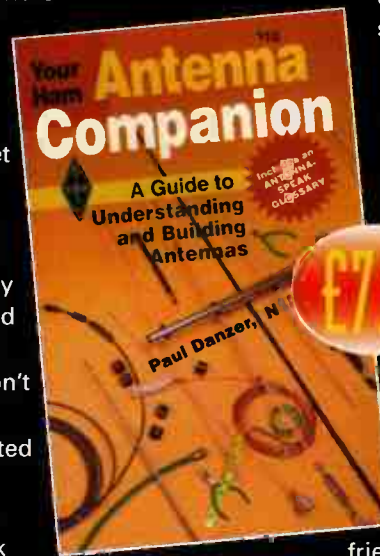


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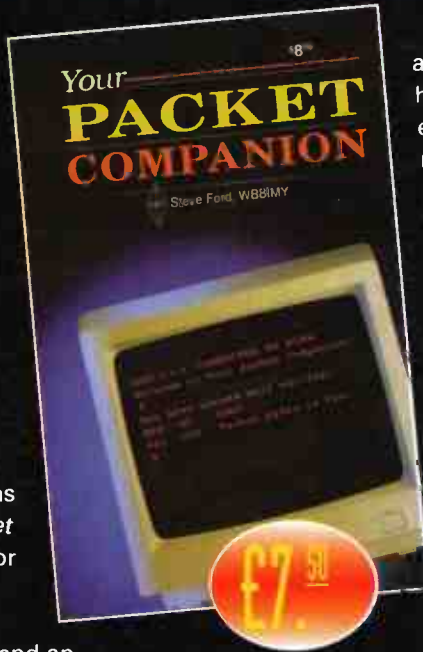
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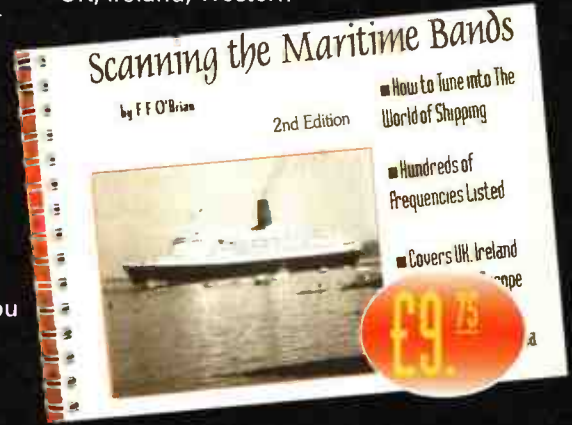
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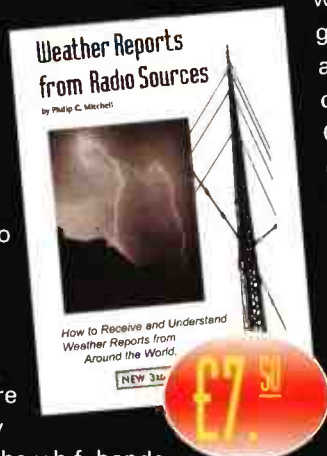
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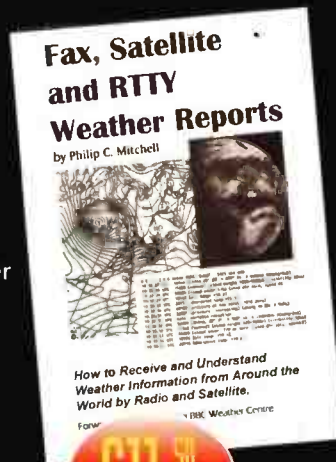
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Amateur Bands

A big item was the effects of the total solar eclipse. **Wyn GW8AWT** noticed between 1140 and 1146 some loud boomer signals from the re-enactment of RNI...and ever since, the normal daytime sizzling noise of frying eggs. GB2RS reported that on Eighty, G4FP, G3WWM and G0LLT set up some skeds and 'on the day' were putting out calls from about 1000UTC at 3799. Normally of course there is no propagation at this time, but VY2ROB VO1BAR/P and KE1P all heard G4FP.

On Top Band, G3SED noted enhanced propagation for about 20 minutes, either side of totality, and a much-enhanced period for the four to five minutes around totality. He worked ON4UBA, IV3PRK, GM3POI up in Orkney, and F/G3TKN in central France. Lower frequencies still; the Swiss time-signal station HBG on 75kHz; listeners in UK, Netherlands and Germany all noted the sudden appearance of sky-wave to interfere with the normally-audible ground-wave signal.

I was chez G4PEM in Penzance 'on the day'; I have to admit both the XYL and I were diverted by what went on. We got no view of the sun through 10/10 overcast, but TV made up for that. The eyes adapt so well one just doesn't really notice the darkening - around 3dB in the half-hour from first contact - until one looks around and sees the lighthouse and street lights coming on. Then, so suddenly, totality: darkness.

Out to the south over the sea, it seemed the sun was shining - the area where a tiny bit of sun was still shedding light. Of course, the 'brightness' was due simply to our dark-adapted eyes. Outside, the temperature dropped as expected - but it was much more enjoyable watching from indoors with a TV and a good view over Mounts Bay, to standing outside!

One final comment - why did hundreds of people have to use photo flash-guns at totality? We could see the flashes going off right round the bay from Mousehole to Marazion.

Letters

First **John Collins** in Birmingham who seems to spend all his time on 7MHz; on Eclipse Day, GB2SUN at Poldhu was extremely strong at 2030; at 2100 GW0SSB was attracting a pile-up; one evening at 1945 FK8HC was booked in. On the 'lighthouses' weekend, John noted, between 1400 and 1700UTC, GB2TD from Anglesey run by the Dragon Radio Club, GB2HL, GB2BTL, GB2NPL and GB0SAL all around the 58-59 mark.

Later in the day, 2030 saw 9J2AM, then a few minutes later RA0SA from Zone 18; at 2100 9H1EU, and at 0100 JY9NX who calls for cards direct to JA0HA or via the JA Bureau. Around midnight, another lighthouse showed up, by way of TF1IRA, at Locator HP93MD, and asking for cards via TF3AO. **Igor EU5R** in Minsk, Belarus, wants cards direct only to: **220036, PO Box 57, Minsk, Belarus**, while ER3MR was from Moldova and prefers his cards direct.

Charlie-Whisky

During August **Geoff Wallis** in Corsham stuck to 14MHz c.w. with his FRG-7700 and home-brew vertical. This netted 4X1CL, YW7C, VK3RP, CO2CZ, JM1XMT, 7S5T, JI2ZKX, UX3BG, JA4DZI, FY5YE, PT7GZ, JF2WME, PP7CI, 3Z5PW, SN0ZPW, YV5AIE, PY2GM, FO2AT, VE3PNZ, FM5BH, PY1BGP, JQ3QYL, AX4VT, 4N1PB, ER1DA, CE8CLQ, EA8SY, K0HX, FM/DK9PY, U08JL, UN7PJO, FM5CW, YZ7HRW, KP4YD, KP4ATF, PR7PO, EA8/OH2BY, KL7QOW, VK8AA, HP8GAT, CN8WWW, VU2DZ, VU2VIT, 9A/DL3DRN, JG6CDH, NR5ZM, YV5AIE, TA1TC, UX0ZA, SV1CEI/M, SV2BBJ, 3A5OR, VK5MD, HZ1AM, ZP5KQ, YS2BJ, SU1DZ, 9M2AN, ZL1AC, 4K1HK, ZS6FW, VS6BN, 4S5NA, LU5DD, AD6BO, YV5DTJ, A5BNP/MM, HP1TA, EK6LP, ES7DL, EL3D, A45AR, 5Z4GS, AX4VT, CO2BX, A5BNP, CP4BT, 5U7AC, CY9PP, HU4UUP, LU3ET, UY0MM, KP4RAT, ZL5BT, 5N0ZKD, EU5R, VP2ECV, EA8/DJ9HD, SM0/SV1LGT, VE9MY/P, CE3AYW, A2BI, CP9DT, EA9AY, 5A1A, VP2BT, HK3BP, CO2JD and VK7VR.

From **Ted Trowell** on the Isle of Sheppey we have another all-c.w. listing, though Ted reckons conditions were quite patchy. On 7MHz there was 5A1A, and on 10MHz OY6FRA/LGT and 5B4/OH2RF both around 1900. A morning on 14MHz accounted for 7X4AN, and the afternoon cuppa was attended by the scalps of JH4JNG, JV1LS in Mongolia, 7X5WWW, OY6FRA/LGT again, ZB2LGT, JH5FXP.

At 1700, Ted noted LU2GPI, VK8AV, VU3MVCV, W0UO, 3XY1B0 which left mid-evening for W6CYX, JA4DZ, JA1BFD, CN2BR, 5A1A and A35BG in Tonga. Up at 18MHz 9M6AAC and CX3AL popped up,

and on 21MHz VK8HA CN8YR/P, CN2BR and E21EJC (Thailand). On 24MHz 5X1P in Uganda, EA6XN, ZS6AVP and VQ9GB while 28MHz openings dealt with C4A, 4X/OL7DEU, JY9QJ, PY1KS, PY2AER, PY2YU, LU4DD, LU9GBR and PP5QA.

On a somewhat sour note, Ted wonders why some DX stations try to send so fast that they can't even get their own calls right? On the other hand, the 3XY1B0 puzzled Ted, who taped it for several minutes to confirm that the last symbol really was a zero.

Coming Up!

We hear that Clipperton, FO0, is likely to be on between February 26 and March 15 next year. They are looking for financial help, the transportation charter alone runs to \$75000. Anyone wishing to contribute, can send to **PO Box 81, Searchlight, NV89046**. (Bank of America Account Number 4961527327) The last successful Clipperton activity was back in 1992.

January 2000 will see VP6BR, Pitcairn, by OH2BR. Remember, P & O cargo ships only call every three to four months, and the departure date from Auckland will only be firm a week before sailing.

East Malaysia and Spratly; three stations will be on the latter signing 9M600 between November 12-18. The group will be in Sabah as 9M6AAC the previous week, go from Spratly to Brunei as V857, and finish back in Sabah until 29th 9M6 The cards for Sabah and Spratly go to N200.

Finally in this section, Glorioso, FR/G looks possible in the July/August 2000 period, by the Lyon DX group who did the FR5ZH exercise.

Late October into early November is the time to search for V26B, 8Q7IT, J68J and VP5T. November should see Malpelo, HK0 living up the bands. For the longer-term, ON4QY is active from Guinea as 3XY2A based in Conakry for the next couple of years; cards to ON4QY. Another long-term bet is New Caledonia where FK/F5CW is active from Noumea. Pasteboards via F5PED.

G0VNW who has been signing 5Z4GS from Nairobi will by the time you get this have gone to Kampala in Uganda where he will be 5X1GS in between work commitments.

XT2DP hopes to put Burkina Faso on the air again around December. No other details at the time of writing.

If you seek Chatham Island, keep an ear open for ZL4IR/ZL7 over the next 18 months; Ed says his special Millennium QSL will note the fact that Chatham will be the first place to see the sun in year 2000.

Busted Flush!

Alas, Lakshadweep Is, VU7 - the place we used to know and love as the Laccadive Is - was to have had a DXpedition this autumn. The date has now slipped back to next spring, partly because of operator commitments and partly because of hang-ups over the authorisations.

The proposal to activate the Cuban island of Key Breton (IOTA NA-201) which was to have been about now, has been postponed to between 1 and 6 December to avoid the hurricane season.

Just Past!

That R1MVA joint Finnish-Russian team eventually left Malyj Vysotkij Is after the 20 operators knocked up some 65221 contacts; OH2BR 'drew the short straw' for writing out the QSLs.

BARTG

Is alive and well. Some people seem to have thought it had died because there was no BARTG rally this year. Anything to do with data communications is BARTG-oriented, so if you want to know more, try contacting **Ian Brothwell G4EAN** either by letter or telephone to **0115-926 2360**, or E-mail: **ian@bartg.demon.co.uk**

More Letters

7MHz is the forte of **Colin Dean**, where he heard CP6VP, C93BM, EZ8CQ, E44/I20CKJ, HS0/IK4MRH, JA2, JA4, VK1MJ, VU2PAI, YB0DX, ZL1BMW, ZL1GQ, 4L1DA, 5A1A, and 7K1WLE but on 14MHz he reports only 3B9FR. 18MHz got a beating with AP2JZB, A45XM, BA7JF, BV5BG, D44BC, EX8MZ, JY5HX, KH0/JN1WTK, PJ7/PA3EWP, PJ7/PA4WMM, PJ8/PA5ET, PY0FZ, YU5IJ, VP2ECV, VP2EET, VP2EFM, VU3MVCV, YB0AI, Z21KW, 4S7BRG, 7K2PMJ, 9K2TD, 9K2VO, 9M2XA, 9M6AAC and 9V1XE. As for 21 MHz, A41KJ, A92GH, BD4ED, BY4BSN, BY4BZB, CP0ARA, DZ4CKW, DU1IVT, EK6TA, E21WZ, E44/I20CKJ, HK0KBU, HL3ENE, HS0/G3VAQ, JT1KAA, JY4NE, OD5/9K2MU, OH0JTV, PJ9.ON4CFD, P42P, P21CU, T88CB, UA0QBA, UN8LA, VK5ARE, VQ9GB, VR2MY, UR3IDD/MM off V51, V63AO, assorted YBs, ZD7VC, Z21CS, 3B9FR, 4L5NLS, 5R8PL, 5U7DG, 9J2AM, 9K2/SP5UAM, 9M2ZA, 9M6CT, 9V1WW and 9Y4GR.

Paul Goodhall in Oxford is joined this time by son Peter in a log shortened by holidays. On Forty we find YV4GD, ZL3FM, PY2ABU, ZL2FG, CE60BE, PT2CC, ZS6PSP, ZS6XT, ZL2JR, VK2PS, ZL4BO, FM5DN, almost all around the 0400 UTC mark. On 14MHz VK7EK, Z31PK, VK2PP, TN7OT, 9G5DX, VK4CY, VK3GK, VK3DHI, VK2JP, K1UQV, PT7AZ, PY5JA, VK6MOJ, VE2PC, JA3LWJ, VK5AEP, VK2APP, VK3BR, and - amazing - VK6CV calling GW3KFE! Of course, Sod's Law existing, I wasn't about.

Finally, our anonymous correspondent overheard a ragchew QSO discussing the origin of the SOS call. No, it isn't for 'Save Our Souls' or anything like that. Back to RSGB member GG Blake, and his 1926 History of Radio Telegraphy and Telephony. The first proposal was by Italian delegates at the 1903 Berlin conference, when the use of SSSDDD was suggested.

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The first occasion it came to the notice of the public in July 1909 was when the Republic collided with the Florida in thick fog and the radio op, Jack Binns, remained at his post and obtained help. On a more personal note, I recall the late G2NJ of Peterborough telling me about this - I gather he knew Binns.

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JRC NRD-545 d.s.p. receiver with NVA-319 speaker, Lowe supplied, hardly used. Callbook, *WRTH* and *Passport to World Band Radio* radio books and Global AT-2000 a.t.u., all purchased late November, £1150. Purchaser must collect to ensure satisfaction. Tel: Bournemouth area (01202) 892986.

JRC NRD-545 d.s.p. receiver, mint condition, purchased April, will throw in antenna and speaker, £800, no offers. Tel: Bournemouth (01202) 547428 after 1900 or (07971) 209336 after 1400.

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Kenwood R-5000, v.h.f. converter, narrow s.s.b. filter, v.g.c., £500. AR3000, v.g.c., £350. AX400 scanner, charger, case, v.g.c., £165. Kenwood TH-78E, batteries (3), case, extra memory, CTCSS, charger (2), v.g.c., £200. Mount. bike, £100. John G3XLL, QTHR. Tel: Diss (01379) 652043 evenings/weekends.

Kenwood R-820 communications receiver with notch, i.f. shift, variable bandwidth tuning, operating manual, v.g.c., £375 o.n.o. Mark on (01288) 359422.

Martelec MSR50 satellite receiver, plus software, JVF-2 interface, manuals, rig crossed dipole antenna JVFAX 7.0, data switch and cabling, p.s.u. regulated supply, complete outfit, computer ready, £135 o.n.o. Tel: Newbury (01635) 845823.

PCR1000, £150. Sangean 818, £75. Target HF3, £75. Redifon R551N, £150. Trio 70cm transceiver TM411E, no TX, £50. Might exchange the lot for v.h.f./u.h.f. multimode. A. Bell M1EIA, Kent. Tel: (01959) 575113.

Realistic DX-394 short wave receiver, purchased 26/5/99, paid £100, will accept reasonable offer. Tel: (07880) 752300 after 1800.

Realistic PRO-2026 100 channel mobile scanner, 66-956MHz, not continuous, brand new, boxed, unwanted gift, ideal vehicle scanner, £80 + postage. Tel: (01753) 885163.

Realistic PRO-60 scanner 200 channels

boxed, manual, case, NiCads, mint condition, £85. Grundig Yacht Boy 500 world band receiver, inc. batteries, p.s.u., boxed, manual, in mint condition, £70. Tel: Blackpool area (01253) 727279.

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Scanner clearout: Yupiteru MVT-7200 wideband scanner, £190. Radio Shack PRO-63 hand-held, £75. PRO-2006, 400 channel base station, £80. PRO-2032 200 channel base station, £60. All in good condition. Chris Perkins, N. Somerset. Tel: (01934) 512054.

Sensible offers required for mint radio collection, etc. Sony SW1, SW55, CRF320, PRO-80, ICF-8650, Panasonic RFB60L, RFB600LBS, Grundig Yacht Boy 500, Sony CDP502, B&O record player. Tel: London area (01923) 828836.

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Yaesu FRG-100 receiver, mint condition, boxed with manual plus 12V d.c., £350 including postage. Martelec JVF-2 weather satellite interface with crossed dipole antenna, £50. Tel: (01377) 217883.

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Yupiteru MVT-9000 scanner, two months old, charger, manual, used once, £200. Tom, Northampton. Tel: (01604) 499569.

Zenith trans oceanic royal 7000 182T4023, original owner, 9D batteries, or mains, little used, mains plug and jack included, £40 + carriage and insurance. J. Power on (01624) 851330.

Service manual, circuits, advice, help! on faulty Marconi TF2370 110MHz spectrum analyser, crt display frozen, no frequency display or tracking output, early grey model, any help appreciated and costs refunded. Norman, Stoke on Trent. Tel: (01782) 550684.

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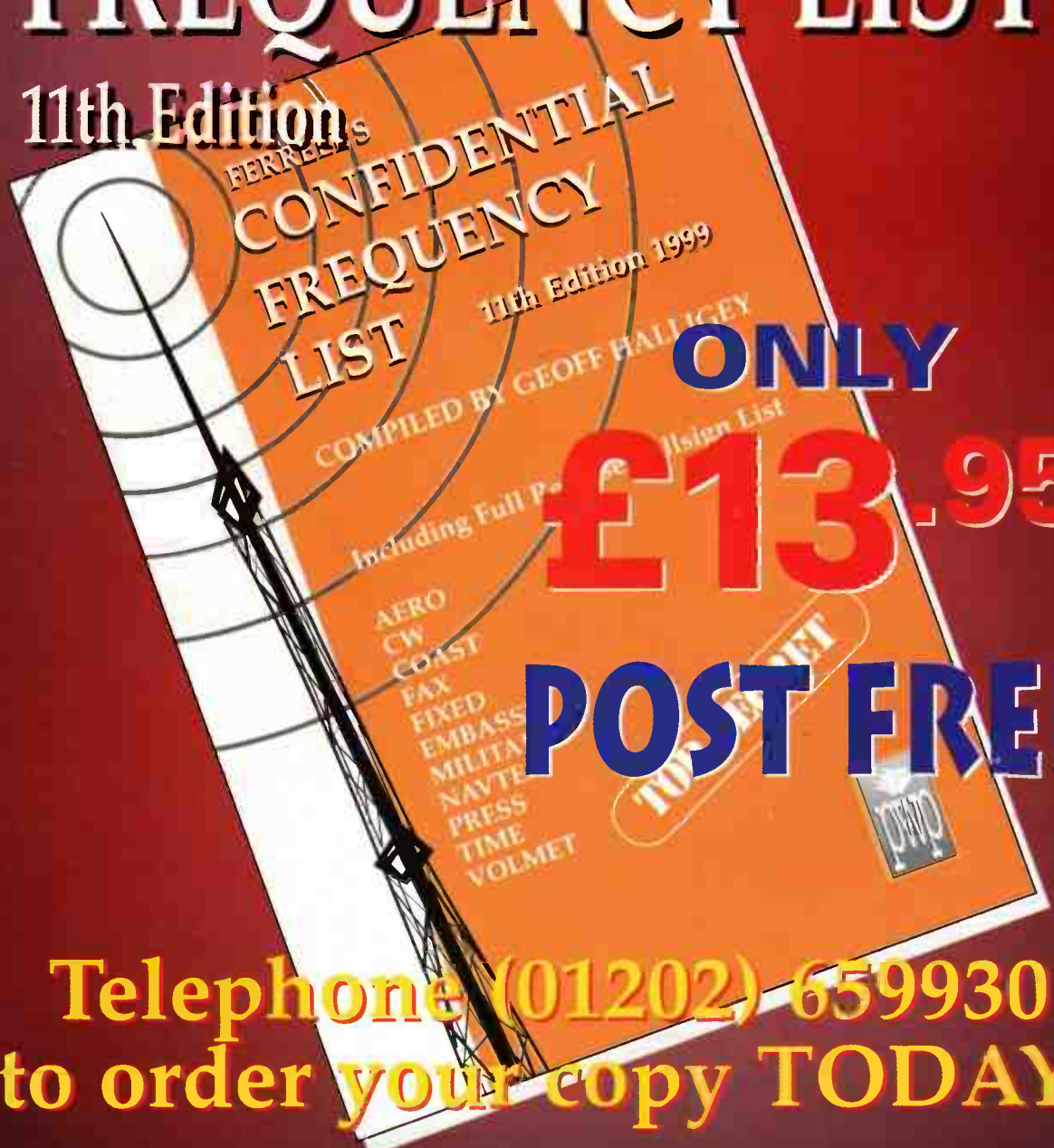
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