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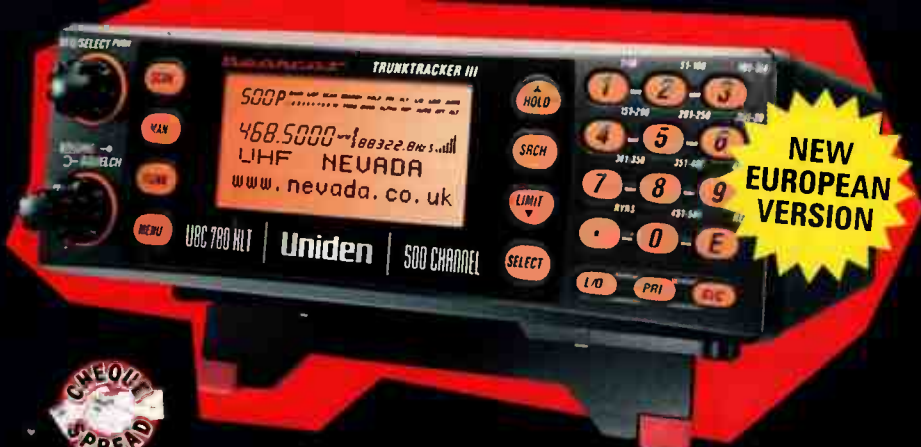
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Don't miss the easy way to get a **SWM** subscription - take advantage of our special three ways to pay offer now - see page 35.

Listen to the world with satellite radio - see our special offer on page 15.

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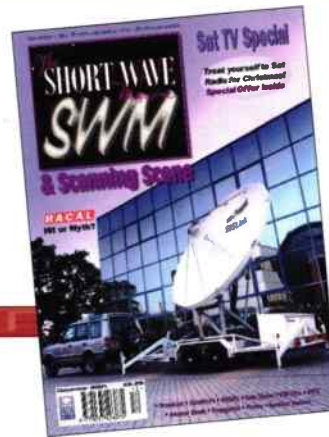
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Cover subject: SISLink's trailer-mounted 3.7m antenna - approved by Intelsat, Eutelsat and Panamsat for international operations. (courtesy SISLink).

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COMING UP NEXT MONTH IN SWM JANUARY 2002

- * Modern Times with Bob Ellis
- * JW in-depth with the Racial RA1772
- * DXTV Special with Keith Hamer & Garry Smith
- * DXpedition experiences with Jacques d'Avignon
- * Wavecom W40PC Reviewed

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Components For SWM Projects

In general all components used in constructing SWM projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for SWM projects are available from the SWM PCB Service, **KANGA PRODUCTS, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for SWM are £3.25 each and photocopies are £3.25 per article. Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

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

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Technical Help

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

ed's comments

As you'll see from the accompanying picture, I'm still busy opening Survey forms. We've had a phenomenal response to this latest SWM reader survey, better than any previous attempt to poll the people that matter - you.

The initial impressions that I get from looking through each and every single returned form is that by and large many of you are happy with the current format of SWM. In fact there are one or two people who state that verbatim.

Obviously, until the full analysis has been completed it's not possible to quantify the results fully, though the cursory examination does appear to show areas that need action - so I look forward to steering SWM in the appropriate direction.

Whilst I've said that we've had a brilliant response, the returns still only account for about 10% of the total readership. I'm quite sure that there must be many more of you that have almost got around to sending in your form - go on fill it in, the post is free if you live in the UK. You never know you might be the lucky winner of the RD500.

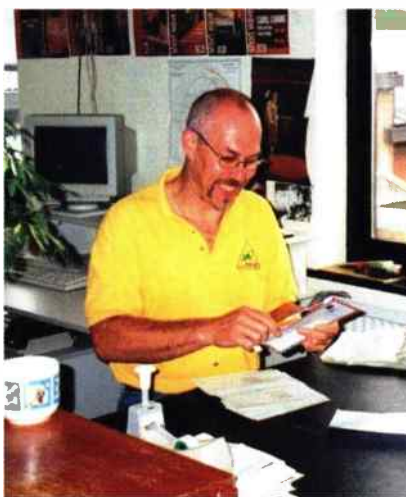
Just in case you've forgotten, the survey form was in the September 2001 issue of SWM.

Quarterly Subs

One matter that was very clear from the survey forms was that there are a considerable number of readers who would like to enjoy the benefits of a SWM subscription, but found it difficult to get together the lump sum required. As a result, you can find a solution on page 35. As you'll see, we are offering a special subscription offer payable quarterly by standing order. I hope this helps some of you, I look forward to welcoming you as subscribers.

Subs Queries

Whilst on the topic of subscriptions, there is an important change that subscribers should note. For some time now, Kathy Moore, who retired as a Director of PW Publishing Limited earlier this year, has been continuing her role as Subscriptions Manager. Commencing immediately however Kathy will be dealing directly with subscription maintenance and administration issues. New contact details therefore now apply. If you need to advise us of address changes, lost issues or similar, then you need to contact Kathy direct on (01590) 641148, E-mail: subs@pwpublishing.ltd.uk or Post: Subscription Queries, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone,



Dorset BH18 8PW.

New subscriptions will continue to be taken via the SWM Book Store - see page 78 for details.

Christmas Offer

In a further attempt to help save you money you'll find a special offer for the Sanyo WorldSpace receiver as reviewed by Jerry Glenwright last month in SWM. You can save over £20 with our special offer and enjoy the likes of the BBC World Service and CNN in stereo in your shack or on the go. The Sanyo receiver is well

suited to connecting to your stereo too, so you can entertain the whole household with satellite radio if you choose. You will find that as long as you have a clear view of the southern sky, then you'll get good reception of one of the three WorldSpace satellites. For more information, you can look back at SWM October 2000 or take a trip to www.worldspace.com

Changes To This Issue

Last month we advertised that we would be featuring a Racal RA1772 review from John Wilson. Unfortunately, John was unable to complete the article in time due to an unforeseen visit to the operating theatre to remove a defective appendix. Instead of the planned review, you can find an article that was due to be published in the January 2002 SWM.

John is now well on the road to recovery and I'm sure you'll all join me in wishing him well.

Also missing this month is a trip to the 'Other Mans Shack'. Regrettably, too much other material got in the way, so we had no choice but to oust the feature this month. It'll be back next month - you can be assured - Eric please take note.

Finally, you must have noted that the adjacent page doesn't contain any readers letters. With the continuing events in Afghanistan, I felt it essential to bring you an update on the broadcast scene in the area. Martin Peters furnishes us with that report.

Yuletide

As this is the last *Short Wave Magazine* to be published this side of December 25 - January's SWM is on sale two days after - all the season's best wishes from all of us involved in the production of SWM.

WJ 73 Kevin

Bandscan Afghanistan

This report from Martin Peters details the broadcasting scene into and out of Afghanistan, focusing on how this aspect of the media has evolved since the terrorist attacks of September 11th. In this crisis, as in others, radio has proved to be the medium of choice when fighting for hearts and minds in the region.

Sparse At Best

First to Afghanistan itself, where even in more stable times, the broadcast arena was bleak. The state-run Voice of Shariah had outlets in the major population centres delivering a blend of Koranic recitation (the only music allowed under the law), news and commentaries from the Taliban's perspective. The stations were not networked and carried their own, locally produced programming.

The Voice of Shariah maintained a limited external service which broadcast in a selection of languages, including English - 1530UTC on 1107kHz and 7.087MHz.

There are believed to have been a smattering of local, low-power broadcasters, but details are sketchy.

The Taliban prohibit television viewing and connection to the Internet. Only one TV station, in the northern town of Faizabad, operates a daily two hour schedule from 'studios' consisting of little more than some VCRs, TV monitors and the 10W transmitter. Transmissions barely cover the city centre.

In common with other recent US-led operations, the enemy's broadcasting stations were amongst the first to be hit. At around 1630UTC on October 7th Kabul's Voice of Shariah went off the air abruptly. They were back on later that night, prompting speculation that the transmitters and studio remained intact and that the station had merely suffered a power outage.

Next day, the Kabul transmitters were again silenced and have not been reactivated. It is believed that broadcast facilities in all other areas, except one, have also been taken off the air. The exception is the Voice of Shariah's Balkh Province station in northern Afghanistan on 1584kHz which continues with its usual, pro-Taliban programming. It shows

no sign of being targeted by the bombing campaign. On October 26th the regime in Kabul began using a mobile, 1kW medium wave transmitter for one hour each afternoon. This was silenced by coalition forces within two days.

Wind-up?

With state-run radio all but silenced, the Americans have begun broadcasting into the region from a converted EC-130E transport plane overflying the area. Part of the US-led Psychological Operations - code-name, Commando Solo II - Information Radio's programmes consist of music, interspersed with announcements encouraging listeners to welcome coalition forces and for the Taliban to surrender.

As part of the programme of humanitarian aid, leaflets in Arabic and English have been dropped, advising the local population of the broadcasts. An air-drop of pre-tuned, wind-up radios are also figure in the plans to increase listenership.

Broadcasts, in Dari and Pashto, go out twice daily, 0030-0530 and 1230-1730UTC on 864 and 1107kHz, formerly used by the Voice of Shariah's Kandahar and Kabul transmitters respectively. The third frequency is 8.700MHz and the mode of transmission is upper sideband.

This choice of frequency/mode is interesting. One theory is that a US report on Voice of Shariah from some years ago inadvertently logged 8.700MHz instead of Shariah's actual operating frequency of 7.080MHz. Another suggestion was that the short wave frequency is being used as a 'feeder' to the aircraft. This was disproved when, on November 1st, the 'feeder' was observed lagging 20 seconds behind the 864kHz outlet. One theory

suggests that the transmission is broadcast from near Ashkhabad, capital of Turkmenistan - another, that it comes out of Diego Garcia.

European listeners can hear the 8700kHz transmission with ease during the hours of darkness.

Considerable Increase

Broadcasts to the region, in local languages, have increased considerably since the campaign began. BBC World service, for example, has expanded its broadcasting hours as well as hiring additional medium wave facilities in the area. Other major players have followed suit. It is thought that upwards of 60% of Afghanistan's population listen to BBC World Service.

The content and tone of broadcasts from surrounding countries can give an alternative perspective on events in the region. Radio Pakistan in English goes out at 0800-0805 and 1100-1105UTC on 21.465MHz whilst the Iran's external English service broadcasts to Europe on 21.730MHz at 1100-1130UTC.

Reports of a planned opposition radio station, with European and US backing, are emerging. 70% of programming would be sourced by a coalition of opposition groups and supplemented by relays from the BBC and Voice of America. Meanwhile, in north-western Pakistan, close to the Afghan border, Pashtun tribesmen are using four home-built f.m. transmitters to recruit fighters for holy war in Afghanistan.

Al Jazeera, the Quatari-based, pan-Arabic news channel and both Osama Bin Laden's and the Taliban's chosen media outlet, is easily received in western Europe. The station has the only permanent television crew in central Kabul so are able to provide exclusive footage. It is available on *Hotbird* at 13°E on 12.111GHz vertical. A standard Sky minidish system can also access the station as Al Jazeera also downlink via *Eurobird* (co-located with the Astra 2 constellation) at 28.2°E

on 11.585GHz horizontal. The station appears on the electronic programme guide as ch674.

Dissemination Problems

News gathering teams, attempting to get their pictures back to HQ for onward dissemination, face problems of their own. Whilst it is possible to transport, and then configure, a conventional satellite uplink terminal in relatively friendly territory, this is not an option whilst near or behind enemy lines.

The BBC's John Simpson and his crew are working in difficult and dangerous conditions to the north of Kabul. Keeping mobile whilst under cover dictates that equipment is compact and easy to conceal. Use of an Inmarsat satellite terminal, no bigger than a laptop computer, allows either low quality, 'live by videophone' contributions or VHS quality pre-packaged feeds. British-based, 7E

Communications manufacture a unit which heavily compresses video enabling live, 'video conference' quality feeds over an Inmarsat link. Alternatively, when a pre-recorded insert is required, a device called a TOKO can be used. This employs store and forward techniques that permit high quality video to be sent via Inmarsat, however, one minute of video can take up to half an hour to transfer.

With a steerable dish and free-to-air digital satellite receiver it is possible to intercept the raw and pre-packaged news feeds direct from the war zone. *EuropeStar 1*, located at 45°E, is the craft most likely to produce results. Even a modest 800mm dish can be sufficient to capture these feeds. Commonly used transponders include 11.659GHz for BBC, 12.605GHz for Sky and 11.472GHz for CNN feeds - all vertically polarised with a symbol rate of 5632 and FEC of 3/4.

This report was compiled November 4th.



Communiqué

News & Products

Talk & Dinner

Starting at 2000 on **Wednesday 5th December 2001** the **Bangor & District Amateur Radio Society** are hosting two talks - both relating to the use of computers within the hobby. **Dave GIOWEM** will be talking about linking the Internet to radio, in particular the Belfast 70cm repeater, which now has users from all over the world. There will also be a talk by **Mike GI4XSF** on the usefulness of the world-wide web, with particular reference to amateur radio. Also, make a note in your diary for **Friday 7th December** as this is Bangor's Christmas Dinner, held at The Stables. (Pre-booking is essential). More information from **Mike GI4XSF** on **0284-277 2383** or visit the club's website at <http://welcome.to/bdars>

IMW 2002

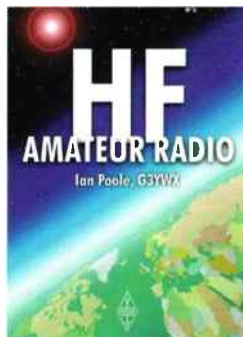
In June of this year, Harry Bloomfield ran what proved to be a very popular and enjoyable amateur radio event in Great Britain, called the 'National Museums Weekend 2001' (NMW 2001).

Next year, the event will become an international one and will be renamed the '**International Museums Weekend 2002**' (IMW 2002). The IMW 2002 will take place on the weekend of **15/16th June 2002**. Individual operators, as well as amateur radio clubs from around the world, are invited to join in the event, by setting up a special event station at your local museum.

Registration is a requirement for taking part in the event. Registration is free via the website <http://www.imw.f2s.com> Nearer the event, the original NMW 2001 web site <http://www.qsl.net/m1byt> will eventually become a mirror site for the IMW 2002.

New Title

New from Ian Poole is his book entitled **HF Amateur Radio**. Written in an easy to understand style, this book has chapters covering radio wave propagation, types of transmissions, receivers, transmitters, antennas, bands and bandplans setting-up a radio station - basically all the essentials that enable the reader to make the most of the hobby. Now stocked in the **SWM Book Store**, priced at **£13.99** - order your copy now.



Chelmsford's Course

The **Chelmsford Amateur Radio Society** will be running a course for the new Foundation Licence starting in January. For further information, contact the Secretary **David Bradley M0BQC** on **(01245) 602838** or E-mail David at DavidWBradley1@activemail.co.uk or visit the club's website at <http://www.g0mwtf.free-online.co.uk>

The Perfect Gift?

The discerning electronics enthusiast need hint no further for the perfect Christmas gift - a Brother P-touch labelling machine. The **Brother P-touch 1250**, priced at around £50, produces durable self adhesive labels at the touch of a button, ideal for helping you to organise storage boxes, drawers, individual wires and tools. Also, because the PT-1250 can run off either a mains adapter or batteries (batteries not included), you can use it anywhere around the house, garage, shed or garden.

The unique navigation dial and true QWERTY keyboard make the PT-1250 simple and convenient to use. Since it allows you to produce a label simply by typing in the text and pressing print, there's no need for scissors as the PT-1250 will cut the label to your required length with one click of a button. Different text sizes, fonts and formats and two-line printing are also easy to achieve and you can clearly see what's been typed as the PT-1250 has an eight character display screen.

Pick up a P-touch 1250 from Staples, or for details of the full range of P-touch machines, please contact Brother on **(0845) 6060626** (stockist information and brochure requests), **0161-931 2354** (helpdesk), sales@brother-uk.com or visit the Brother website at www.brother.co.uk



New Way To QSL

The **Ontario DX Association** is the QSL Manager for **CFRB - 1010kHz** & **CFRX 6.070MHz** (QSL Manager: Steve Canney) and **CHWO - 740kHz** (QSL Manager: Brian Smith). Both stations and transmitters are located at Toronto, Ontario and Canada. Reception reports for all over the world are most welcome. There is also a new way to send in your report - visit their web site at www.odxa.on.ca and under 'Station Guide' you will find an 'Online Report' for both CFRB/CFRX and CHWO - just click the site and fill in the information

boxes and press submit. That's it!

You can also send in your reception reports to the club E-mail address at odxa@compuserve.com or to their postal address at **PO Box 161, Station A, Willowdale, Ontario, Canada M2N 5S8**. Any listener comments and encouraging words should be directed to: **Steve Kowch** (Operations Manager) at Steve.Kowch@cfrb.com

WRN Transmits McCartney Concert

Sir Paul McCartney's World Trade Centre benefit concert *A Concert for New York* widely predicted to be the most successful charity event since *Live Aid*, was broadcast live from Madison Square Garden in New York on radio stations across Europe, thanks to **World Radio Network (WRN)**.

European radio distribution rights holders MediaLane International, representatives of the Westwood One Radio Network, commissioned WRN to provide a digital stereo feed from New York to London via an ISDN line. WRN then transmitted the concert live via its digital multiplex on the *Hotbird 5* satellite where the feed was retransmitted by at least 25 European radio stations, including the ARD network in Germany and RTL in France. The host broadcaster for radio and television was VH1 America.

Alan Stratton, Managing Director of MediaLane International in London said, "We were very pleased with the level of technical service provided by WRN and the fact that the whole project was achieved in less than five working days". British rock luminaries that took part in the concert included David Bowie, The Rolling Stones, Sir Elton John and The Who, along with contemporary performers Macy Gray, Destiny's Child and Marc Anthony. Around 5000 New York firefighters, police officers and rescue workers were amongst the audience.

Christmas Bash

The next **Manchester DX meeting/BDXC social/Christmas Bash 2001** will be on **Saturday 1st December 2001**. These meetings are arranged by members of the British DX Club, but are open to anyone with an interest in radio, in particular the aspects covered by the BDXC such as short wave broadcast, m.w., l.w., f.m., RSLs, pirates, QSLing, equipment, etc. However, other radio threads tend to be covered, such as utilities, amateur, scanning, etc.

Starting at 1600 in the Wetherspoons pub in Piccadilly Gardens, adjacent to the bus and metro stations, and a short walk from the Manchester Piccadilly mainline rail station. Later everyone will adjourn to a restaurant in nearby Chinatown, and later still to further Manchester hostelries. Please bring along your latest logs, news, QSLs, etc. Further details & a mobile contact for the day, from Tom Read at tommyread@hotmail.com or 'phone **(01625) 612916**.

Stop Press!

Subscription News: If you are a subscriber to SWM or intend to become one in the future, you must read this...

Please note that our Fulfilment Section of the subscription department has moved and from now on all subscription administrative queries such as change of address details should be directed to **Kathy Moore** who can be contacted by telephone on **(01590) 641148**, by E-mail at subs@pwpublishing.ltd.uk or by regular mail at **Subscription Queries, PW Publishing, Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Please **DO NOT** enclose money or any other correspondence when you write to this department.

All subscription payments, queries relating to payments and new subscription orders will still be handled by the PWP Book Store on **(01202) 659930**, bookstore@pwpublishing.ltd.uk or **Book Store, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**.

Take More Photos With Powerex

Nevada are the European distributors for Maha, the Taiwanese manufacturer of the Powerex range of batteries and charges. For those radio enthusiasts that own digital cameras, Maha have just released a new Digital Camera battery pack under their Powerex Brand Name.

Digital camera users can now shoot up to two or three times more photos with the new PowerEx PowerBank external battery pack. The New PowerEx PowerBank is a high capacity Lithium-Ion external power source for digital cameras.

The PowerEx PowerBank pack includes a handy belt pouch to carry the main battery, a UK mains charger, a car cigar adapter lead for re-charging in the car and a selection of camera adapter leads. The PowerBank is compatible with a range of popular cameras including the Nikon Coolpix, Olympus, HP Photosmart and Minolta Dimage series.



Price for the complete kit, model DPB140LI, is £69.95. More information can be found at www.powerexbatteries.co.uk or from Nevada on (02392) 313090 or Unit 1, Fitzherbert Spur, Farlington, Portsmouth, PO6 1TT, www.nevada.co.uk

Winners

Well done to everyone who entered our competition to win one of a pair of Alinco DJ-X3 scanners. Out of the 385 people who entered, the two winners are: **Mr D. Kiely** of Chippenham, Wiltshire and **S. Thompson** of St. Austell, Cornwall. Well done to you both - prizes will be on the way shortly.



Thoughts On South Coast Radar Heritage

Roger Bunney takes a brief look.

The demolition of the last Chain Home Radar mast at Martlesham so marked the end of the final remaining WW2 radar station mast. Well actually, no it didn't! The picture shows the last remaining, albeit shortened, mast in current use by the CAA carrying numerous communication v.h.f. and u.h.f. antennas. The wooden structure stands aloft the 240m (787 feet) High St. Boniface Down, above Ventnor, Isle of Wight, and is the sole survivor of the original CH masts.

The station was bombed severely during WW2 and out of action for several weeks in August 1940. A secondary reserve and low level surveillance radar station - with two masts - was built atop the cliff at St. Lawrence, West of Ventnor. The operational bunkers and mast footings of RAF St. Lawrence, a 'remote reserve station' can still be seen adjacent to the cliff footpath with a couple of nissen huts further back in the trees.

The St. Boniface mast and several other modern radio masts nearby can be seen from the access road that crosses the summit of the down, junction of Down Lane with Newport Road at Upper Ventnor. Further West on the Isle of Purbeck, considerable research was conducted into radar development at Worth Matravers, near Swanage, Dorset. Fears of a German commando raid led to the research establishment being moved to Malvern. Details of the experimental WW2 radar work at Worth Matravers and a 'tourist heritage trail' can be obtained in a publication available from the Swanage Tourist Information Centre.

Publications: **Radar on the Isle of Wight** by Mike Dean MBE, the Historical Radar Archive, Little Garth, High Street, Scampton, Lincoln LN1 2SD. Published 1994. £2 inc. P&P. Very detailed, 38 pages, A5 format.

Radar at Ventnor by Peter Bray, available Ventnor Heritage Centre, Spring Hill, Ventnor, IoW. Currently available price approx. £1 + P&P, 9 pages A4 stapled/photocopied (Ventnor and District Local History Group).

Dorset's Radar Days, the British Radar Story by Dr. W.H. Penley and R.G. Batt. The Purbeck Radar Museum Trust, High Oaks, Harmans Cross, Swanage, Dorset BH20 5HU, ISSN 1367-8590, published 1994, price £2.20 + P&P, 24 pages, A5 format and card cover.

With Radar to Final Victory, authors, Purbeck Radar Museum Trust and address as above, 2nd edition published 2000, ISBN 0 9536673 08, 40pages, A5 format within card covers. Note for Swanage visitors that in upper High Street a small museum for the above Trust is open seasonally, contact Swanage TIC in Shore Road, Swanage, for opening hours - Tel: (0870) 4420680 or E-mail: mail@swanage.gov.uk

Videos and publications on old radar contact **Douglas Fisher, White House, Slough Road, Brantham, Manningtree, Essex CO11 1NS, Tel: (01206) 392220.**

Mature readers previously involved in radar are invited to contact **'Centre for the History of Defence Electronics', Studland House, 12 Christchurch Road, Bournemouth BH1 3NA, Tel: (01202) 503879.**



The last remaining mast in current use by the CAA. (Photograph courtesy Peter H. Goodbody, Ventnor, I.O.W.)

rallies

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. The Editorial Staff of SWM cannot be held responsible for any information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct. Editor.

November 24: The Rochdale & District Amateur Radio Society are holding their traditional radio rally at St. Vincent de Paul Catholic Church Hall, Caldershaw Road, off the A680 Ederfield Road, approximately two miles west of Rochdale, follow the orange arrows from M62, J20. Yes, this is a **Saturday** rally! Open from 1015/1030, there will be a talk-in on S22, Bring & Buy, refreshments, etc. More information from **John G7OAI** on (01706) 376204 evenings, E-mail: radars@mbc.co.uk

November 24/25: The London Amateur Radio & Computer Show takes place at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. There will be trade stands, Bring & Buy, Morse tests, free car park, catering, licensed bar, talk-in, special interest groups, disabled facilities, camp site and family attractions include cinema, swimming, golf and spa. Doors open 0945/1000. More information on (01923) 893929.

November 25: The Bishop Auckland Radio Amateurs Club (BARAC) 2001 Rally will take place at Spennymoor Leisure Centre. This venue is ideally suited for both trader and disabled as it boasts good parking and access to large ground floor hall. There will be the usual radio, computer, electronics and Bring & Buy stall, as well as catering and bar facilities. Morse tests will be available on demand. As you can imagine, there will be lots to do for all the family, within the confines of the Leisure Centre for those of the family not interested in radio. Doors open 1100 (1030 for disabled visitors), admission is £1, under 14s free of charge with adult. Talk-in on S22. **Mark G0GFG** on (01388) 745353 or **Brian G7OCK** on (01388) 762678.

December 8: The Worcester Radio, Electronics & Computer Rally is to be held at Perdisswell Leisure Centre, Bilford Road, Worcester. Doors open from 1000, with a £2 admission fee. There is a free car park, talk-in on S22, trade stands, flea market, special interest groups, licensed bar, catering and a free raffle. More details from **John G8MGK** on (01527) 545823/(07762) 203355 or visit www.qsl.net/jgb21cr

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February 10: The 11th Northern Cross Radio Rally is to be held at Thornes Park Athletics Stadium, Wakefield, W. Yorkshire. Easy access from M1 junctions 39 & 40 - well signposted and with talk-in on S22, trade stands, flea market, special interest groups, licensed bar, catering and a free raffle. More details from **John G7JTH** on (01924) 251822 or E-mail: g7jth@wdrs.org.uk or visit the club page at <http://www.wdrs.org.uk>

February 10: The Harwell Amateur Radio Society are holding a Radio & Computing Rally at the Didcot Leisure Centre. This venue includes a large spacious hall, disabled facilities (including lift), bar, refreshments and good parking. Located three miles from the A34 between Oxford and Newbury (signposted from A34). Doors open from 1030 until 1530. More details from **Alan G8NVI** on (01235) 816379 or visit <http://www.hamradio.harwell.com>

February 10: The Cambridge & District Amateur Radio & Computer Rally is to be held at Lordsbridge Arena, Wimpole Road, Barton, near Cambridge. Entry is £2, concessions and disabled, £1.50. Doors open at 1000. There will be a car boot sale, Bring & Buy (mostly under cover) and a bar. Free parking. **John G0GKP** on (01954) 200072, E-mail: j.bonner@ntiworld.com or **Bob G0GVZ** on (01223) 413401, E-mail: bob.grimes@btinternet.com

March 17: The Norbreck Amateur Radio, Electronics and Computing Exhibition, organised by the Northern Amateur Radio Societies Association (NARSA) at the Norbreck Castle Exhibition Centre, Blackpool. Don't miss the largest single day exhibition in the country! Morse tests will be available on demand. **Peter Denton G6CGF** on 0151-630 5790.

April 7: The 45th Northern Mobile Rally & Computer Fair will be held in the Sports Hall of the Harrogate Ladies College, Clarence Drive, Harrogate. **Gerald G0UFI** on (01765) 640695 or www.harrogaterally.co.uk

LM&S



Listeners in the UK and overseas have sent many reports to me during the year, which refer to actual reception in the broadcast bands. Numerous extracts from them have been included in 'LM&S' to provide SWM readers with a comprehensive guide, which is up-dated every month. The end of the year 2001 is fast approaching and this is the December edition of SWM, so I want to thank most sincerely everyone who contributed to the data.

Before revealing the details of their latest reception in the broadcast bands, may I take this opportunity to wish all listeners and readers a peaceful Christmas and good reception in 2002.

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 September.

While visiting Rhue by Ullapool, NW.Scotland during the first week of September **Brian Keyte** (Gt.Bookham) found he could receive clearly the broadcasts from Ríkisutvarpið (RUV) in Reykjavik via Gufuskalar, W.Iceland, (300kW) on **189kHz** and Eidar, E.Iceland (100kW) on **207kHz** around mid-day. He says "I could listen to both on my car radio (with normal rod antenna) with only a little splatter from Radio 4 on the adjacent frequency".

Late night searches for the sky waves from the RUV outlets proved to be a disappointment for **Ernie Strong** (Ramsey, Cambs). He says "No sign of Gufuskalar this month - only an occasional weak carrier and no modulation!" Nevertheless, he compiled an interesting log (see chart) which included Bod, Romania on **153kHz**, noted as SINPO 23333.

Down in E.Bristol **Simon Hockenull** picked up the sky waves from Sasnovy, Belarus, (500kW) on **279kHz** at the early time of 1918UTC. He logged the transmission as SINPO 24342. While searching the band during the evening of the 23rd **Sheila Hughes** (Morden) heard Sasnovy on **279** at 2030UTC. She listened to a Russian orthodox type Church choir singing, followed by a man and woman talking. The transmission peaked 44333.

Medium Wave Reports

The band was searched after dark by some listeners and they picked up the sky waves from quite a few of the m.w. stations in the Middle East, N.Africa, Europe and Scandinavia - see chart.

A very welcome first report came from **Michael Wesley** in Scunthorpe. Between 2200 and 0030UTC on the 27th & 28th of September he compiled an interesting list for the chart. He says "All were confirmed by positive identification or cross references. There were several I didn't pursue as they were playing music with little chance of making identification quickly". He tried three different receivers and noticed that some European m.w. programmes received from different transmitters are heard about a second or two apart and wondered why. This would appear to be a function of how the modulating audio for the two transmitters is sent from the studio centre.

For example, when the two audio channels from a BBC stereo radio outside broadcast site are sent to the studio centre via BT 'music' lines over different routes of unequal length there is a delay which has to be corrected. Michael

is wondering if one of the transmitters is being fed via satellite, but a delay of only one or two seconds seems rather short. Any comments on this interesting topic would be welcome here.

The ground waves from some local radio stations were received in quite distant places during daylight. Whilst up in Rhue, **Brian Keyte** logged 55 stations with some really long hauls, such as Capital Gold via Veals Farm, Southampton on **1557**; County Sound R. via Peasmarsh, Guildford on **1566**; BBC R.Kent via Rusthall on **1602kHz** - see chart. He says "I noticed that West Sound R. (**1035kHz**) and Forth AM (**1548kHz**) have become West Sound 2 and Forth 2 in all announcements (to distinguish them their f.m. services). He says "This brings them into line with NorthSound Two (1035kHz), though the latter uses 'Two' instead of '2!'".

Fifty-one local radio stations were logged by **George Millmore** in Wooton, IoW. All were heard during daylight with the exception of BBC R.Stoke on **1503kHz**, which was received after dark via a sky wave path and rated SIO 323. The following ratings noted in his report suggest that the ground waves suffered little attenuation as they travelled over long sea paths to reach him: BBC R.Jersey on **1026kHz** - SIO 555; BBC R.Guernsey 1116 - SIO 444; BBC R.Cornwall via Redruth 630 - SIO 333. Good reception was also noted from some of the stations on the mainland, including BBC Asian Network, Leicester 837 - SIO 333; BBC Norfolk, W.Lynn 873 - SIO 323; ILR R.XL, Birmingham 1296 - SIO 333; BBC R.Merseyside 1485 - SIO 222.

Short Wave Reports

At the time of writing (early October) the only occupant of the **25MHz (11m)** band is Radio France International (RFI) but that situation may change when the broadcast schedules for the winter period are introduced on October 28. How well their daily transmissions to listeners in E/C.Africa on **25.820** (Fr 0900-1300UTC) reach that area is still unknown here, but it does seem likely that reception will have been good except during periods of high solar activity. (*Deutsche Welle are also using 11m as of 28th - Ed.*)

A number of reports on the RFI transmissions arrived here from listeners in the UK at the end of September and the SINPO rating quoted therein were 22111 at 0900UTC by **Vic Prier** in Colyton; 45434 at 0910 by **Bernard Curtis** in Stalbridge; 25533 at 0923 by **Richard Reynolds** in Guildford; 25422 at 0925 in E.Bristol; 34333 at 0930 by **Thomas Williams** in Truro; 25343 at 1011 by **Fred Pallant** in Storrington; 21122 at 1025 by **Robert Hughes** in Liverpool; 25242 at 1216 by **Fred Wilmshurst** in Northampton; 23332 at 1255 by **Robert Connolly** in Kilkeel.

Many of the broadcasts in the **21MHz (13m)** band are beamed to far away places but quite a few can be received quite well in the UK. Reception over long distances is often good here too, so this band has much to offer the listener.

The daily broadcasts from R.Australia attract the attention of many listeners in the UK. They also provide a useful pointer to the prevailing propagation conditions. Reception is usually fairly good but sometimes the effects of solar activity render them inaudible for a day or two. Their early morning transmission from Shepparton on **21.725** (Eng to Pacific areas 0200-0900) was noted as SINPO 35444 at 0710 in Northampton. This is followed at 0900 by a broadcast to Asia from Shepparton on **21.820** (Eng 0900-1400), rated 24332 at 1037 by **Rhoderick Illman** in Oxted.

Other occupants of this band during the morning include R.Prague, Czech Rep **21.745** (Eng to E.Africa, S.Asia 0900-0930), rated 45444 at 0900 in Colyton; BBC via Seychelles **21.470** (Eng to E/S.Africa 0800-1300) 32223 at 0935 in Stalbridge; R.Pakistan **21.465** (News in Eng 0800-0803, Ur to Eur 0803-1100) 44333 at 0946 in Truro; HCBJ Quito, Ecuador **21.455** (Eng [u.s.b.]) 43433 at 1045 by **David Hall** in Morpeth; DW via Wertachtal, Germany **21.780** (Eng to Africa 1100-1145) 24322 at 1145 by **Peter Pollard** in Rugby; BSKSA Riyadh, Saudi Arabia **21.705** (Ar to W.Eur 0600-1500) 54454 at 1150 in Liverpool.

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	F*,G*,H*,I*
153	Donebach DLF	Germany	500	C*,E,F*,G,I
153	Bod	Romania	1200	G*
162	Allouis	France	2000	C,E,F*,G,H*,I
171	Nador Medi-1	Morocco	2000	F*,G*,H*
171	B'shakovo etc	Russia	1200	C*,E*,I*
177	Oranienburg	Germany	500	C*,E,F*,G,I*
183	Saarouis	Germany	2000	C*,E,F*,G,H*,I*
189	Gufuskalar	W.Iceland	150	D
198	Droitwich BBC	UK	500	C,E,G,I
207	Munich DLF	Germany	500	B*,C*,E,F*,G,H*,I*
207	Eidar	E.Iceland	100	D
207	Azjal	Morocco	800	G*
216	Roumoules RMC	S.France	1400	C,E,F*,G,H*,I
225	Polskie R-1	Poland	?	B*,C*,E*,F*,G*,I*
234	Beidweiler	Luxembourg	2000	C,E,F*,G*,H*,I
243	Kalundborg	Denmark	300	B,C*,E,F*,G*,I
252	Atlantic 252	Eire	500	A,E,F*,G,H*,I
261	Burg(R.Rogal)	Germany	85	E,F*,G*,H*,I*
261	Taldom Moscow	Russia	2500	C*,G*
270	Topolna	Czech Rep	1500	B*,C*,E*,F*,G,I
279	Sasnovy	Belarus	500	B*,C*,E*,F*,G*,H*,I

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

Listeners:-

- (A) Robert Frost, Felixstowe.
- (B) Simon Hockenull, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Brian Keyte, while at Rhue by Ullapool.
- (E) George Millmore, Wooton, IoW.
- (F) Fred Pallant, Storrington.
- (G) Ernie Strong, Ramsey, Cambs.
- (H) Thomas Williams, Truro.
- (I) Fred Wilmshurst, Northampton.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	Dxer	Freq (MHz)	Station	Country	UTC	Dxer
4.885	KBC East Sea Nairobi	Kenya	1854	F	4.890	RFI Paris	via Gabon	0427	D,J
4.890	R Port Moresby	Pap. N. Guinea	1942	F	4.895	AIR Kurseong	India	1715	F,J
4.895	Pakistan BC	Pakistan	1633	F	4.900	SLBC Colombo	Sri Lanka	1932	F
4.900	AIJR Jaipur	India	1716	F	4.915	R Anhanguera	Brazil	0451	J
4.915	GBC-1, Accra	Ghana	1958	A,F,J	4.915	KBC Cent Sea Nairobi	Kenya	1844	F
4.920	R Quito, Quito	Ecuador	0554	J	4.920	AIR Chennai	India	1720	F
4.920	AIR Jambai	Indonesia	1720	F	4.930	R Internacional	Honduras	0445	J
4.930	AIR Shimla	India	1721	F	4.950	AIR Srinagar	India	1723	F
4.950	VDA via Sao Tome	Sao Tome	1911	C,F,G,J	4.960	VDA via Sao Tome	Sao Tome	0445	D,J
4.965	Christian Voice	Zambia	1736	J	4.975	R Mundial, Sao Paulo	Brazil	0600	J
4.975	R Uganda, Kampala	Uganda	1909	D,F,J	4.980	Ecas del Torbes	Venezuela	0405	A,D
4.985	R Brazil Central	Brazil	0155	A,C	4.990	R Ancash, Huaraz	Peru	0459	J
5.010	R Garoua	Cameroon	1742	J	5.010	R Guangxi 2, Nanning	China	2124	J
5.010	AIR Thirupuram	India	0030	C	5.020	La V du Sahel, Niamey	Niger	1914	F,J
5.025	R Rebelde, Habana	Cuba	0506	J	5.025	R Uganda, Kampala	Uganda	1911	F,J
5.050	R Tanzania	Tanzania	1914	F,J	5.060	PBS Xinjiang, Urumqi	China	1748	J

- DXers:-
 (A) Robert Connolly, Kilkeel.
 (B) Stan Evans, Herstmonceux.
 (C) Bill Griffith, W.London.
 (D) David Hall, Morpeth.
 (E) Rhoderick Iilman, Oxted.
 (F) Fred Pallant, Storrington.
 (G) Clare Pinder, while in Appleby.
 (H) S.Powell, Blackpool.
 (I) Vic Prier, Colyton.
 (J) Richard Reynolds, Guildford.
 (K) Thomas Williams, Truro.

After mid-day R.France Int via ? **21.580** (Fr to M.East, Africa, Asia 0700?-1700?) was 34443 at 1520 in Kilkeel; R.Prague, Czech Rep **21.745** (Eng to N.America? 1700-1730) 44333 at 1708 by **Vera Brindley** in Woodhall Spa; BBC via Ascension Is **21.470** (Eng to E/S.Africa 1300-1900) 44433 at 1800 by **Stan Evans** in Herstmonceux; R.Canada Int via Rampisham, UK **21.570** (Eng to Africa 1800-1859) 45444 at 1805 in E.Bristol; R.Canada Int via Sackville **21.570** (Fr, Eng to Eur 1900-2100) 44333 at 2040 in Morden.

The narrow **18MHz (15m)** band, which is allocated to single sideband (s.s.b.) broadcasting in the future, is at present being used by a few broadcasters with amplitude modulated (a.m) transmissions. Mentioned in the reports were R.Denmark via R.Norway **18.950** (Da to N.America 1230-1300), rated 44444 at 1235 in Truro; R.Sweden **18.960** (Eng, Sw to N.America, Lat.America 1130-1430) 44333

at 1150 in Rugby, 35343 at 1312 in Northampton & 55555 at 1335 in Herstmonceux; Family Radio WYFR via Okeechobee FL, USA **18.980** (Eng to Africa, Eur 1600-2145) 25333 at 1600 in E. Bristol, 35434 at 1730 in Colyton & 35333 at 2145 in Stalbridge; Christian Science Herald via WSHB Cypress Creek **18.910** (Fr, Eng to E/C.Africa 1600-2200) 54444 at 2100 in Morden.

In the adjacent **17MHz (16m)** band listeners in the UK picked up a number of broadcasts over long distances. The most distant came from Radio Australia via Shepparton on **17.750** (Eng to Asia 0000-0500, 0600-1100). It was rated 34433 at 0935 in Kilkeel & 24333 at 1039 in Oxted. During the early evening Channel Africa via Meyerton, S.Africa was noted on **17.860** (Eng, Afrik to W.Africa 1700-1800) as 44434 at 1705 in Woodhall Spa; also on **17.870** (Eng, Fr to W.Africa 1800-1900) as 35333 at 1834 in Storrington. Later, the BBC via Ascension Is **17.830** (Eng to W.Africa 0800-2100) was 32222

- Listeners:-
 (A) Robert Connolly, Kilkeel.
 (B) Simon Hockenhill, E.Bristol.
 (C) Sheila Hughes, Morden.
 (D) Rhoderick Iilman, Oxted.
 (E) Brian Keyte, while at Rhue by Ullapool.
 (F) George Millmore, Wootton, IoW.
 (G) Ernie Strong, Ramsay, Cambs.
 (H) Fred Wilmshurst, Northampton.

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	B,F,G,H	1323	Capital G,Southwick	I	0.50	D*,F,G,H
585	R.Solway	B	2.00	A,E	1323	SomersetSnd,Bristol	B	0.63	A,E
603	C.G.Litt'lme	I	0.10	D,F,G,H	1332	Ci Gold 1332,Pr'bo	I	0.60	A,G,H
630	R.Bedfordshire(3CR)	B	0.20	B,D,F,G,H	1332	Wiltshire Sound	B	0.30	E,F
630	R.Cornwall	B	2.00	A,F	1359	Breeze, Chelmsford	I	0.28	G
657	R.Clywd	B	2.00	A,E,F,G,H	1359	Ci Gold 1359, C'try	I	0.27	A,E,G,H
657	R.Cornwall	B	0.50	A,F	1359	R.Solent,Bournemouth	B	0.85	G
666	Ci Gold 666, Exeter	I	0.34	A,B,F,G,H	1368	R.Lincolnshire	B	2.00	G,H
666	R.York	B	0.80	A,C,E,G	1368	Southern Counties R	B	0.50	C,F
729	BBC Essex	B	0.20	C*,G,H	1368	Wiltshire Sound	B	0.10	F
738	Hereford/Worcester	B	0.037	B,F,G,H	1413	R Gloucester via ?	B	? ?	E,H
756	R.Cumbria	B	1.00	A,E,G	1413	Premier via ?	I	0.50	E,F,G
756	The Magic 756,Powys	I	0.63	A,F,G,H	1413	Fresh AM, Skipton	I	0.10	A,E,G
765	BBC Essex	B	0.50	B*,C*,F,G,H	1431	Breeze,Southend	I	0.35	G
774	R.Kent	B	0.70	C,D,F,G,H	1431	Ci Gold, Reading	I	0.14	E,F,G,H
774	R.Leeds	B	0.50	A,G	1448	Asian Netwk,Peterbr	B	0.15	A,G,H
774	Ci Gold 774, Glos	I	0.14	FH	1458	R.Cumbria	B	0.50	A,E
792	Ci Gold 792, Bedford	I	0.27	D,G,H	1458	R.Devon	B	2.00	A,F
792	R.Foyle	B	1.00	A,E	1458	1458 Lite AM Manch'	I	5.00	E
801	R.Devon	B	2.00	A,B,F,G	1458	Sunrise, London	I	50.00	F,G,H
828	Ci Gold 828, Luton	I	0.20	G,H	1458	Asian Netwk Langley	B	5.00	G,H
828	Magic 828, Leeds	I	0.12	A	1485	Ci Gold, Newbury	I	1.00	E,H
828	Ci G 828 Bourne'm'th	I	0.27	F	1485	R.Humberside (Hull)	B	1.00	E,G
837	R.Cumbria/Furness	B	1.50	A,E	1485	R.Merseyside	B	1.20	A,E,F
837	Asian Netwk Leics	B	0.45	A,E,F,G,H	1485	Southern Counties R	B	1.00	F
855	R.Devon	B	1.00	F	1503	R.Stoke-on-Trent	B	1.00	A,C*,D*,E*,F*,G,H
855	R.Lancashire	B	1.50	A,E,G	1521	Breeze, Reigate	I	0.64	C,E,F,G,H
855	R.Norfolk, Postwick	B	1.50	D,G	1530	R.Essex, Southend	B	0.15	C*,G
855	Sunshine 855,Ludlow	I	0.15	G,H	1530	Big AM, W.Yorks	I	0.74	A,E
873	R.Norfolk, W.Lynn	B	0.30	F,G,H	1530	Ci Gold, Worcester	I	0.52	E*,H
936	Brunel CG, W.Wilts	I	0.18	F,G,H	1548	R.Bristol	B	5.00	F
936	Fresh AM, Hawes	I	1.00	A,E	1548	Capital G, London	I	97.50	E,F,G
945	Ci Gold GEM, Derby	I	0.20	A,G,H	1548	Magic88, Liverpool	I	4.40	A,E
945	Capital G, Bexhill	I	0.75	A,D,F	1548	Forth AM, Edinburgh	I	2.20	E
954	Ci Gold 954 via ?	I	? ?	G	1557	R.Lancashire	B	0.25	A,B*,E
954	Ci Gold 954, Torquay	I	0.32	C,F	1557	Ci Gold 1557,N.hant	I	0.76	E,G,H
954	Ci Gold 954, H'ford	I	0.16	A,B,H	1557	Capital G, So'ton	I	0.50	D*,E*,F
963	Asian Sd, E.Lancs	I	0.80	A	1566	CountySnd,Guildford	I	0.50	E,F,G
963	Liberty R, Hackney	I	1.00	D,E,F,G,H	1584	London Turkish R	I	0.20	G
972	Liberty R, Southall	I	1.00	A,B,D,E,F,G,H	1584	R.Nottingham	B	1.00	B*,C*,E,G,H
990	R.Aberdeen	B	1.00	E	1584	R.Shropshire	B	0.50	A
					1594	Tay, Perth	I	0.21	E
					1602	R.Kent	B	0.25	C,D*,E,F,G,H

(Eng to Eur 2200-2300) 45544 at 2215 in Northampton.

In the **13MHz (22m)** band Christian Science Herald via WSHB, Cyprus Creek, USA on **13.650** (Eng to Africa 0600-0700, Mon, Wed, Fri, Sat) was 45544 at 0655 in Northampton; Croatian R, Zargreb **13.830** (Cr to Eur) 55545 at 1005 in Stalbridge; R.Australia via Shepparton **13.605** (Eng to Pacific areas 0800-1200) 33433 at 1010 in Morpeth & 24333 at 1039 in Oxted; R.Austria Int via Moosbrunn **13.730** (Eng, Ger to Eur 1130-1230) 55355 at 1225 in Rugby; R.Prague, Czech Rep. **13.580** (Eng, Cz to Eur, Asia 1300-1357) 55544 at 1325 in Herstmonceux; VOA via Sao Tome **13.600** (Special Eng to Africa 1600-1700) 44444 at 1625 in Woodhall Spa; Vatican R, Italy **13.765** (Eng to Africa 1730-1800?) 44434 at 1745 in Colyton; China R.Int via ? **13.790** (Eng to N.Africa, W.Asia 1900-2000) 43333 at 1930 in Morden; AIR via Bangalore **13.620** (Ar to M.East, Africa 1730-1945) 54444 at 1945 in Liverpool; R.Damascus, Syria **13.610** (Eng to Eur 2005-2105; Eng to America, Pacific 2105-2205) 55444 at 2015 in Appleby; Voice of Vietnam, Hanoi **13.740** (Eng, Fr to Eur 2030-2130) 44444 at 2030 by **Gerald Guest** in Dudley; R.Australia via Darwin **13.620** (Eng to SE.Asia 2200-0000) 22222 at 2312 in Truro; WWCR Nashville, USA **13.845** (Eng to Africa 1300-0100) 43443 at 2350 in Kilkeel.

Some of the broadcasts in the **11MHz (25m)** band travel long distances to reach the UK. The most distant come from R.New Zealand on **11.675** (Eng 1100-1300), rated 35432 at 1227 in E.Bristol. R.Australia has been received here on two frequencies from Shepparton: **11.880** (Eng to Asia 0900-1100), rated 33333 at 0925 in Truro; also **11.660** (Eng to Asia 1430-1700), 44444 at 1530 in Kilkeel.

During the early morning HCJB, Quito via ? **11.680** (Eng to Eur? 0600-0800) was 54445 at 0700 in W.London; Voz Cristiana, Chile **11.745** (Sp to S.America 2100-1100) 32222 at 0735 in Liverpool; World Harvest R. (WHRI) via Maine, USA **11.730** (Eng to Africa 0800-0900) 54444 at 0815 in Stalbridge.

Later, R.France Int via ? **11.615** (Eng to Africa 1600-1730) was 44444 at 1638 in Woodhall Spa; R.Japan via Sri Lanka? **11.970** (Eng to M.East? N.Africa? 1700-1800) 33233 at 1700 in Appleby; R.Finland via Pori **11.755** (Fin to Eur) 43544 at 1722 in Colyton; Voice of Mediterranean, Malta via Russia? **12.060** (Eng to Eur, N.Africa 1900-2000) 44443 at 1902 in Blackpool; Israel R, Jerusalem **11.605** (Eng to Eur, N.America 1900-1930) 42432 at 1905 in Truro; VOIRI Iran **11.670** (Eng to Eur 1930-2030) 33332 at 1930 in Blackpool; R.Damascus, Syria **12.085** (Ger, Fr, Eng to Eur 1900-2105) 55444 at 2038 in Northampton; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1400-2200) 44444 at 2105 in Morden; China R.Int via ? **11.790** (Eng to Eur 2000-2200) SIO 444 at 2121 in N.Bristol; R.Taipei Int via WYFR? **11.565** (Eng to Eur 2200-2300) 54433 at 2205 in Herstmonceux.

During the morning R.New Zealand may be heard in the **9MHz (31m)** band. Their 100kW transmission on **9.885** (Eng 0700-1100) was rated 24333 at 0754 in Guildford, 32223 at 0810 in Stalbridge & 22222 at 0925 in Truro. Also mentioned in the reports were Christian Science Herald via WSHB Cypress Creek, USA **9.860** (Sp, Eng to Eur 0800-1000) 43344 at 0800 in Dudley; WTJC Newport NC, USA **9.370** (Eng to N.America 24hrs) 34233 at 0830 in Rugby; R.Vilnius, Lithuania **9.710** (Eng to Eur 0930-1000) 54445 at 0930 in W.London; R.Netherlands via Wertachtal **9.860** (Eng to Eur 1030-1225) 55555 at 1145 in Herstmonceux.

Later, R.Australia via Shepparton on **9.475** (Eng to Asia 1330-1858) was 43443 at 1545 in Kilkeel; VOA via ? **9.645** (Eng to Asia 1400-1800) 33333 at 1644 in Woodhall Spa; BBC via Cyprus **9.410** (Eng to Eur, N.Africa, M.East 1600-2200) 45444 at 1806 in E.Bristol; Voice of Vietnam, Hanoi **9.730** (Eng to Eur 1800-1830) 43434 at 1810 in Colyton; Voice of Turkey via ? **9.785** (Eng to Eur 1830-1920?) 55555 at 1830 in Appleby; China R.Int via ? **9.440** (Eng to Eur 1900-?) 45154 at 1910 in Larnaca, Cyprus; VOIRI Tehran, Iran **9.022** (Eng to W.Eur 1930-2030) 33332 at 1930 in

Blackpool; TWR via Meyerton, S.Africa **9.510** (Fulani to W.Africa 1830-2045) 33343 at 1946 in Storrington; R.Polonia (Polish R, Warsaw) **9.540** (Eng to Eur 1930-2030) 43333 at 2000 in Morden; R.Australia via Shepparton **9.500** (Eng to Pacific areas 1900-2130) 44444 at 2010 in Morpeth & 45444 at 2115 in Northampton; R.Ext.España **9.595** (Eng to Eur 2100-2200, Sun) 44444 at 2100 in Appleby; Voice of Turkey, Ankara **9.460** (Tur to Eur 0800-2200?) 55555 at 2205 in Liverpool; WWCR Nashville, USA **9.475** (Eng to Eur, Africa 2100-2300) 32333 at 2230 in Stalbridge; VOA via Kavala **9.850** (Eng to S.Asia 0100-0300) SIO 333 at 0157 in N.Bristol.

The **7MHz (41m)** band carries a number of broadcasts intended for listeners in Europe. Those mentioned in the reports came from R.Japan via Woofferton, UK **7.230** (Eng, Jap 0500-0700), rated 44333 at 0500 in Appleby & 44444 at 0600 in Herstmonceux; WYFR Family R. via Okeechobee FL, USA **7.355** (Ger, Eng 0600-0800, also to Africa) 35444 at 0742 in Northampton; R.Slovakia Int **7.345** (Eng 1630-1657) 44434 at 1648 in Woodhall Spa; AIR via Bangalore **7.410** (Hi, Eng 1745-2230) 42333 at 1745 in Colyton; Voice of Russia **7.440** (Eng) 45433 at 1927 in E.Bristol; R.Thailand, Udon Thani **7.155** (Eng 1900-2000) 43333 at 1945 in Truro; Voice of Russia **7.360** (Eng) 33233 at 2000 in Stalbridge; R.Minsk, Belarus **7.210** (Eng 1930-?) 43333 at 2030 in Morden.

Some to other areas may also be received here. They include the Voice of Nigeria, Ikorodu **7.255** (Eng to W.Africa), rated 44444 at 1900 in W.London & 54534 at 2212 in Guildford; WBCQ Monticello, USA **7.415** (Eng to N.America) 33343 at 2230 in Liverpool; World Harvest Radio (WHRI) via Maine, USA **7.580** (Eng to N.America) 44444 at 0005 in Morpeth.

There are many more broadcasts for listeners in Europe in the **6MHz (49m)** band. Some come from R.Japan via Skelton, UK **5.975** (Eng 0500-0600), rated 44444 at 0520 in Morden; Voice of the Mediterranean, Malta via Russia? **6.110** (Eng 0600-?) 32222 at 0601 in Blackpool; R.Vlaanderen Int via Julich, Germany **5.985** (Eng 0700-0730) 55544 at 0715 in Herstmonceux; TWR Monte Carlo, Monaco **6.045** (Eng 0655-0800) 54434 at 0716 in Oxted; Voice of Hope via Julich, Germany **5.975** (Eng 0700-0800) 44444 at 0725 in Rugby; Deutsch Welle (DW) via Julich? **6.140** (Eng Service) 43443 at 0956 in Kilkeel; R.Netherlands via Julich, Germany **6.045** (Eng 1030-1225) 34433 at 1125 in Dudley; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 44444 at 1720 in Colyton; Swiss R.Int via Julich, Germany **6.110** (Ger, Fr, It, Eng 1730-1930) 44444 at 1730 in Colyton; R.Slovakia Int **5.920** (Eng 1830-1900) 45444 at 1833 in E.Bristol; R.Budapest, Hungary **6.025** (Eng 1900-1930) 44444 at 1900 in Appleby; R.Korea, Pyongyang, Korea **6.575** (Eng 1900-2000) 45154 at 1915 in Larnaca, Cyprus; RAI Rome **5.970** (Eng 1935-1955) 34434 at 1935 in Dudley; R.Canada Int via Skelton, UK **5.995** (Eng 2000-2100) 55555 at 2000 in Dudley & 44444 at 2005 in Truro; R.Finland via Pori **6.120** (Fin) 33333 at 2050 in Truro; R.Ukraine Int **5.905** (Eng 2100-2200) 44344 at 2100 in Appleby; R.Japan via Skelton, UK **6.055** (Eng 2100-2200) 55555 at 2135 in Herstmonceux; R.Yugoslavia, Belgrade **6.100** (Fr, Eng 2030-2130) 45444 at 2120 in Northampton; R.Sweden **6.065** (Eng 2130-?) 55544 at 2140 in Northampton; R.Austria Int, via Moosbrunn **6.155** (Eng) SIO 333 at 2130 in N.Bristol; also **5.945** (Eng) SIO 444 at 2154 in N.Bristol.

Some intended for listeners in other areas have been received here including R.Diff.Nat.Chad **6.165** (Fr) 44434 at 2155 in Oxted; BBC via Antigua, W.Indies **5.975** (Eng to Caribbean, C/S.America 2100-0400) 32332 at 2216 in Oxted; R.Corp of Singapore (RCS) **6.150** (Eng 2300-1100), rated 43334 at 2300 in W.London; BBC via Kranji, Singapore **6.195** (Eng to SE.Asia 2100-0200) 33443 at 2328 in Kilkeel; American Forces Network (AFN) via Puerto Rico **6.458** (Eng [u.s.b.]) 44344 at 0230 in Morpeth; R.Havana, Cuba **6.000** (Eng to N.America 0100-0500) 53444 at 0455 in Guildford; WEWN Birmingham, USA **5.825** (Eng to N.America 2200?-1400?) 54444 at 0505 in Morpeth & 32222 at 0730 in Blackpool; ORTM Bamako, Mali **5.995** (Fr 0555-0748, 1757-0000) 55444 at 0611 in Guildford; WHRI South Bend, USA **5.745** (Eng to N.America 2100?-1000) 44444 at 0702 in Oxted.



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

Signal Strength	
5	excellent
4	good
3	fair
2	poor
1	barely audible
Interference	
5	nil
4	slight
3	moderate
2	severe
1	extreme
Noise	
5	nil
4	slight
3	moderate
2	severe
1	extreme
Propagation Disturbance	
5	nil
4	slight
3	moderate
2	severe
1	extreme
Overall Merit	
5	excellent
4	good
3	fair
2	poor
1	unusable

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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.)

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

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6" STAND OFF BRACKET
 Complete with 'U' Bolts
 9" stand off bracket £9.00

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 25 METRES OF ENAMELLED WIRE INCLUDES 10M PATCH LEAD & INSULATOR

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 Complete with 'U' Bolts

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 SINGLE 1 1/2" £10.00
 SET OF FOUR 1 1/2"£34.95
 SINGLE 2"£15.00
 SET OF FOUR 2"£49.95

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 PL259/9..... 0.75 each
 PL259/6..... 0.75 each
 PL259/7 for mini 8 1.00 each
 BNC (Screw Type) 8 1.00 each
 BNC (Solder Type) 8 1.00 each
 N TYPE for N582.50 each
 N TYPE for RF213 ..2.50 each
 SO239 to BNC1.50 each
 PL259 to BNC2.00 each
 N TYPE to SO239 ..3.00 each

CABLE
 RG213 MILITARY 0.85 per mtr.
 MINI 8 0.70 per mtr.
 RG58 STANDARD 0.35 per mtr.
 RG58 MILITARY 0.60 per mtr.

WEATHER SATELLITE ANTENNA
TURNSTILE 137
 Freq. 137.5 MHz Length 1000mm

This Antenna is designed for external use to receive weather satellite signals.
 Complete with mounting hardware.
£39.95



£29.95
SUPER SCAN AIR BASE (Airband)
 (Stainless Steel)
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 This is a transmitting & receiving antenna designed for the aircraft frequency range. (For the control tower & aircraft listener.)

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 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.)

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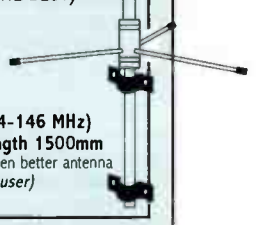
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 Freq. Range 0-2000 MHz. Length 1500mm.
 This is designed for external use. It will receive all frequencies. at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the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

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 Freq. Range Receive - 0-2000 MHz. Transmit 144 - 146 MHz gain 2.5 DBd 420 - 430 MHz gain 4.5 DBd Length 1000 mm.
 Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike. Comes complete with mounting hardware and brackets. (Ideal for the amateurs ham radio - user.)

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 Freq. Range Receive - 0-2000 MHz. Transmit 50 - 52 MHz gain 2.00DBd 144 - 146 MHz gain 4.00 DBh 420 - 430 MHz gain 6.00 DBd Length 2.5 m.
 For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. (THE BEST)



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 Freq. 0.05MHz-40MHz Adjustable comes with 25 metres of H/Grade flexweave antenna wire, 10 metres of military spec RG58 coax cable feeder, insulated guy rope, dog bone & choke balun. All Mods No A.T.U. required. Super Duper Short Wave Antenna.
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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.)
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 Freq. Range 0.05-30MHz Length 770mm
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 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.)
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TRI SCAN III
 Freq. Range 25-2000MHz Length 720mm
 Desk Top Antenna for indoor use with triple vertical loaded coils. The tri-pod legs are helically wound so as to give it its own unique ground plane. Complete with 5mts of low loss coax and BNC plug. (Ideal for Desk Top Use.)
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 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).
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 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.)
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 Dedicated for Civil & Military Airband VHF/UHF RX & TX Capabilities Length 215mm. PP £2.00
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Off The Record

On September 1st the former offshore Radio Essex held a reunion at a West London restaurant. Most of the original DJs and engineers attended, several of who had not met since 1966. This nostalgic event was filmed by Mark Wesley, who works in TV advertising, also by John Aston, who now does special effects for the film industry. The guest of honour was Joan and Roy Bates and their son Michael who owned the original Radio Essex based on Knock John fort in the Thames Estuary. The Bates family are now better known for their activities on their self-proclaimed state of Sealand located on another ex-navy fortress off Harwich in Essex.

Radio Caroline have had a series of open days on their vessel based at Queenborough on the Isle of Sheppey, they have also had a couple of regional meetings at Bournemouth and Herne Bay. Unfortunately, these were organised at short notice and only publicised on their Internet mailing list, so it was impossible for me to give these events any publicity until after the event. As it happened, only about a dozen people turned up at each of the regional meetings.

World Trade Centre

I am writing this just a week after the horrific attack on the WTC and the Pentagon in the USA. I cannot say anything that has not already been said, however it does seem doubly poignant as our hobby includes aeronautical, military and search and rescue communications. My initial thoughts were how frivolous our hobby is compared with a catastrophe of such magnitude and should we be getting pleasure from monitoring the consequences from such a tragic event?

However, having discussed this point with friends pursuing other entirely different hobbies, it is a little comforting to know they feel just the same. With the forthcoming military action - which will undoubtedly include an international media propaganda battle - there will be much to monitor.

Radio Anoraks

A new E-mail list has been created by **Christopher England** so like-minded radio enthusiasts can swap messages. This is a discussion forum rather than news group with something of a pub atmosphere. Topics include pirates past and present, also opinions on all radio broadcasting including personalities, formats, modes and equipment. Chris says almost anything is in-topic in this interesting and informal forum, **RadioAnoraksUK-subscribe@yahoo.com** I would hope you would already be subscribed to **SWM's** own list **swm_readers-subscribe@yahoo.com** that covers all of the very varied radio topics included in this magazine.

SW Pirates Log Book

Classic Rock Radio from Holland has been widely heard on 7.470MHz. Borderhunter Radio, also from the Netherlands, is reported as having been received on the Canadian west coast on 15.794MHz. In New Jersey, USA, **Ralph Brandt** has received Swinging Radio England on 6.276MHz with classical music including the American national anthem. Even further away the Andino Relay Service are broadcasting on 6.880MHz between 0500 and 0600, the station address is **Casilla 159, Santiago 14, Chile**.

Radio Geronimo is rebroadcast by the Dutch Relay Service on 15.070MHz; Dave Valco listening in Dunlo, Philadelphia, USA, has produced an impressive list of Europirates including Radio Nova 6.210MHz, Northlight 6.205; Geronimo 6.303; Foxfire 6.294; Casanova 6.240; Doctor Tim 6.261; Borderhunter 6.209 also 15.794; England 6.276; Ozone 7.434 and Radio Free London 5.805MHz.

An E-mail from Germany revealed that Studio Northlight was raided by communications officials and police on Saturday 29th September at 1323 while broadcasting on 6.300MHz. Their programme schedule had been widely publicised on the Internet.

Ex-Pirates Success

The Radio London RSL during August from Clacton pier has been hailed as a great success. Programme Controller Paul Graham has revealed that over 30,000 people hit the Big L website and listened to the live streaming of the station. He says; "The figure for the net listeners is staggering for any station, let alone a so-called RSL. I am delighted with the way Big L sounded, it was certainly a privilege to work with the big names who gave their time to the station". Paul also tells me that more archive material will be available on the website soon. He also says that talks are taking place with a Dutch contractor with view to putting Big L back on m.w. again. Other possibilities include options with the Sky Digital or WorldSpace satellites to bring back Radio London's much needed service in today's radio market.

Long Wave Radio

Following the antenna site planning difficulties experienced by the Isle of Man Broadcasting Company, Holland's Delta Radio project has run into similar problems. The Dutch government had granted them a licence, but controversially required their antennas to be located offshore. It is reported that as construction has not yet started, their licence will be suspended, presumably as they would be unable to meet any target date to be on air. There is no suggestion at this stage that the contract be offered to another broadcaster. At present there is a downturn in radio advertising rates and profits, but actual overall listening appears to be increasing slightly. Delta radio proposes to broadcast to the UK in English on 171kHz using the callsign 'The Lounge'.

Another l.w. station hoping to come on air is Northern Star International from Norway, who secured the franchise to broadcast on the former Norsk Rikskringkasting l.w. frequency 216kHz that has been unused for about six years. The only competing group was the local Tamil community who had also applied for a station near Oslo. Northern Star Radio intend to broadcast a range of international programmes to Northern Europe, further information will be available shortly.

Atlantic 252, based in Ireland, is engaged in talks that may result in a change of ownership. At present the station is jointly owned by Radio Telefis Eireann and Radio Telediffusion Luxembourg. Any new owner would be able to change the format without recourse to the Irish governments broadcasting regulatory body, which could make the station an attractive acquisition for sports broadcaster Teamtalk Media.

Automated Programming

The Radio Authority wish to regulate the amount of time British commercial radio stations use automated programming during the day. This is the percentage of the day in which computer generated output is exclusively used with there being little or no requirement for a live presenter. Most stations use various systems of automation, particularly during the night and other off-peak broadcasting hours. The proposals suggest limiting larger stations to a maximum of two hours of daytime automation and smaller stations broadcasting to an adult population of less than 50,000 to be restricted to just four hours of daytime automation.

While control of automation is welcome in many quarters, it is something that will take a lot of effort to actually measure. All stations use programme computers these days that select and play music, jingles, advertising and previously recorded announcements. They can run completely unattended or can be used in a live assist mode where presenters can choose to do live links if and when they wish. There is also the question of when does official daytime actually begin?

Depending on the station's format and previously agreed requirements, the daytime of different stations may indeed vary quite a lot. The interesting point is how the Radio Authority will enforce these proposals, stations are required to record all of their output, but a dispute over the varying degrees of automation would be impossible to prove from a recording.



Radio Caroline's English Service Studio.

Letters

Harry Richards writing from North Lincolnshire says in the aftermath of the American terrorist attack he had difficulty receiving broadcasts from Voice Of America and was disappointed he was unable to hear their Munich transmitter on 1197kHz. Sometimes in the UK the American Forces station AFN (from Germany) can be heard on 873kHz.

A spokesperson from Enigma Radio has been in touch thanking me for the mention in the October issue. By now London pirate listeners will be aware that Radio England are now using 819kHz at weekends. Enigma made arrangements to start a South East m.w. station when Radio Free London said they were closing down last March. When Enigma commenced using 819 they were unaware of RFL's planned return or the starting of Radio England.

After what is described as an unfriendly meeting, it was decided that Radio England would use 819kHz and Enigma could move elsewhere. Enigma plan to return shortly, which with Radio Argus and Radio England would make three London m.w. pirates. There is once again doubt over the future of RFL who have recently been missing from their regular spots on the radio dial.

■ Greg Baker, c/o SWM EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

■ E-MAIL: gbaker@pwpublishing.ltd.uk

Bandscan Australia

This time I have news of more strife in the Australian Broadcasting Corporation, news of community radio, pay television and f.m. radio and a collection of web sites and a couple of listener reports.

ABC

As I write this it looks like the chief executive of the Australian Broadcasting Corporation (ABC), Jonathan Shier, is about to lose his job. Persistent reports have indicated that Mr Shier has lost the confidence of the ABC board and will be removed at the next board meeting. These moves have been happening against a background of a federal election campaign where various branches of the Liberal Party - main partner in the coalition which has governed Australia since 1996 - appear to support Mr Shier on the one hand or Mr Malcolm McDonald, the chair of the ABC board on the other. Mr McDonald has been reported as telling Mr Shier that he had lost the confidence of the board for his alleged erratic behaviour and poor management style.

All this is against a background of the release of figures following a Senate estimates committee hearing a few months ago. The figures show that redundancy payments cost \$25 million (about £8.8 million) in the first full financial year of Mr Shier's management. These payments were paid to 254 retrenched staff. Interestingly, the ABC now has 271 senior executives compared with the 245 when Mr Shier started his term of office. So, while the ABC retrenched senior executives on the one hand, it recruited them on the other. In the 12 months between July 2000 and June 2001 the ABC recruited 55 new senior executives and nine of these had resigned or been retrenched by September 2001. No doubt the turmoil will continue; the government is reported as resolved on making further changes at the ABC regardless of who is at the helm.

FM Radio

The f.m. radio scene is hotting up in this country with the launch of a new Brisbane f.m. commercial radio station with UK and Ireland connections. The station is owned jointly by DMG Radio and the Australian Radio Network ARN.

DMG Radio is in turn 75% owned by the UK Daily Mail and General Trust DMGT and 25% by the UK GWR Group. ARN is 50% owned by Australian Provincial Newspapers APN, which in turn is part owned by Rupert Murdoch's News Corp. The other 50% is owned by US radio company Clear Channel Communications. APN's other shareholder is Independent News and Media of Dublin.

DMG recently launched Nova 96.9, a new f.m. station in Sydney and will soon launch a new f.m. station in Melbourne and is expected to bid for a Perth

licence soon. DMG already owns an assortment of stations across Australia. SWM readers can listen to the DMG Sydney radio station Nova 96.9 f.m. through the Daily Mail and General Trust web site at <http://www.dmg.co.uk> and find other DMG Radio stations at http://www.dmg.co.uk/dmgt_websites/dmg_radio.htm Independent News and Media is at www.independentnewsmedia.com

DMG has also won a court battle with a public relations consultant for rival network Austereo. The consultant was alleged to have orchestrated a campaign of bogus letters targeted to undermine DMG's credibility.

Community Radio

Controversy surrounds the granting of a Sydney community f.m. radio licence 2MCR to Muslim Community Radio (MCR). The licence was announced in May this year by the Australian Broadcasting Authority (ABA). The ABA says that MCR had a sufficient level of support - it says around one third of the Sydney Muslim population - to justify the allocation of the licence. It also says that the station will represent the whole Muslim community and will be accessible to all those who wish to participate.

The allocation of this licence seems to have come at a time of strife within the Islamic community in Australia (and this dispute pre-dates the United States 11 September incidents). The statements from the ABA in support of the licence are being challenged by the Islamic Council of New South Wales which says that MCR represents only 500 supporters and 150 financial members; it plans to take the ABA to court to have the licence decision overturned.

Meanwhile, the Australian Federation of Islamic Councils says that neither MCR nor the Islamic Council of NSW are fit to hold the licence. It says that MCR has never been a member of the Federation and that the NSW Islamic Council has been expelled from the umbrella body.

Reports

Brian Wicks lives to the north west of London and runs a Realistic DX-394 with a 15m long wire antenna about 6m from the ground. He says that he manages to pick up RA on most of their frequencies, but that the signal strength is often not good. His best has been 11.660MHz at SINPO 44434 around 1700-1900UTC.

And my good friend and correspondent **Martyn Gardiner** from Portsmouth tells me that Radio Australia (RA) comes in well morning and evening. He has had most success with 9.500MHz in the evenings, including one occasion when he says it was 'bombing in'. Martyn says that 17.750MHz is good in the mornings but that 15.240MHz is variable.

Other News

Canberra, the nation's capital and home to over 300,000 people, again has its own ABC television news service after a ten year hiatus. The local news had been axed as a cost saving measure. Radio emissions of another kind - those from electric fences - are apparently affecting Internet download speeds for New Zealand farmers. Reports here say that about 40,000 farmers are thus affected.

Australia's biggest pay television operator Foxtel has just passed the 750,000 subscriber mark. Regional pay television operator Austar has about 450,000 subscribers. In total there are about 1.5 million pay television subscribers in Australia, representing about five million people (Australia's population is nudging the 20 million mark).

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

Web Sites

The following are a fairly random selection of radio related web sites in this part of the world:

The Australian Broadcasting Authority <http://www.aba.gov.au>
 TV New Zealand <http://www.tvnz.co.nz>
 Special Broadcasting Service <http://www.sbs.com.au>
 Australian Broadcasting Corporation <http://www.abc.net.au>
 Radio Australia <http://www.abc.net.au/ra>
 Australian radio stations online <http://www.andygrace.com/liveradio.htm>
 Australian commercial radio stations

<http://www.radiomarketing.com.au/html/station.htm>
 Regional Radio Bureau <http://www.rrb.com.au/rrb.htm>
 Australian Radio DX Club <http://www.ardxc.fl.net.au/main.html>
 Radio New Zealand International <http://www.rnzi.com>
 Australian Communications Authority <http://www.aca.gov.au>
 Australian Communications Authority register of radio communication licences <http://www.aca.gov.au/database/radcomm/index.htm>
 Australian Association of Citizen Band Radio Operators <http://www.geocities.com/acbroteam/index.htm>
 Australian National 4WD Radio Network <http://4wdclubs.sofcom.com/au/an4wdrn>

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Comments from John Griffiths

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Ready assembled wire antenna offering low noise reception on long, medium, short wave (100kHz-40MHz) 12.5mtrs long. Magnetically coupled transfer system ensures reduced static noise levels and allows unwanted build-up to leak harmlessly to earth without damaging the receiver. (Subject to recr. being earthed).

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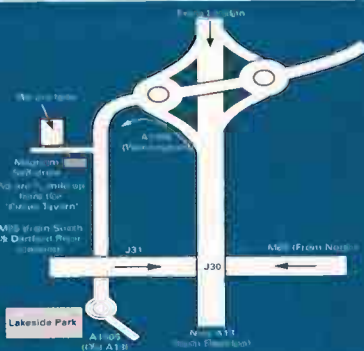
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Satellite TV
9-page
Special

Satellite Reception - A Starter...

Roger Bunney brings us another 'Satellite TV Special'.

This is the 4th annual 'Satellite Special' supplement and four years since a 'how to start' article has been included. There's been a steady trickle of letters asking "how can I start satellite DXing?" and my answer is usually to try *SWM's* back copies department for the December 1998 and December 2000 issues. Since the 1998 issue, the basics have remained more or less the same, though the transition into digital has accelerated - virtually all news and OB (outside broadcast) feeds from the remote site back to the studio are digital, with an ever increasing number of satellite broadcasters moving into the digital environment and dropping analogue transmission.

Analogue - unscrambled - is still transmitted from many satellites, though these are intended for entertainment or propaganda consumption - and analogue allows the newcomer an easy and

inexpensive start to satellite 'DXing' for equipment familiarisation and dish tracking experience. Interestingly, an analogue receiver will help you find digital satellite signals, more on this later...

Real DX

Though the expression 'Satellite DXing' is often used, I personally feel that this isn't 'real' DXing. Receiving a line of sight

Equator at 36,000km height. This altitude ensures that these satellites travel around the Earth and would appear to be stationary (geostationary), providing a stable link platform for microwave communications and each giving coverage of one third of the Earth's surface.

Entering the 21st century, there are several hundred communication satellites in geostationary orbit. To

The most popular dishes are typically 0.9-1m, either offset (like a Sky analogue dish) or a standard parabolic circular dish...

microwave signal - albeit weak - from satellites in geostationary orbit is perhaps more of a technical achievement, particularly if a small dish or home constructed equipment is in use.

It is certainly possible to throw a chequebook or 'plastic' at a satellite supply company, buy a large tracking dish and the latest singing, dancing receiver with switches, flashing l.e.d.s, 5000 memories and makes the morning tea. Successful reception with such upmarket and expensive gear is less of an achievement, and at the end of the day, I feel that it's a hobby to enjoy within your available financial constraints, to learn from and perhaps gain entertainment. If you, the enthusiast, can exchange experiences, reception tips and perhaps a social visit with other like minded enthusiasts, so much the better.

End of sermon!

Geostationary Orbit

Readers will have heard of Arthur C. Clarke and his famed 1940s *Wireless World* article in which is described using three satellites spaced at 120° apart over the

receive these craft, it follows that we must point our receiving dish at a point 36,000km high above the equator, depending on which satellite we wish to access, then the dish must track along that '36,000km high line' in the sky. Our dish will point highest (elevation) when due South and as we look for satellites East or West of South, so the dish will gradually dip down towards the SE or SW horizon - assuming that our readers live in the UK.

The further North the receiving site, so lower dish elevations will be experienced. For example, Eutelsat's *Hot Bird* at 13°E, in Jersey the elevation is 30.7°, in Portsmouth 30.3° and in Lerwick it drops to 20.7°.

For optimum reception we need to track the dish across an unobstructed view of the Clarke Belt. A tracking dish will need either a **polar mount**, a mechanical assembly that bolts to the rear of the dish that once aligned will track the Clarke Belt accurately, usually a motor driven arm (**actuator**) is used, both powered and controlled from indoors - often incorporated within the receiver's circuit or a stand apart positioner - or a **horizon to horizon** mount, a special motor assembly that incorporates integral tracking mechanics, again controlled from the receiver position.



The Dish

The most popular dishes are typically 0.9-1m, either offset (like a Sky analogue dish) or a standard parabolic circular dish. Rarely do enthusiasts have larger dishes, though Channel Master still make a 1.2m offset - the larger the dish the higher the signal gain and the sharper the pointing accuracy.

An 'enthusiast' dish will usually be pole mounted from wall brackets or a stand apart garden stand weighted down with bricks/concrete blocks - thus it's not a 'permanent installation'. The DTI/planning ruling for dishes is that only one dish per domestic house is permitted, not exceeding 0.9m diameter. So, if you have a 350mm Sky Digidish, you have used up your official dish allocation and planning permission is required for your second 'enthusiast' dish.

If the garden (second) dish is likely to be mounted at ground level, your neighbours are OK and it can't be seen from the road, then you should have no problem. Difficulties may arise if you have spy neighbours, you live in a conservation area or region of outstanding natural beauty, i.e. national park, etc. Your local planning office will give you the DTI guide book to dishes on request, though call in and ask without giving your name/address - no point in alerting the Gestapo!

The LNB

The dish houses the most important part of the satellite receiving system - the LNB (low noise block downconverter) - that sits at the focal point of the dish. There are many types of LNB in use, though commonly now the UNIVERSAL LNB is a favoured type featuring an integral feedhorn, switching both polarity (13/18V) and band coverage (22kHz tone). Ku-band coverage will normally range from 10.7-12.8GHz in two bands, downconverting to an i.f. of 700-2200MHz for feeding back to the receiver using low loss CT100 or CT125 double screened cable.

In the 1998 feature I mentioned LNB noise figures of 0.7dB. In 2001 we are considering noise figures of 0.3-0.4dB, so a small dish with a ultra low noise LNB will often produce quite remarkable results. The more specialised LNB with bolt-on polariser requiring a control skew voltage to go vertical/horizontal is rarely seen - as is the straight LNB with a 10GHz oscillator.

The Receivers

Unfortunately in the past year the Scottish manufacturer RSD Communications ceased manufacturing digital satellite receivers, though their designs live on, though constructed in Korea - and currently they're not imported into the UK. The RSD digital receivers, though not having the hottest of r.f. front-ends, were unique in that having inputted a suspected digital signal frequency the receiver would search on and about that frequency, any MPEG-2 digital signals found would be entered into the receiver memory band with its digital parameters - Forward Error Correction (FEC); Symbol Rate (SR) and

the Packet Idents (PIDS).

Early Nokias, such as the 9500 series, featured an auto search function, but current receiver production availability suggests there are no auto search SR, though most will offer auto search FEC. Fortunately at this time many operators use common digital parameters such as SR 5632, 6111, 27500 and an FEC of 3/4. It's the few that might be found using very odd parameters such as recent Skopje EBU feeds with SR 6666, FEC 7/8. The various digital parameters can be dialled into the receiver, though the popular parameters are usually preset as selectable options such as the Humax range.

If you find a suspected digital frequency, try SR 5632 + FEC 3/4 for a starter, though *SWM* and my *What Satellite TV* column can be studied for recently noted signals and parameters. Another excellent satellite info source for operating frequencies, etc. is the *Tele-Satellite International*, a German sourced magazine with an English language edition from larger newsagents - alternatively try the Internet at www.satco.dx.com

With most things of interest now digital, the remaining action with analogue are the numerous broadcast TV channels which are

LNB to horizontal and to the low band 10.950-11.750GHz band. Take your faithful analogue receiver, tune to 11.750GHz and slowly tune it down the band - or if it has a scan function select scan down.

As you tune down, check for a change in screen shash level. If there is a dip, find the centre and note the frequency. The auto scan will stop on the centre frequency hopefully. Either way you are presented with a suspect frequency. If you're lucky enough to use an RSD, just enter that frequency, SR and FEC to auto and then 'search'. If you have your bog standard Humax, etc., enter 5632 + 3/4 (or if FEC has auto function set to 'auto'). Hopefully you'll be rewarded with a signal - if nothing locks up then you might have found a data channel or even an MPEG 4:2:2 signal.

Whilst the digital receiver 'searches', continue scanning down with the analogue until the next 'stop'. This method assumes that you have a single dish output, and a twin output active splitter with one output fed into the digital receiver and the other into the analogue receiver, each single input connected to individual TV receivers, otherwise you're into cross patching cables,

....Rarely do enthusiasts have larger dishes, though Channel Master still make a 1.2m offset - the larger the dish the higher the signal gain and the sharper the pointing accuracy.

still available in profusion - again check out the satellite listings - the most active Ku-band analogue slots are 10, 13, 16, 19, 26 and 42°E. Analogue sat receivers are plentiful, unwanted and cheap! The *What Satellite TV* magazine is the best source for satellite equipment, but ensure that you deal with a technical aware individual/shop rather than box shifters.

Finding Digital Signals

Checking out earlier articles which include readers' reports is often a good pointer for the regular feeds, e.g. Reuters 11.462GHz-V (SR 5632 + FEC 3/4) or the Globecast 11.590GHz-V package (SR 20145 + FEC 3/4) are first priorities for news breaking action, NY Stock Exchange, NASA TV output, etc., but these are not on-air all the time. UK mid evening is usually the most active period on NSS-K @ 21.5°W, but many signals are random and appear infrequently, unless there is a breaking story.

Take for example the UK general election, much of the year 2001 election action was found on *Intelsat 801* @ 21.5°W and *Eutelsat 2F3* @ 21.5°E. Experience has shown that feeds on 2F3 tend to be horizontally polarised and that UK sat trucks tend to use SR 5632 + FEC 3/4. Switch the

not an enviable task.

Check the news, for example the September 'World Trade Centre' terrorist disaster there were many circuits established over the Atlantic, NSS-K 21.5°W and PAS-3 43°W are likely signal carriers. Then a week later the Afghanistan/Talaban situation evolved and the sat-linkers quickly established themselves in Islamabad, Pakistan, to link footage back into Europe, check out *Europe*Star* 45°E and *SESAT* 36°E and sure enough a quick scan showed up five carriers on the former sat!

Sounds a little confusing, but with practice it's very easy, unlike analogue which instantly reveals a picture with possibly noise (sparklies), the digital signal doesn't reveal itself until it's above a certain receiver threshold level which once captured provides a big quality noise free picture. Digital pictures will provide good quality or zilch, nil, blank screen. At threshold the picture lock, only 1dB lower and the signal may go into pixellation, squares and motion freezing, any further fall in level and the picture disappears.

Once you've found a few digital satellite news feeds you'll gain confidence and soon be zapping around the sky viewing the many news and outside broadcast feeds that are available each day!

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World Radio History

Satellite TV
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SDS Technology

SDS is a relatively simple technique whereby signals received by one or more master dish systems are retransmitted at lower frequencies to local homes at distances to 20km. Roger Bunney explains more.



Top view of the first SDS prototype L-Band 20mW transmitter.



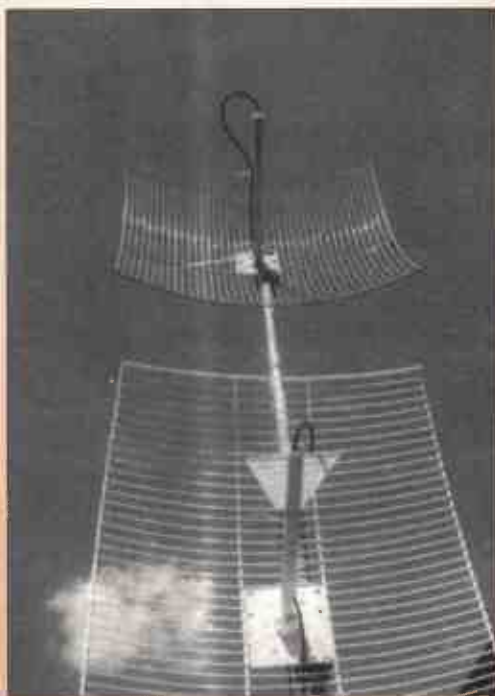
The output of the 20mW transmitter is fed into a nil gain prototype L-Band discone antenna.

A P5 (noise free) retransmitted digital TV programme (Fashion TV channel) is received 1.2km away immediately.



A 'hand-bashed' log periodic (soldered coat hangers) served as the initial experimental receive antenna to prove the SDS feasibility.

The later and much refined SDS system retransmits both vertical and horizontal L-Band digital TV transmissions at distances to 17.7km (P5) line of sight. An improved log periodic antenna now utilises etched low loss laminate for repeatable low loss performance.



The UK is generally served well with satellite downlinked signals from the Eutelsat *Hot Bird* 13°E and *Astra* 28°E orbital slots, requiring perhaps an 650-800mm dish for *Hot Bird* and the standard 350mm Digi-dish for Sky digital. There are distant areas such as in New Zealand, however, where satellite TV services can be received on dishes perhaps of 2-3m minimum (C-Band), which certainly are beyond consideration by the average householder on grounds of cost, size and local planning disapproval. Over the past 12 months or so interesting experimental development work has been ongoing to offer multi-channel satellite reception to localised areas on relatively simple, cheap and inconspicuous equipment.

Simple Technique

SDS or 'Shared Dish System' is a relatively simple technique whereby signals received by one or more master dish systems are retransmitted at lower frequencies to local homes at distances to 20km. Take for example numerous Ku-band signals, both digital and analogue, in the clear or encrypted, as received from a Ku-band satellite. The incoming signals within say the 10.950-11.950GHz band are downconverted by the LNB to the lower i.f. (intermediate frequency) of say 950-1950MHz, which is carried back to the receiver through low loss coaxial cable.

At this point we can do one of two things. The 'SDS Translator' approach is now to amplify the incoming signals from the LNB - including bandpass filtering for the 950-11.950GHz (or a smaller bandwidth as required) - and then pass the 'i.f. block' to a high gain amplifier system that lifts the i.f. signal to the necessary output transmit level - which could be from 100mW to perhaps 10W and couple the output signal to low loss coaxial feeder and the transmitting antenna.

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Satellite TV 9-page Special

Satellite TV Special Satellite TV Special Satellite TV Special

Type Of Antenna

Depending on the coverage area so will depend on the type of antenna used for the transmit system, though hopefully we can look to increased output powers with antenna gain. It would of course be possible to retransmit two transmit 'i.f. blocks', one vertically polarised and the other horizontal.

Since the transmitted signals are at the standard LNB i.f. (intermediate frequency), it follows that a suitable medium/high gain receiving antenna for the 950-1950MHz band, with perhaps an antenna amplifier, can be used to receive the translated signals and connect to the standard satellite receiver - which is now operating as a terrestrial receiver!

All signals that are received by the SDS Translator main dish are therefore passed straight through to retransmission without conversion and complete with original encryption allowing the home user to subscribe to a PAY-TV company as normal. Both analogue and digital signals pass through the system without change.

More Complicated

The second SDS system is more complicated and is known as the 'SDS Modulator System'. As before, the incoming satellite signals are received at

the SDS main receiver head, amplified and then via a splitter DA (distribution amplifier) to a bank of receivers which are tuned to the various TV channels to be received at the home receivers. The output of each receiver, both audio and video, is then f.m. remodulated and the signals now recombined, amplified to a suitable level for connection to the transmitting antenna and thence into the air for local reception - local in the context can be anything to 1-20km, depending on transmit output, intermediate terrain and receive gain at home.

The 'SDS Modulator System' has a major drawback in that an encrypted PAY-TV channel would require unscrambling to achieve baseband audio/video components prior to remodulation and as such would incur the wrath of the PAY-TV operator once he was aware that subscription programming was being transmitted to a wide area!

Neither of the SDS systems will appear in use within the UK since satellite TV is well received everywhere. But this technique is gaining popularity and interest, sufficient for the 'Strong' company in Australia to market a full SDS line to the trade. In S.E. Asia mass channel TV entertainment isn't easily available, though satellite can offer a widespread choice - unfortunately many of the channels are transmitted at C rather than Ku-band, the former band at 4GHz requires very large dishes which effectively prevents normal domestic usage.

Easy Tests

Early tests feeding 200mW into a 0dB gain discone antenna proved that reception was possible up to a couple of miles with a simple receive antenna. Increasing transmit powers to 1W and a simple 6dB gain receiver log-periodic cut to the i.f. band as noted can lift receive distances still further on a line of sight basis, particularly if a head amplifier is used. An 18km seapath transmit path across a bay provided noise free TV signals without dropout showing that quite dramatic coverage is possible on an unobstructed signal path.

Filtering is paramount on the transmit system to ensure that signals as transmitted do not produce interference to other spectrum users that already have allocations - for example the local radio amateur populace will be far from happy if their 1.3GHz band is suddenly invaded with TV programming from a nearby SDS system!

The SDS system is definitely not for UK official use, though overseas localised pockets that have minimal TV entertainment may well seek to install their own SDS operation, its fairly cheap to buy and easy to set-up for a community install now that a commercial company is involved with hardware supply.

Thanks to **Robert Cooper, SatFACTS, PO Box 303, Mangonui, Far North, NZ** for allowing use of material and photographs published in the trade magazine *SatFACTS* and to **John Ramsey** for his technical work in proving the SDS system.

Locating 'Invisible Friends'

The autumn season for flaring 'geosats' has just started, and John Locker has already read reports of an observer seeing twelve geostationary satellites in one evening using binoculars! So, how do you go about locating your 'invisible friends'? Here John explains.

When I said to Roger Bunney that for this year's 'Satellite TV Special' I would be 'looking' at satellites, that's exactly what I meant! First and foremost TV satellites are spacecraft, designed with a specific function in mind. To carry out that function they need power, and the bulk of that power is generated by solar panels. It is those solar panels that - under certain conditions - enable us to see these birds, even though they are in

excess of 35,200km out in space. I'm also going to take a look at two of our favourite low Earth satellites, *ISS* and the Space Shuttle, both of which feature regularly in ESA/NASA TV relays to the Europe.

Specialist equipment for spotting geosats ranges from a good pair of 10x50 binoculars to a high powered telescope. Whichever you can get your hands on, the basic principles are the same, and the time of year plays an important role.

Invisible Friends

So, let's get stuck in and decide, firstly how we are going to set about locating our 'invisible friends'. As we already know, the 'geosats' are located in the Clarke belt which sits above the equator. Those satellites are positioned at roughly 3° slots across the sky, and from our viewing position, remain stationary.

Using a standard satellite tracking programme it is a simple matter to identify the slot of a particular satellite from your own geographical location. The co-ordinates are best set using Az and El values. In other words, the 'heading' and 'elevation'. Using those two values, it is relatively easy to mount a pair of binoculars on a tripod and point them towards the arc. It's a bit like setting up your satellite dish, and in fact, if we take the 19.2°E *Astra* group as our target, then you can line your binoculars up with your old analogue Sky dish...if you

haven't taken it down yet!

Wait until around 2300 local then, assuming the sky is clear, and you are well away from any light pollution, start searching for the sat's. There's no need to move the binoculars, once set to the right co-ordinates, just let your eyes get used to the darkness, and notice that the stars in your field of view are moving from left to right. (In the northern hemisphere). Anything that doesn't move is a 'geosat'!

Can You See?

That's the principle, but don't go rushing outside just yet. These satellites are a long way off and under normal circumstances weigh in at magnitude plus fifteen on the astronomical scale of visibility. That means unless your name happens to be Clarke Kent, you won't see them! If you have 20/20 vision, the average limit of the human eyeball is about plus five or six - negative values are bright, positive values dim - confusing isn't it!

The sun is -29, a bright moon -9. A good telescope will have light gathering capabilities sufficient to see these dim objects, but not so binoculars. This being the case we have to wait for the geosats to flare to brighter levels. This usually happens for a few weeks during mid March and early October when the sun tracks in the same plane as the arc.

Flaring Geosats

As I write, the autumn season for flaring geosats has just started, and I have already read reports of an observer seeing twelve geostationary satellites in one evening using binoculars!

If you can't wait until next March, you'll need that telescope...even then conditions will have to be good to see birds in the arc. Remember, setting up a telescope for geostationary viewing is a little different. The

instrument will need to be aligned to the pole star, as usual, then using your tracking programme the Right Ascension (RA) and Declination (Dec) values will need to be computed for the precise location of the target satellites...a little more complicated.

The field of view (FOV) will be much smaller due to the greater magnification and alignment will have to be much more accurate. Remember to turn off the instrument's tracking motor.

Space Aerobatics

Take a look at the images produced by Nick Quinn - Fig.1. He used a telescope fitted with CCD camera to take time lapse exposures of the *Astra* and *Hotbird* groups. The satellites show up as bright spots, the background trails were generated by stars passing through the FOV during the exposure.

In similar vein, Stefano Sposetti set his camera for an exposure time of over ten hours and produced his spectacular image of the *Astras* performing what look like space aerobatics. In fact, the picture shows the movement of the satellites within their slot affected by the invisible forces of the solar system!

A normal 40mm single lens reflex (SLR)

If you decide to track *ISS* using your own PC, I suggest trying the versatile, **SATBUSTER** programme, written by Paolo Cosetti. A free demonstration version is available at <http://www.satbuster.com/> To ensure your tracking is accurate, current Keplerian Elements will be needed and can be downloaded from

<http://celestrak.com/NORAD/elements/stations.txt>

Web References - examples of webcam astro photography:

David Cash

<http://www.djcash.demon.co.uk/astro/webcam/spacecraft.htm>

Ulrich Beinert

<http://www.analemma.de/english/ccdsatel.html>

Mike Tyrrell

<http://www.btinternet.com/~mikejtyrrell/iss.htm>

Phil Masding (includes VRML simulations of *ISS* passes)

<http://freespace.virgin.net/philip.masding/index.htm>

Nick Quinn

www.nquinn.demon.co.uk/geostationary.html

SATBUSTER satellite software

<http://www.satbuster.com/>

Updated Keplerian Elements for accurate tracking

<http://celestrak.com/NORAD/elements/stations.txt>

NASA *ISS* tracking site

<http://spaceflight.nasa.gov/realdata/tracking/index.html>

camera is capable of producing similar, if not as spectacular pictures. The key is to point the camera towards the arc. Set to F4, the focus to infinity and using the 'B' setting, leave the lens open for at least ten minutes. Again a dark, pollution free location is desirable.

As a very wide field of view is produced, a sizeable chunk of the arc will be targeted. The result should be a series of tiny dots (satellites) set amongst a backdrop of star trails, see Fig. 2. From the crystal clear sky conditions of Switzerland, Stefano also produced a brilliant study of the arc, part of which is illustrated by the accompanying image, Fig. 3.

Continued on page 29



Fig. 1: This image, provided by Nick Quinn - www.nquinn.demon.co.uk/geostationary.html - shows the seven *Astra* satellites at 19.2°E as they were in January 2000. It is a timed exposure using telescope, CCD combination. Notice the faint star trails.

Fig. 2: Taken over a period of about 12 hours, Stefano Sposetti - <http://aida.astroinfo.org/sposetti/> - captured this stunning display of 'aerobatics'. It shows the *Astras*, 19.2°E, moving within their orbital slot.

Fig. 3: Stefan also prepared a wide view of the geostationary arc. The full version can be found at http://aida.astroinfo.org/sposetti/Geostationary_Satellites.gif.html Meanwhile, here are two small sections showing the *Astras* and *Hotbirds*.

Fig.4: Time exposure photo of the *Hubble Space Telescope* (white line) crossing the summer Milky Way. The *Hubble* was moving from right to left. The short white lines are star trails caused by the Earth's rotation. Taken 1997 from Mount Pinos, California. Copyright 1997, Brian Webb - <http://home.earthlink.net/~kd6nrp/>



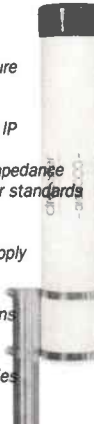
Fig. 5: Just 20 minutes after launch, the shuttle and external tank passed over the UK. Here we see the tank about 960km from the Wirral, separated from the orbiter and heading for decay over the Indian Ocean, (150mm telescope/webcam), (credit John Locker).

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<p>Technical performance</p> <p><i>Frequency range</i> 40kHz-40MHz at full performance 40MHz-108MHz 2.3dB gain</p> <p><i>Output impedance</i> 50-75 ohm coaxial</p> <p><i>Connector to Rx</i> PL comes as the standard. Other standards can be fitted upon request</p> <p><i>Gain</i> 5dB +/-0.2dBs</p> <p><i>Intercept Point</i> +45dBm IP 3rd order (10MHz/12V)</p> <p><i>DC power supply</i> 11.5-13 volt DC at 70mA typ. (230V mains adaptor for 12V DC is supplied with the antenna)</p> <p><i>Mast diameter</i> 30-50mm can be fitted</p> <p><i>Dimensions</i> ARA40 115cm total length with glassfibre whip. Antenna tube 40mm x 140mm ARA40 TEL 125cm total length with telescopic whip extended. 45cm minimum length. Antenna tube 40mm x 140mm Ideal for portable radio</p> 	<p>Technical performance</p> <p><i>Frequency range</i> 40kHz-60MHz (full performance) 60-120MHz 2-3dB less gain</p> <p><i>Output impedance</i> 50-75 ohm coaxial</p> <p><i>Connector to Rx</i> PL type delivered as standard. Other standards can be fitted on request</p> <p><i>Gain</i> 10dB +/-0.2dBs</p> <p><i>Intercept Point</i> +50dBm IP 3rd order (10MHz/12V)</p> <p><i>DC power supply</i> 11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)</p> <p><i>Mast diameter</i> 30-50mm can be fitted</p> <p><i>Dimensions</i> 115cm total length. Antenna tube 50mm x 160mm Ideal for base stations</p> 	<p>Technical performance</p> <p><i>Frequency range</i> 50-2100MHz</p> <p><i>Output impedance</i> 50-75 ohms coaxial</p> <p><i>Gain</i> 18dB -1000MHz 9dB -1500MHz 6dB -2100MHz</p> <p><i>Noise figure</i> 1.5-2dB -1000MHz 1.8-2.5dB -1500MHz 2.5-4dB -2000MHz</p> <p><i>3rd order IP</i> +38dBm typical PidB = +22dBm</p> <p><i>Output impedance</i> 50-75 ohms coaxial</p> <p><i>Connector standards</i> N type connector at the antenna. BNC male connector to the receiver</p> <p><i>Power supply</i> 12V DC at 160mA DC. Power supply for 230V AC is delivered comes with the antenna</p> <p><i>Dimensions</i> Length 450mm. Diameter 90mm</p> <p><i>Weight</i> 2kg</p> <p><i>Accessories</i> Mains wall plug adaptor (230V A/12V DC). Interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps</p> 

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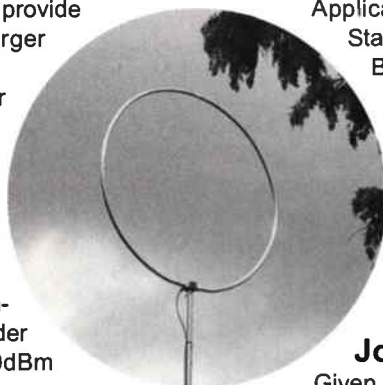
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This Active loop sets new standards for the listener. For the first time it is possible to reject locally radiated and mains borne noise and still provide improved sensitivity compared to larger antennas and Active Whips.

1m dia. Aluminium loop is designed for outdoors, even at ground level. The loop has a frequency range from **50kHz to 30MHz** and matches directly to the receiver. With 30dB nulls to reduce interference, LW, MW and SW reception is outstanding. Professional performance is assured for high signal environments with excellent 2nd and 3rd order intercept point of +70dBm and 40dBm respectively.

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This is what the experts say.

John Wilson; Nov 2000 SWM:

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

Wellbrook Antennas are also used for Professional Broadcast, Navigation Beacon, Radio Monitoring, etc

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Continued from page 27

Satellite TV 9-page Special

Satellite TV Special Satellite

Step Up A Pace

So far we have looked at the rather leisurely, if painstaking, seasonal process of spotting geosats. Now it's time to step up a pace!

Low earth orbit satellites are of course much closer to us, and as such their relative velocity to the observer, much greater. Imagine trying to catch a bullet in your teeth and you'll have some idea of what it is like tracking *ISS* or a Shuttle (or both) through the inverted optical viewfinder of a telescope. But it can be done!

First though, back to the SLR. Using your PC tracking programme, loaded with up to date elements, find out when the next visible passes of *ISS* are due, (there will be suitable evening passes mid December). Pass details can also be obtained from the *Heavens Above* Internet site - see <http://www.heavens-above.com/> Log in your location and you can obtain a list of visible passes for your part of the world.

If the sky is clear, set up your camera pointing roughly in the direction of the peak of the predicted pass. Exposure F4 or F5.6, ASA 200 or better. As the satellite appears from the west, open the camera shutter and keep it open for the duration of the transit. The resulting exposure should show a bright trail. Take a look at **Fig. 4** - Brian Webbs image of the Hubble Space Telescope with the Milky Way in the background...stunning!

Again, if you have a telescope to hand, try following *ISS* with that. Pretty tricky! Manual tracking of a Low Earth Orbiting satellite is rather nerve racking. If you're lucky, you may just catch a glimpse of the

speeding object travelling at 27,200km/h. It's unlikely you'll see much detail though.

The answer is to record what the telescope sees to video, or the hard drive of your computer. A costly business? Well no, if you are prepared to do a bit of d.i.y.

What About Cost?

A dedicated CCD camera for astro work will set you back about five hundred pounds, but a converted webcam, or CCTV camera, less than a tenth of that - and will give acceptable results. Make sure the device is fitted with a CCD chip, not CMOS. Some straightforward surgery has to be carried out on the webcam to remove the lens and fit a plastic film canister adapter in front of the exposed chip. This will allow the assembly to be mounted into the eyepiece holder of the telescope.

Check out the following website for detailed instructions on the conversion technique - The Quick Cam and Unconventional Imaging Astronomy Group (QCUIAG) - see <http://groups.yahoo.com/group/qcuiag> which has excellent FAQ and archive sections. Included here are tutorials on how to convert your webcam, where to look for free processing software and examples of satellite and planetary images.

Be Patient

Armed with the webcam telescope combination, await a visible pass. Take a deep breath, then follow the satellite keeping it centred on the cross hairs of your findscope. Provided the webcam is fitted correctly, whatever the telescope sees will be relayed to your PC video card, or videotape. It's then a matter of reviewing

your recorded images frame by frame. With practice you should find that you get a handful of clear images from a full pass. Those images can then be processed using astro software to stack and enhance the results.

Some amazing pictures have been obtained by enthusiasts using this method and manual tracking. In August I was lucky enough to catch some images of the shuttle external tank passing over the UK just 20 minutes after launch, **Fig. 5**. As I was looking at the tank, a fellow observer, Dave Cash, was tracking the shuttle. The objects were a few kilometres apart and Dave captured his spectacular (**Fig. 6**) image of the orbiter. A few days later, both vehicles were docked, giving another opportunity to grab some images.

If you have one of the more expensive telescopes, then it is possible to acquire tracking software which will do all the hard work for you, provided of course your instrument is perfectly aligned. Take a look at **Fig. 7** and **Fig. 8**, produced by Mike Tyrell and Phil Masding. The amount of detail is stunning.

Don't despair if a telescope isn't available. Those 10x50 binoculars should be good enough to resolve the basic shape of *ISS*...provided you have a steady hand and nerves of steel!

Keep An Eye Out

It is worth keeping an eye on the news for information regarding upcoming crew exchange flights. Whilst visiting shuttle missions bring spectacular viewing, the Russian Progress/Soyuz flights to *ISS* can also provide great photo opportunities. Regular visits to the NASA Manned Space

Flight webpage

[http://spaceflight.](http://spaceflight.nasa.gov/index.html)

[nasa.gov/index.html](http://spaceflight.nasa.gov/index.html) will keep you up-to-date with crew and supply missions.

Finally, if you do get the chance to take some photos, then why not share the results with us all. I'd

be interested to see them, and I think the Editor would too!

Clear skies and happy viewing.



Fig. 6: Taken at the same time as the image of the External Tank, this picture by Dave Cash shows shuttle *Discovery* on climb out over the UK, 20 minutes after launch - estimated range 1040km from Dave, based in NW UK.

Fig. 7: This is how the two objects would have appeared. The tank below and behind the shuttle, both

travelling at around 27,200km/h. Thanks to Dave Cash for the orbiter image.

Fig. 8: Image animation (*ISS* Banner) and ISS0003. Copyright Mike Tyrell and Phil Masding.

Fig. 9: Mike Tyrell and Phil Masding (UK) use a software guided telescope and video camera to capture their images which reveal amazing detail.

Fig. 10: *STS105* and *ISS* docked, captured at long range during a pass over the UK, (credit John Locker).

Fig. 11: Ulrich Beinert captured this image of *ISS* using his hand guided 90mm telescope fitted with a webcam.

Fig. 12: And this exposure taken around the same time captures four *Eutelsats* at 13°E.

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SANYO WS-1000 WORLD SPACE DIGITAL RECEIVER



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Comes complete with decorative mini flip-up dish and also fits of plate. Receives digital broadcasts from the WorldSpace satellite. Runs from supplied AC mains or external battery. Audio output via internal mono speaker, external optional stereo headphones or headphone out via phono connectors as well as a 5VDC signal output. It also has 32 memories complete with remote control and a port for multimedial services. Amazing performance, amazing price.

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World's leading free scanner!
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Covering the complete radio spectrum from long wave to UHF, you have a complete station in your pocket. Features include NFM, WFM, NAM, WAM, LSB, USB, CW, * 7 Frequency steps * 1,000 Memories in 20 banks * 500 Pass memories * 10 Priority channels, * Band Scope display * Duplex receive function lets you hear both sides of the conversation * Fast tune function, * Built-in AM antenna * Dual frequency display * Fast keypad entry. * Rechargeable batteries, AC charger and helical antenna.



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YUPITERU MVT-7100EX 100kHz - 1.65GHz

Probably the best value for money, it has stood the test of time and is very sensitive. Offers USB, LSB, CW, AM, FM, WFM, * 1,000 memories * 500 Pass channels * 12 Tuning steps * Fast scan speed * Rechargeable batteries, AC charger and telescopic antenna.



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Yupiteru MVT-7300

* NFM, WFM, NAM, WAM, USB, LSB, CW
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ICOM IC-R8500



The IC-R8500 has a wide frequency range continuously from 0.1 to 2000MHz. It's ideal for the radio amateur or shortwave listener.

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Bandscope * Noise Blanker *
Wide range of tuning steps *
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ICOM IC-R3

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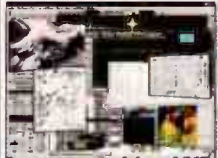
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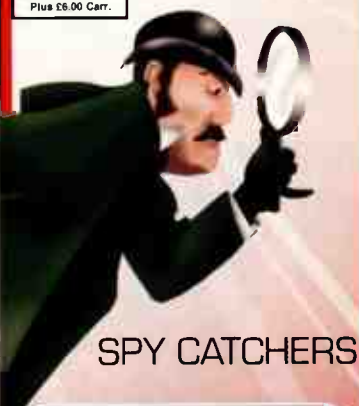
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SPECIAL

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

Satellite TV
9-page
Special

Satellite TV News

The Column

Satellite TV Special

Last month's column led with the first gut reaction to the terrorist attacks on both the New York's World Trade Centre Tower complex and Washington's Pentagon building. As the human tragedy within the building's debris has been slowly cleared - and with only a few survivors - so international plans to try and rid the terrorist problem are already coming to fruition.

From about the 17/18th of September *Europe*Star* @ 45°E has been carrying an increasing number of satellite uplink customers, mostly based in Islamabad with isolated uplinks at Quetta, Peshawar (Khyber Pass country) and in Dushanbe (Tajikistan). These remote uplink flyaway equipment uplinks have been flown in by satellite uplink operators who in turn lease time on their systems out to broadcasters and news providers, e.g. BBC, CNN, CBC, CBS, etc. and to Reuters, APTN *et al*.

A clutch of 45°E downlinks have been monitored as follows:- 11.470, 11.534, 11.546, 11.555, 11.560, 11.604, 11.661, 11.666, 11.676 and 11.684GHz, all vertical polarisation and using SR 5632 + FEC 3/4. Several downlinks were noticed in *Europe*Star*'s Telecom band segment, an interesting 'UKI-685 SKY NEWS 420' was sending edited material back from US aircraft carrier out in the Arabian Sea on October 10th, this for CNN and featured numerous technical crew in ordnance assembling activities - 12.605GHz-V, 5622+3/4.

The Moscow PTP channel relayed the live CNN pictures from New York (NSS-K).



8 Reuters DC 202-898-0057



The third hi-jacked aircraft smashed into the Pentagon, the engineer foreground prepares for a live satellite news broadcast from outside the crash scene (NSS-K).

There are other downlinks that have been seen during this period, but the above tend to be the regular ones including Globecast and NTL providers. CNN for example are using NTL's UKI-371 on a full time hire basis whereas other broadcasters share capacity. Signal levels have been strong (on a 1.2m dish) though the very heavy rain storms over the South UK October 7th produced some rain fade/dropout.

With the uplinkers sat in Pakistan and out of visual range of the bombing action



September 11th and the World Trade Centre Towers have just collapsed, as seen from Liberty Island. Many thousands have died as the world watched on TV screens. Also lost were the six transmitter engineers manning their equipment on floor 110, World Trade Tower One. Their transmitting mast slowly descended into the maelstrom of debris and smoke (NSS-K).



The satellite uplink truck shows test colour bars plus a live relay of the rescue operation (NSS-K).

in Afghanistan, so most signals have been reporters speaking straight to camera, with Pakistani government guests and the occasional VTR package. At about 1300, whilst checking a CBS feed in preparation (11.546GHz), both the reporter and crew were seen staring into the black sky - being nighttime in Islamabad - commenting that those aircraft cannot be commercial since there's a no-fly restriction at that time over the city - then of course three hours later the first official reports of bombing and missile launches. As I type, October 8th, more bombing raids are in action.

The New York aftermath continues of course, clearing the rubble and human remains with nearly 6000 classified as lost as the 'Ground Zero' graveyard continues to smoulder. On a personal note, as I mentioned last month, my son witnessed the terrorist plane outrage from the other side of the Hudson River, when he eventually returned to NY Island three days later - all access by bridge and tunnel was closed for that time - he found a Manhattan with folk openly weeping, standing or wandering round seemingly lost, an all penetrating dust with larger debris thrown a couple of kilometres distant from the impact and collapse area, no police but army checkpoints. He'd both lived and worked in the area, his friend never came home from the Towers, he returned to Heathrow visibly changed by what he had seen.

'SKY NEWS UKI-784 CODER 1' was providing a moving item live into Sky News, September 16th via *Eutelsat 2F3*, 11.047GHz-H @ 21.5°E. The Franklin Delano Roosevelt Memorial Park in London

Terrestrial microwave link news trucks also fed their output signals via their studio to the world on satellite as did KNBC-21, note the ghosting (ringing) (NSS-K).

was being used as a US Garden of Remembrance for those lost and missing in the New York, Pittsburg and Washington outrages. Sky's reporter Mark White was at the park offering a compassionate description of both ordinary and titled folk arriving to pay their floral respects and united in their sadness for the events of September 11th.

The Rest

Whilst scanning over 45°E there appeared 'Newsforce LF7', this uplinking cricket out of Harare, Zimbabwe in the 'Old Mutual OD1 Series' for Sky Sports - 11.513GHz-V, 5632+3/4 - there have been a series of one day matches in week 1 October all carried over this bird from the green pitch in Harare. Another oddity on 45°E was 'Locked-in Communications' at 11.604GHz-V, this seems to carry the occasional news item, though not related to the unfolding events in Afghanistan.

I was delighted to hear from regular sat-



Another camera view down Manhattan from the North East, again darkened buildings stand almost in silent tribute as the fires rage nearby (NSS-K).



Half past midnight UK time September 14th, Manhattan and the fires of despair silhouette the darkened skyscrapers that remain. This live 'locked-off' picture remained for hours overnight (NSS-K).

zapper **Edmund Spicer** (Littlehampton) again and with our

encouragement he's moved his 600mm dented Amstrad dish both to the East and received several news feeds ex *Europe*Star* and round to the West with *Telstar-12 15°* and *NSS-K 21.5°W* - even with a modest system and a Manhattan Digi Plaza receiver it's possible to check out with the larger upmarket systems successfully! Edmund watched the launch of *Atlantic Bird-2*

September 25th on Ariane flight 144, a new Eutelsat sat which is now slotted @ 8°W *Telecom* slot. The live broadcast was via *Hot Bird*, 13°E in the clear on the 'HB CHANNEL',

12.111GHz-V, SR 27500 + SR 3/4) and included full commentary, pictures of the control room and journalist guests, (I've yet to receive my free invite and airflight ticket!), visits around the whole site and of course the full countdown and launch.

More good news from **Dave Gilroy** (Herts) who has succeeded in finding fulltime signals from low on the horizon *PAS-10 @ 68.5°E*, he reckons below 5° in Hertfordshire. Carried are various South African encrypted and FTA (free to air) channels both TV and radio, so if you're an exiled South African seeking programmes from the home patch, you'll need a residence in the SE UK with a completely clear view South East down to the horizon. He suggests the strongest 68.5°E signal to look for is at 12.722GHz-V, SR 26651 + 3/4. Dave used his 1.2m prime focus IRTE dish with universal LNB feeding a Strong SRT 4375 receiver.

Other low horizon signals received at Dave's home are both *NSS-703 @ 57°E* and *Intelsat 602 @ 62°E*. Perhaps the main ingredient to this success lies with the dish siting some 9m high on his flat roof with 'gently receding terrain towards the East' and giving a clear take off round to 58°W. Meanwhile back in the Surrey woods something is stirring, **Roy Carman** (Dorking) and he regrets that the



Sky News cover the US Garden of Remembrance, the Franklin D. Roosevelt Memorial Park, London September 16th. The ordinary folk pay tribute in thought and flowers (*Eutelsat 2F3*).

As military action approaches APTN establishes a satellite uplink in Tajikistan, borders with NW Afghanistan (*Europe*Star-1*).



And APTN also have a flyaway in Peshawar, Pakistan (*Eur/*Star-1*).



CNN have initially set up in Islamabad, but later move to Quetta using full time leased NTL equipment (*Eu/*Star-1*).

Continued from page 33

Satellite TV 9-page Special

Satellite TV Special

Dr. Dish programme for satellite enthusiasts, zappers, etc. airing on Friday evenings over *Intelsat 801 @ 31.5°W* is on the main Eurobeam and the EIRP levels across the UK are lowish, typically 41-46dBW, OK if you're using a 1.5m dish or larger, but the average UK enthusiast dish will be around 0.8-1m and this isn't enough to give digital picture lock - apart from the programme language being



The whole World awaits developments including the Korean TV networks (*Eu*Star-1*).



One of the delightful volleyball players in the Brisbane Goodwill Games, live September last (*NSS-K* via *PAS-2*).



Meridian Tonight investigates crop circles in fields near the Chibolton DSIR radio telescope, East of Andover, end August. Seen on *Intelsat 801, 31.5°W*.



CBS meanwhile settle for the duration in Islamabad.

German as well.

For the record, it has appeared at 11.487GHz-V, SR 6110 + 3/4. If PA1ALK can access W2, 16°E for hours, why not *Dr. Dish* with his technically useful satellite programme?

Roy incidentally uses two main receivers, an RSD ODM300 and an Echostar AD3000.

Interesting to note that *PAS-3R, 43°W* was feeding the *America on Alert* programme September 17th (12.730GHz-H, SR 6111+3/4) with 'a hell of a signal', the RSD was totally overloaded and took ages to resolve any signal whereas the Echostar just accepted the signal and displayed it, thought is that receiver front-ends vary, some are good, some are bad, some are noise and others have poor signal handling under high level input conditions - is there really a perfect digital satellite receiver?

This month's column has been dominated by the aftermath to September 11th. The action in Afghanistan has

brought many signals into our homes from areas that perhaps have been untouched by high-tech communications before. September 18th and *Europe*Star-1* (11.685GHz-V) is feeding shots of the APTN crew itself and their makeshift studio with VTR editing equipment on benches inside airportable containers. The background dish is

about 1m diameter, there's a short wave radio running, the location suggests Peshawar, the Pakistan end of the Khyber



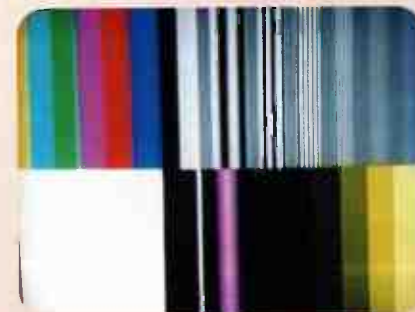
The CBC Canada are in Pakistan as well and provide both a smile and an improvised VTR countdown clock! (*Eu*Star-1*).



An Afghan is ready to be interviewed for a UK early evening news programme (Pakistan is UTC+5 and it's their night-time) (*Eu*Star-1*).



The CNN reporter leans on the railings when broadcasting with a backdrop of the local town distant and bushes nearby. To the left and also below - out of sight - are more broadcasters who as a breed all migrate to flat roofs during such events with their dishes and equipment plus CNN sunchairs. (*Eu*Star-1*).



Reuters often show this test pattern of test patterns on *NSS-K @ 11.462GHz-V*.

Pass near to the Pearl Continental Hotel. The uplink is switching PAL and NTSC depending on presenter and direction of his report. In the late 1800s the British were out in the Khyber Pass region fighting, a little more than a century and we're back there again.

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Colour Key

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- WXSAT Special
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RACAL



Hit or Myth?

John Wilson sets about examining how easy it can be to take matters out of context. Especially specifications...

When I wrote my review of an RA17 receiver, and note that I say 'an RA17' rather than 'The RA17', I realised that I might get some reaction from the many RA17 fans among the listening enthusiasts as a result of my comments on, amongst other things, the a.g.c. performance. What I didn't expect was the way in which one reaction evidenced itself.

As part of my preliminary research into the background history of the RA6790 prior to my recent article on the receiver, I was directed to a UK web site called 'Keith's Vintage Racal Enthusiasts Site'

www.recelectronics.demon.co.uk I didn't find anything on the RA6790, but did find a pithy remark directed at "a well known UK reviewer who should get his facts straight

"It's simply that the receiver was designed for conditions which existed a long time ago and it's no use thinking that a good design will always cope because it won't."

before rubbishing Racal a.g.c. designs". This comment was associated with a description of the RA66 panoramic display, fitting of which involved an MA251 buffer amplifier and I quote from the description: "Alterations have to be made to the i.f. strip and also to the a.g.c. Once made, these alterations

affect the signal handling characteristics of the receiver" and it was after this line that the remark about a 'well known UK reviewer' was inserted. I note that it has now been removed since I contacted the owner of the site and confirmed that I was indeed the person to whom he was referring. What I couldn't quite understand was the apparent

connection between the RA66 display and my article on the RA17, but after exchanging a couple of E-mails with the site owner, I finally solved the puzzle.

Perfectly Satisfactory

In my review I made observations about the poor

Continued on page 42

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"In the case of the RA17 I took an apparently immaculate unmodified receiver and described its performance, warts and all."

performance of the a.g.c. system and confirmed it with measurements using my standard stepped r.f. burst. The effects were most peculiar, and the receiver whilst perfectly satisfactory for its original use in the early 1960s did not cope with today's s.s.b. utility channel signals. The article was illustrated by photographs of an RA17 which everyone apparently studied with a magnifying glass in order to identify which of the many RA17 variants this particular receiver represented. Having studied the pictures and read the text, they all, like lemmings, leapt over the cliff

modified to take the RA66 panoramic display and thus had the MA251 buffer amplifier visible. Because of the misunderstanding over the relationship between test and photographs, for which I accept some of the blame, the contributors to the web site assumed that I made an error and had tested an RA17 which had been modified. This is not the case, and the receiver I measured, which is still here in North Devon, is a pristine unmodified unit, serial number 6640, year code TK, and its a.g.c. performance is still terrible on s.s.b. I believe that all RA17s suffer from the same problem, but it's not a

system". Well, I didn't say anything of the sort and the exact quotation from the *Short Wave Magazine* reads "...he kindly sent me some circuit extracts from the handbook of the RA117E which clearly demonstrated that Racal were aware of the a.g.c. shortcomings and introduced modifications to separate the a.g.c. attack and decay characteristics for better a.g.c. performance." I think this should have made it clear that I was referring to the RA117E, which is nevertheless a version of the RA17, but where is the reference to drastic modifications? Why indeed did Racal modify the RA117 a.g.c. system in this way? Answer coming shortly.

Intended Framework

Let me once again repeat what I try to achieve when writing my reviews for this magazine. I put myself in the place of an enthusiast who is going to lay out hard earned cash for a short wave

into the abyss of the wrong conclusion. The simple fact is that because the RA17 receiver that I reviewed was the property of a local collector who didn't want the receiver to be shipped to Dorset to have photographs

"Let me tell you that the single valve t.r.f. set I reviewed some months ago had a signal-to-noise ratio of 25dB. Does this make it a better receiver than the RA1792? Of course not"

taken, the Editor of *Short Wave Magazine* used library pictures of a 'typical' RA17. What we didn't realise until later was that the photographs were of a receiver which had been

design fault, it's simply that the receiver was designed for conditions which existed a long time ago and it's no use thinking that a good design will always cope because it won't. No-one expects a 1958 Ford Anglia to perform as well in today's motorway traffic as a brand new Ford Focus, and there's no shame in recognising the truth.

The only Racal enthusiast who actually contacted me about the apparent mismatch between the review text and the pictures was Michael O'Beirne, and of course he immediately knew how the misunderstanding had arisen. It was with some surprise that I had a comment in an E-mail from the site owner which said "I would like to know where you get the idea that "Racal knew they had a problem" and to what drastic changes they made to the RA17s AGC

receiver, and by using and measuring a sample of a typical receiver I can point out the advantages and possible disadvantages of each particular model. In the case of the RA17 I took an apparently immaculate unmodified receiver and described its performance, warts and all. These articles are not intended to be a definitive history of the receiver nor of the company which produced it, and that is why I started out this article referring to 'an RA17' rather than 'the RA17' which shows that I am describing a typical sample, not a generic type and highlighting some of the unexpected problems a new owner might experience with a receiver of this age. Indeed I have adopted the same approach with every receiver review, and regularly issue warnings about the pitfalls of



owning an older receiver. If you want confirmation of the wisdom of this approach, I refer you to Keith's web site which contains pages and pages of RA17 faults, most caused by simple old age, but requiring a great deal of effort and knowledge to sort out.

I shall continue to use this basic framework in future articles and am gratified by the positive response from the readership who contact me directly rather than putting questionable remarks on a public domain web site.

The web site covers amongst other units the range of Racal receivers from RA17 to RA1792 inclusive, and has much of interest. Settling down to read the various articles on individual receivers did cause me to blink a little when I read (about the RA1792) that "However, despite Racal's sales literature the r.f. performance of this set can only be described as adequate, it is nowhere near as good as the RA17. The r.f. amplifier has no tuning or preselector circuits and if the set is connected to anything approaching a decent aerial then the receiver starts to overload". Can this be the same RA1792 which has a measured 3rd order intercept point of +25dBm compared to the RA17 at -10dBm, some 30dB worse? Can this be the same RA1792 which is used and applauded by hot shot expert listeners all over the world and which has earned itself a reputation for being one of the best h.f. receivers in the company of Collins, Harris, Cubic and everyone else? Can this be the same RA1792 about which a new owner in the US E-mailed me (on 25 July 2001) to say "My RA1792 arrived today and with just an hour or so of listening around the ham

"...the '1792 has a far better sound and feel to it. The signals just jump out of the background noise..."

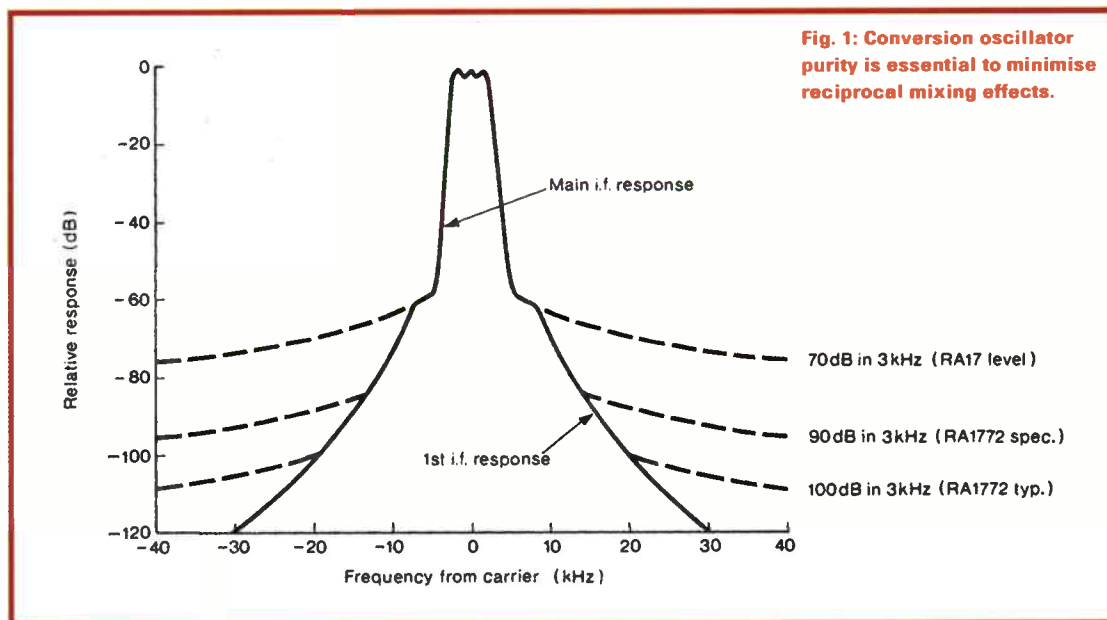


Fig. 1: Conversion oscillator purity is essential to minimise reciprocal mixing effects.

bands using the Wellbrook loop I can tell you that you are absolutely right, this is, subjectively of course, the best receiver I have used thus far. From what I remember of the RA6790GM, subjectively, although I last used one 10 years ago, the '1792 has a far better sound and feel to it. The signals just seem to jump out of the background noise, and that hang a.g.c. is excellent". Just as an aside, I should mention that the writer worked in r.f. design in the South African company which bought out Racal South Africa in 1979, so he is very knowledgeable on his subject. However, Keith's web site carries on about the RA1792 with comments from a named Racal ex-employee saying:

"People rave about the Racal RA1792 this was just a cost competitive and cheap receiver designed at Racal's factory in Rockville Maryland USA for a US Government contract". This is a pretty dismissive statement about one of Racal's more successful designs which sold more than 10,000 units world-wide, and in many ways is surely more damaging to the Racal reputation than my comments about the a.g.c. performance of the RA17. The same quotation goes on:

"The RA1792 only had a 10dB signal-to-noise ratio which was poor when compared to the much earlier RA1772 with (sic.) has a 15dB signal-to-noise ratio. The best of these sets was the RA1778 and the later RA1779 these were still quoted as 15dB signal-to-noise ratio but did not leave the factory with less than 17dB the last ones around 21dB which were the first semiconductor sets to equal the RA17 from 20 years before..."

This text is quite amazing, because it states unequivocally that the entire RA1700 and indeed the RA1200 series prior to the last production of the RA1779 were all inferior to the "RA17 from 20 years before". Surely this can't be true, and it is a very derogatory way for an ex-Racal employee to describe his company's research and development efforts. It also seems a bit harsh to accuse me of 'rubbishing' Racal design.

Virtually Meaningless

Fortunately, the technical content of this statement on the web site is virtually meaningless because you can't simply say "receiver X has a 15dB signal-to-noise ratio and is therefore better than

"These design criteria laid down in 1974 have held good until today, which is one reason why the performance of the receivers I have quoted is so similar."

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receiver Y which has only a 10dB signal-to-noise ratio" unless you also say at what signal level, and in what bandwidth the measurement was made. Let me tell you that the single valve t.r.f. set I reviewed some months ago had a signal-to-noise ratio of 25dB. Does this make it a better receiver than the RA1792? Of course not, because the 25dB S/N ratio was for an input signal of several millivolts.

Researching Racal's product literature and technical manuals revealed that Racal invariably quoted their receiver sensitivity as a signal-to-noise ratio at an input signal level of $1\mu\text{V}$ e.m.f. Note that most signal generators, with the exception of earlier Marconi Instruments, are calibrated in μV p.d. (potential difference), which is why the unambiguous dBm has come into general use in the professional field. What's the difference? If your generator is calibrated in e.m.f. (electromotive force), the calibration is in terms of open circuit output voltage. If the generator is then connected to a load having an impedance equal to the generator output impedance, the voltage across the load is half that of the open circuit calibration. Racal's sensitivity figures at $1\mu\text{V}$ are thus equivalent to $0.5\mu\text{V}$ when connected to an actual receiver, and this in dBm terms is -113dBm . OK so far?

The RA17 is quoted as having a signal-to-noise ratio of 18dB (RA17 handbook) at $1\mu\text{V}$, although the handbook does not state whether this is e.m.f. or p.d. My own measurements on the sample RA17 I tested would indicate that the figures are quoted as e.m.f.

Published Information

Let's take a look at some accurate and published information from Racal itself, since it's a golden rule of historical research to try and get to the source documents rather than depend on hearsay. The RA1779 sales brochure quotes s.s.b./c.w. signal-to-noise ratio as 15dB in

a 3kHz bandwidth for $1\mu\text{V}$ e.m.f. input. This means that in raw sensitivity terms it is 3dB worse than the RA17. A very detailed article by R.F.E. Winn of Racal, (*Wireless World* 1974) describing the development of the RA1772, suggests a signal-to-noise ratio of 15dB for a $1\mu\text{V}$ e.m.f. signal in a 3kHz bandwidth, so the 1770 series seem to be very much the same throughout according to Racal themselves. Note here that the 1772 and 1779 had built-in r.f. amplifier stages before the mixer. Now the "poor" RA1792.

The RA1792 sales brochure states that for an input signal of $1\mu\text{V}$ (-113dBm) in a 3kHz bandwidth, and in s.s.b. or c.w. mode, the signal-to-noise ratio is 10dB (cries of "I told you so" from the RA17 enthusiasts) but hang on a minute, this is without the built-in r.f. stage provided in the RA1792. The sales brochure goes on to say that the signal-to-noise ratio

2.7kHz bandwidth with the r.f. amplifier off, and a signal-to-noise ratio of 16dB with the amplifier on. The later RA3790 series quotes identical figures. Let's take a look at some other manufacturers who should know how to design h.f. receivers.

Other Examples

The Watkins-Johnson WJ-8711 receiver quotes a signal-to-noise ratio of 10dB (pre-amp off) in a 3kHz bandwidth of -112dBm , i.e. slightly less (1dB) sensitive than the RA1792. Their HF-1000 is, not surprisingly the same. The Rohde & Schwarz EK-890 quotes a signal-to-noise ratio of 10dB for -113dBm input in a 3kHz bandwidth, whilst the Eddystone 1650 quotes 12dB signal-to-noise for an input of -113dBm . The Collins 955-1 quotes 10dB signal-to-noise ratio for -112dBm input signal in a 3kHz bandwidth s.s.b. mode.

Right: if we apply the logic



increases to 15dB if the r.f. amplifier is used, in other words there is no quoted difference between the 1772, 1779 and 1792, **if you compare them under the same conditions.**

Moving on to later Racal receivers, and referring to information kindly sent to me by Keith Thrower, Research Director of Racal Radio Group at the time, the RA3700 series receivers quote a signal-to-noise ratio of 10dB for a -113dBm input signal in a

of the statements made on the Vintage Racal web site, then none of these are as good as the dear old RA17 because they all have a signal-to-noise ratio less than 18dB at $1\mu\text{V}$ e.m.f. input, so you now have to ask yourself "what have I missed?" The answer starts by reading what Winn wrote in 1974 about the development of the RA1772:

"In practice, however, it is not normally the noise figure (i.e. the sensitivity - JW) of the receiver which limits the

RACAL
Hit or Myth?

detection of the small wanted signal, but the simultaneous existence of atmospheric and man-made noise on the antenna. A far more severe limitation comes from the large unwanted signals also present whose effect is often disguised. It is not sufficient to provide a high degree of single-signal selectivity; the dynamic selectivity must also be of a high order". He goes on to discuss the importance of second and third order intermodulation performance and in a section entitled 'The Front-End' writes:

"The first mixer is the section where the greatest amount of development effort has been concentrated in recent years. The problem is to achieve mixing and maintain linearity to signals at the input in a function that is basically non-linear. The mixer must be non-linear to signals on two inputs but linear to signals on the same input. A solution lies with the switching type of balanced mixer in which the input signals are switched through to the output in-phase and out-of-phase alternately at the local oscillator repetition frequency. It is important to maintain this linear switching even at input voltages of several hundred millivolts which requires several volts for switching".

What Winn was describing is the now commonplace high level mixer fed with up to a watt of local oscillator drive in order to maintain a high level of intermodulation performance, and this paper and the development of the RA1770 series of receivers marked the end of Racal's production of the old style

Wadley loop derived designs. He also described the necessity for oscillator purity in order to minimise reciprocal mixing effects, and compared the phase noise performance of the RA1772 with that of the RA17 (Fig. 1). These design criteria laid down in 1974 have held good until today, which is one reason why the performance of the receivers I have quoted is so similar.

The end of the quest for raw sensitivity came with the realisation that

when I had a call at my home from Rob Filby who announced himself as a friend of Keith's and whose E-mail address is given on the Racal Enthusiast's web site. Rob is probably the best informed person I have encountered when it comes to the RA17, and he runs a repair and refurbishment service for the receivers. This is presumably how he came to write the pages of RA17 faults which are listed on the Enthusiasts web site, details of which would be

"The article by Winn on the development of the RA1772 is a classic, and illustrates forcefully just how good Racal design was at the time"

intermodulation performance was of greater importance in the crowded h.f. conditions which existed from the late 1960s onwards, and whilst it is true that under very quiet conditions on bands above 20MHz, sensitivity figures such as those achieved in the RA17 can be of use, the truth is that linearity plays a greater part in h.f. communications than sensitivity.

Now let me return to an earlier quotation from the Racal Enthusiast's web site which said that "...if the set is connected to anything like a decent aerial then the receiver starts to overload". This puzzled me considerably bearing in mind that the intermodulation performance of the RA1792 is markedly better than the RA17, but I think I began to understand

extremely helpful to anyone in trouble with an RA17. Rob can be contacted on (01636) 686392 or at robfilby@totalise.co.uk (I had his permission to list these).

Use Of An Attenuator

During a long conversation, Rob told me that he had been a professional operator of many of the Racal receivers under discussion, and I took the opportunity to ask him about the reported 'overload' when using the RA1792. He said that when the RA1792 was connected to 'big rhombics' it overloaded, and went on to say that the worst thing that Racal did in the RA1792 design was to omit the provision of a stepped r.f. attenuator such as that fitted



to the RA17, because the RA17 could handle the big signals by use of the attenuator. At this point it started to make sense, and I recalled a comment made in the article by Winn, from which I have already quoted.

I went back to Winn and read the following:

"If the antenna is a large rhombic, for example, there may be several thousand signals received of levels up to 100mV and all these will combine in the receiver front-end to produce many thousands of products".

Now 100mV is -7dBm, so it's no wonder that the RA1792 overloaded. However, the RA17 would be infinitely worse under these conditions if it were not for the fact that it had a stepped r.f. attenuator in the front-end of the receiver which the operator could back off until the overload effects diminished.

This did not make the RA1792 a bad receiver, it simply meant that the even worse performance which the RA17 had (30dB worse) could be minimised because it had an input attenuator!!! Let me quote from the RA17 manual:

"AE (ANT) Attenuator: This control enables the operator to reduce the level of all incoming signals when strong unwanted signals are present which cannot be rejected sufficiently by tuning the aerial; the input level can also be reduced if the required signal is causing overload in the early stages of the receiver".

This is, remember, a quote from the RA17 manual. It seems to me to be a fair conclusion that the RA1792 is being damned on Keith's Vintage Racal Enthusiast's Site because Racal didn't fit it with a flippin' attenuator. If this is so, it's a classic case of a jumping to the wrong conclusions and then propagating the mistake. Looking at the published specification and the actual measurements carried out on both the RA17 and the RA1792, it is clearly obvious that the RA1792 is a much better r.f. performer than the RA17. If it wasn't, why did Racal develop it at all? Why

not carry on with the "much better" RA17. I have as much admiration for the RA17 as anyone, but you can't endow it with magical powers and then say that the RA1792 as "can only be classed as adequate" and "this was just a cost competitive and cheap receiver". As I said before, just who is guilty of "rubbishing" Racal design?

And that's enough of that. I suggested to Keith that perhaps I should review an RA1772 and then compare the different Racal receivers in a 'Racal Special' article, and he readily agreed. The Editor has arranged with a well known UK supplier (Telford Electronics) to let me have an RA1772 on loan, so my thanks in advance to them, and let's look forward to a bumper test session where I will have the RA17, RA1792 and RA1772 on the bench at the same time. Having just reviewed the RA6790 that should complete a fair cross section of the Racal designs of the 1970s and will give us all a chance to compare the findings. The article by Winn on the development of the RA1772 is a classic, and illustrates forcefully just how good Racal design was at the time. For any British manufacturer to sell to the US Government is quite an achievement, and the respect accorded to the RA6790GM by owners in America is indication enough of its performance capabilities. The equal respect accorded to the RA1792 by owners in this country just reinforces the excellence of the overall design teams involved, and amongst 'those who really know' I feel sure that the RA1792 will continue to be a receiver in great demand.

The AGC Question - Answered At Last

And finally, the a.g.c. system of the RA17. The reason that the a.g.c. got itself in a twist with a stepped r.f. input, simulating the start of an s.s.b. syllable, can be ascertained by looking at the Racal specification for the receiver (source documents) where it shows that the a.g.c. attack time is 25ms, with the release time

changing depending on the setting of the a.g.c. fast/slow switch. This attack time is simply too slow to cope with s.s.b. speech, and if you ask "Why then can it cope with c.w., which is a stepped r.f. signal?" the answer is that skilled operators like Rob Filby would normally receive c.w. with the a.g.c. switched off, and use the r.f. gain control (and/or the r.f. attenuator) to set the signal levels into the detector.

The modifications incorporated into the RA117 a.g.c. system which turned it into an RA117E were devoted, according to the original bulletin issued by Racal, (source documents) to separating the attack and decay times of the system to achieve an attack time of some 2ms with a decay time of ten seconds. Taking the opportunity to ask an expert, I asked Rob about the RA117E and he told me that this was a modified RA117 produced specially for the Royal Navy to use on s.s.b. channels!

Q.E.D. as my old geometry master used to tell me. Racal did modify the a.g.c. system to cope with s.s.b., and if that modification were incorporated into an RA17 of any vintage it would go a long way towards bringing its performance up to modern requirements. I'll try to get permission from the owner of Serial No. 6640 to do the 117E modifications and re-evaluate the receiver. In the meantime, since writers in magazines have to subject themselves to public scrutiny of what they write, it might be a good time to remind publishers of web sites that they also operate in the public domain and should take care to separate fact from opinion and clearly identify which is which.

SWM

RACAL Hit or Myth?

Hit or Myth? Well, for me Racal products have always been a hit, but some of the myths do need dispelling by accurate research and measurement. Happy listening!

AR8600

MOBILE - BASE - TRANS-PORTABLE

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



(TCXO). An RS232 port further extends the capabilities with free supporting control software available from the AOR web sites.

Although many microprocessor features have been adopted from the trendsetting AR8200 Series-2 hand portable receiver, **the AR8600 RF front-end is an all new (*high sensitivity) design with a first rate switched attenuator and preselection around VHF to ensure the highest levels of adjacent channel rejection with software spuri cancellation.** In addition to a hinged telescopic whip aerial, the AR8600 is supplied with a **detachable plug in medium wave bar aerial** which locates on the rear chassis of the receiver for localised medium wave monitoring. An additional BNC socket is mounted on the rear chassis so that **10.7MHz i.f. output** may be extracted for use with external spectrum display and vector analyser units such as the AOR SDU5500. The TCXO ensures **high stability** with **minimal internal spuri** and is usually only seen in top of the range (more expensive) models such as the AR5000 and AR7030.

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

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

AR8600 - up to FIVE HOURS portable operation from the BP8600 optional internal battery

There are many qualities which make the AR8600 a unique award winning package, as a trans-portable receiver the optional internal battery pack (BP8600 £49.00 inc VAT, carriage extra) extends the versatility even further. When travelling to an airport, airshow, racetrack or wherever, the ability to remove the receiver from the vehicles power and carry on monitoring without the need for a separate hand-portable receiver

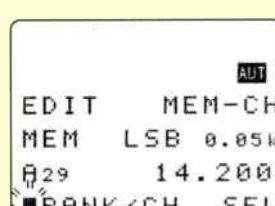
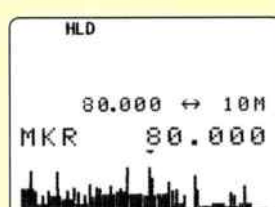
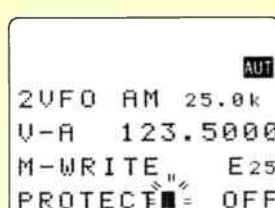
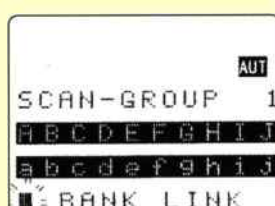
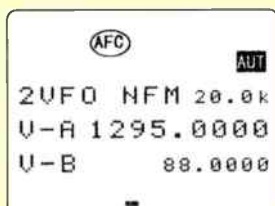
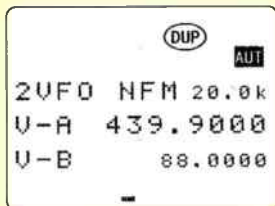
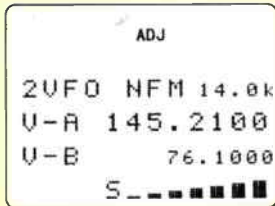
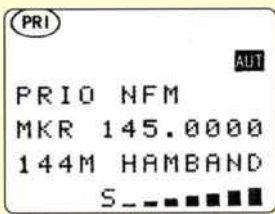
is a great plus point.

Initially designed to provide up to two hours of operation, tests have shown that once the internal battery has been **fully charged** using an optional **15V regulated DC power supply**, the monitoring time extends to around **FIVE HOURS** (with back-lit LCD lamps off).

There are many other options available: mobile mounting bracket (MM8600), tape record lead (CR5000), RS232 lead (8600PC), free PC software from the AOR web site (or available on CD-ROM priced at £5), five slot cards (CTCSS, tone eliminator, record/playback, external memory, analogue voice inversion), Collins mechanical substitute IF filters for SSB and AM. If you are undecided whether you need a hand-portable receiver or a base station, take a closer look at the AR8600... virtually two concepts in one compact cabinet.



Note: Operational times are for guidance but depend upon the style of operation (volume level, backlight, scanning etc) and are not guaranteed.



AOR UK - extensive web site and world renowned after-sales service

The AOR UK web site provides more than just sales information, although there is plenty of detail if you wish to look at the full technical specification of AOR products. There are technical bulletins, free download of current and older operating manuals, spare parts listings & service procedures, many free software packages with demo versions of others, main item & accessory prices, used equipment listings and a **SSL secure order facility for credit card orders** (Visa, Master, Euro, Connect & Delta). Many customers from around the world have already ordered parts & accessories via the SSL page including those in Australia, New Zealand, USA, Canada, Spain, Italy as well as the UK & Ireland etc. This support facility is backed by a fully equipped (and internationally well respected) UK workshop where spare parts & service information is held for models old & new.

On the letters page of the Nov'01 SWM (page 7) we note non-AOR customers complaining that the manufacturers of their products are 'disinterested' in support of their units once they are sold... although it is a fact that eventually all equipment will become uneconomic to repair, where possible, AOR will go the extra mile in assessing costs or suggesting alternative suppliers for consumables such as battery packs for the AR800, AR900 & AR1500 receivers. Big companies don't always provide 'big support', AOR UK by contrast is a relatively small company but our emphasis on support is comparatively large!

If you have an older AOR receiver sitting in a draw no-longer in use, dust it down and give it a go... if you feel that it is not performing optimally, we are happy to inspect the unit for a nominal charge (£20 inc VAT and return carriage) and provide a written report and estimate if additional work is required. Typical repairs tend to cost around £50 inc labour, small parts, return carriage and VAT... but obviously subject to inspection and estimate. In particular, if you have an AR2700 receiver, all repaired units are currently being shipped back to customers with a FREE SOFT CASE (SC2700) while stocks last.

AOR UK is happy to receive phone calls, e-mails and letters from our customers in the UK & Ireland who require technical assistance with respect to the repair and on-going maintenance of their AOR equipment. If you have internet access, have a look at the AOR UK web site (technical bulletin section), if you can't find the information you require, let us know and we may be able to help. Many customers (internationally) are surprised that the information they require is available FREE from the AOR UK web site and find they can order parts from the spares listing via the SSL facility without even having to speak to anyone on the phone, all orders being acknowledged by e-mail.

The key pages are as follows:

- Main site: <http://www.aoruk.com>
- Technical bulletins: <http://www.aoruk.com/bulletin.htm>
- Service & spare parts listing: <http://www.aoruk.com/service.htm>
- Operating manuals: <http://www.aoruk.com/manuals.htm>
- Full price list for main items & accessories: <http://www.aoruk.com/rpr.htm>
- Used equipment list: http://www.aoruk.com/used_eq.htm
- Payment page: <http://www.aoruk.com/payment.htm>
- SSL credit card page: https://aoruk-com.secureserve.co.uk/c_card.htm



www.aoruk.com



☆☆☆ 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 Blanking. Popular with government agencies throughout the world. **AR5000c** Frequency coherent version for commercial applications, special order.

Commercial & government operators have selected the AR5000, AR5000+3 and AR5000c in great numbers over recent years resulting in the model being recognised within their organisations in the same manner as many household brand names & products. For counterintelligence surveillance, the AR5000 (often partnered with the SDU5500) forms the cornerstone of modern day monitoring. System training often revolves around the AR5000 which leads to even wider implementation across departments. Transform **your** hobby to a commercial grade listening post with the AR5000, **the professional choice.**

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 Blanking.

SDU5500 The SDU5500 is a Spectrum Display Unit providing practical and cost effective spectral monitoring for band occupancy and identification of new transmissions.



The **AR7030** is tremendously popular short wave all mode receiver (0 - 32MHz) **still beating off the competition. AR7030, the professional choice.**

Excellent strong signal handling, low noise local oscillator (producing extremely low reciprocal mixing figures) and excellent audio fidelity. Receiver of the Year 1996/97 WRTH, 5-star award and editors choice Passport to World Band Radio for several successive years:



The **AR8200** represented a beacon when first released, technology marches forward with the AR8200 Series-2 keeping the innovative concept and forward thinking alive and bright.

530kHz - 2040MHz all modes, no gaps with computer port (via optional 8200PC), free PC software via the AOR web sites. The list of features is vast, including 8.33kHz airband channel steps, optional slot cards. Supplied with NiCads, charger etc.

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



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Well I spent two days at the Leicester show and walked my legs to stumps. You just don't realise how big that old hangar place is until you've covered every square foot of it about twenty times. There were some bits and bobs for scannists to purchase and play with. I reckon that the best buy were Racal wideband base antennas which were being sold including mounting brackets (all new) for a tenner. I made the purchase and also obtained one for a mate of mine, Geoff Holman, who is a keen milair monitor. He reports that it works very well indeed.

Also there were the usual plethora of ex police PFX sets, which according to rumour, are being re-purchased by some police forces as a stop gap until they decide with what equipment to replace their existing radio gear. Although the current police frequencies will be sold off, it seems that TETRA is by no means as popular as the authorities would have us believe.

Some other first rate bargains were Racal TRA967 manpack v.h.f. f.m. transceivers which were being sold as new with some accessories at a price that made them nothing short of a bargain. By the end of the Saturday these radios, which transmit/receive a maximum of 3W f.m. between 36 and 76MHz, were being knocked down at £45 with the antenna and headset. They are made to full military specification with 1600 channels available and, no, I didn't get one. Quite a lot of these sets were sold with not all of them going to collectors! I reckon that a few of these will be heard around and about for a few years yet. There are quite a lot of these excellent items which have yet to be sold and I'm sure that amateur radio rally goers will spot them on sale in the future.

Scanning around at the site afforded considerable amusement as excited purchasers tried out equipment that they had bought. As previously noted, a fair bit of it was not on amateur bands. It was noticeable that some retailers were not present this year and it seemed to me that attendance was not what it had been in the past. Anyhow the venue is better than the Granby Halls, which I am delighted to report has been

Scanning Scene



comprehensively flattened for redevelopment as a car park.

Monitoring Airband

I listen to everything if I can, but don't necessarily spend much time monitoring air band. It's true to say that by no means everything that flies is exclusively using a.m. airband frequencies. Many aircraft that have to interface with ground units use f.m. radios which are not within the airband allocations. Of course all the equipment has to be certified as safe for use in aircraft, but quite a lot can be heard which relates more to the airborne unit's task than to general aircraft traffic control and movement. Some of the frequencies that are below 400MHz may be found to be in use with either a.m. or f.m. signals. All those above 400MHz will be f.m.

Try popping these in the memory: 138.09375, 138.29375, 138.30625, 138.10625, 152.075 (f.m.), 143.475 (f.m.) 152.075 (f.m.) 143.725 (f.m.) 143.575, 155.8625 and some more familiar frequencies 450.625, 450.675, 452.150, 452.000, 452.050, 451.300, 451.150, 452.150, 452.100, 452.000, 452.075, 452.175 and finally a couple of airband a.m. channels that may be worth having a crack at, 130.650 and 130.475.

Even if you don't live near the sea, 156.000 and 160.600 may still produce some coastguard results as well. Remember when airborne their antennas are pretty high up. Should you be fortunate enough to spend time in an office or at home where you can run a scanner regularly, you'll certainly hear some traffic on these frequencies.

Heightened Security

As the world enters an era of increased military activity and heightened security awareness,

this will inevitably result in increased use of radio equipment. For those involved in ground security at military and governmental facilities, it is quite likely that the changed security situation will eventually require the use of more secure communication systems. No doubt this is being addressed by those responsible for procurement even as you read this, but clearly it will take some time before the new radio schemes are in place.

In the intervening period, it seems likely that more ancient radio equipment that may have been languishing in the store cupboard will be hauled out and pressed into service. It may be worth checking the 68-85MHz sections of low band for activity. Likewise, even more frequencies in the 30, 40 and 60MHz ranges could yield interesting results. Higher in frequency, the US Fleetsatcom channels have been active. At the moment I have only heard data on them, but voice in n.f.m. can sometimes be audible. The data seems easier to resolve in u.s.b.

Try 253.075, 255.350, 257.050, 260.410, 244.000, 265.345, 244.090, 240.040, 261.650 and 255.450. These have all had data on them and some are active as I write this.

Simple Antennas

On a more lighter note, an awful lot of time wasting amusement can be had fooling around with antennas. One of the simplest antennas for general scanning is a quarter wave ground plane cut for v.h.f. band. It works fine on u.h.f. too. For several years, this type of antenna was my main scanning antenna and I had some really good results with it.

One of these can be made very simply and most cheaply. Imagine five lengths of welding

rod or coat hanger or similar wire of 465mm in length. One of the pieces has to be connected to the core of a length of coaxial wire feeder. The other four pieces have to be connected to the braid so that they are equally spaced around the braid forming cross + with the end of each piece of wire connected to the braid and with the fifth length of wire sticking up vertically in the centre of the cross and connected to the coaxial core.

Usually the easiest way of making this is to get hold of an old SO-239 socket or BNC socket, if you have thin piano wire. Stick the vertical in the centre socket and solder the four radials to the outer case. Make sure that the radials are angled down at about 45° so that the antenna will stand up on it's four legs. Hook up your coaxial cable and make sure that there is no electrical connection between the outer radials and the vertical element. Also ensure that the coaxial braid is connected to properly with the radials and the element connected to the core. Pop a plug on the radio end and it will work.

Obviously you can't use this outdoors, unless it's more substantially made and waterproofed, but it will work OK in the loft. The antenna will also transmit on the 2m band as well. I know it's simple, but when you look at the actual construction of most antennas as opposed to the theory, they are fairly simple stuff.

Finally...

As I said earlier, the increased security measures necessary in the western world will mean increased security strictures for us all. I am the same as many other people in that I know many more frequencies for 'official' agencies than I would dare to publish, or want to. We are all going to hear traffic from time to time from these groups, probably unintentionally as we tune through the bands looking for something else. It's going to get busier and discretion will have to be the name of the game for the scanning hobby, unless we are to be even more tightly constricted by our laws and regulators.

Scanning Scene **EXTRA**

What A Pair!

Dave Roberts puts the Watson WR5001 & WR5002 nearfield receivers to the test.

It's twelve years since I quit smoking. A few years before that I remember there was a brand of cigarettes that came in a black flip top box and were 'international' or 'luxury' length. How anyone can describe smokes as 'luxury' I just don't know. The pack just fitted in a shirt pocket. Now, I didn't smoke these fancy cigarettes, being more of a roll up sort of chap, but when I first set eyes on the pair of Watson nearfield receivers, the resemblance to a couple of packs of these flashy cigarettes was immediate.

The More Basic

The Watson WR5001 is the more basic of the pair, although both receivers share many common components. Billed as a u.h.f./v.h.f. nearfield receiver, the '5001 has receive coverage from between 30 and 900MHz in f.m. mode only. Unlike frequency counters, these units don't display the received frequency, but the recovered audio is presented through a small speaker on the front panel.

Running from a NiCad battery pack fitted within the black anodised aluminium case, the '5001 will

operate for around five hours on one charge. A plug top type charger is supplied and this charges the unit up via one of the three sockets on the top of the set. The other two comprise a BNC for the supplied antenna, which is a skimpy thing about 190mm long, the other aperture is a 2.5mm earpiece socket and a suitable earphone is supplied.

Controls are minimal on this unit. On the top there are two rotary switches. One is a squelch control and the other is for on/off and volume. The radio is marked with a CE symbol and a little exclamation mark in a triangle, very similar to the road sign that can sometimes be seen propped up on the side of the road (!) which warns you to be alert for almost anything.

The front panel comprises the speaker grille, two small red l.e.d.s,



signal and the squelch is open. There is a push button on the bottom right of the '5001 marked 'SKIP' and

'HOLD' and also on the same side a five bar l.e.d. stack is located above the SKIP switch. On the top next to the earpiece socket there is a 3.5mm CI-V port which takes a cable to a suitable receiver or frequency counter for reaction tuning. That's why it costs more!

The idea of these gadgets is that they will receive any local f.m. transmission of the wide frequency range and play the audio through the speaker. The '5002 will also display signal strength on the l.e.d. tower and it can also be switched to hang on to a detected frequency by utilising the hold switch.

What If?

The applications for these units is obvious. Imagine that you are someone who feels that you may be under surveillance. Every so often you can turn one of these little rascals on and let 'em roll. If the guys that have you under observation are using f.m. radios between 30 and 900MHz and if they are in proximity to you, there's a fair chance that you'll hear the chatter

The Watson WR5001 is the more basic of the pair, although both receivers share many common components.

one to indicate that the unit is turned on and the other marked 'sq' tells you when the box is picking up a

the whole thing sits on a very sensible thin rubber pad glued to the bottom of the set which sets it firmly on most surfaces and prevents scratching the Chippendale secretaire. The whole thing weighs in at 280g which is around ten ounces for those of us who prefer to buy our consumables in imperial measure.

Next Up

The WR-5002 is built in the same cabinet and weighs the same as the '5001 and has the same coverage of frequency and mode. It comes with an identical antenna, charger unit and earphone to its kid brother, but the '5002 has some extra features.

On the front panel there's a two position slider switch marked 'AUTO



Inside the front - the WR5002 is shown on the right.











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Scanning Scene **EXTRA**

What A Pair!

as the people physically close to you use their radios. If someone has placed a simple f.m. r.f. transmitter in your home to 'bug' your conversations, then you'll hear that too and should be able to find the device.

If the operators that have you in their sights are using TETRA or digital mobile 'phones, then these units won't tell you that they are there. Likewise, if the radio bug in your home or office is a spread spectrum device or anything more complex than a straightforward f.m. radio transmitter, you just don't know it's there by using this kit. Having said all this, there is potential here for some real snooping with one of these.

Out & About

Well, as they are designed as portable units the best thing to do is get out and about with them. There are no prizes for guessing what the first thing that any wideband receiver of this type is going to find. You've guessed it. The industrial sound of the beastly pager systems. The noise that instantly has you reaching for the volume control and the scan button. In the case of the WR5001 and WR5002, you can hit the skip button as many times as you like, but such is the search rate of the radios that you get straight back to the pager transmitters in a second or so. This is where judicious use of the squelch control on both these sets can prevent a mass of anguish.

I found that cranking up the squelch to around the eleven o'clock position dealt with the ghastly row on both radios. This will reduce the effective reception range, but is necessary to make any use of the sets at all in areas with pager coverage. That's unless you just love to hear pager noise or you are able to try them out in an area where there are no pager transmitters at all. Which is what I did initially.

With the squelch control set so as to eliminate noise and hash I conducted a few field trials. Starting with a 10W mobile radio in the 2m band transmitting into a quarter wave vertical antenna on the vehicle, I found that both the radios locked up on the signal at a distance of around 137m over a clear and unobstructed path. During all the tests I found that

both the radios performed identically in this respect, with occasionally one set beating the other to grab the signal.

Mobile Conditions

I repeated this experiment under mobile conditions with the 10W mobile driving towards me as I stood by the side of a road. This time I was within range of pager noise which had to be eliminated and I found that both sets grabbed the signal and played me the audio simultaneously when the car was 73m from me. This is pretty respectable stuff!

It wasn't a warm day and I was getting pretty chilly, but I soldiered on and this time a u.h.f. portable was deployed in the 450MHz band. I guessed that this band may be one of interest to some folks, so I thought that it could be a good idea to try the units in this frequency range. With a transmitter set to 5W I strolled off

Both these receivers work very well indeed and for sheer nosiness they take some beating.

with the first set. I was a whole 87m away before I lost the signal. This was with the squelch set to the level to remove pager clutter.

Both sets performed identically during this test. Now I'd already had a long walk that day, but undeterred I repeated the exercise with each set, but this time the transmitting unit was set to 1W. The signal was lost on both the WR5001 and WR5002 only ten metres earlier. Back to base and a trial at v.h.f. Off I hiked, firstly with the WR5001 and with a 5W handheld transmitter running on a 154MHz frequency. I lost the transmission eighty one yards (say 74m) from the transmitter, again both radios performing identically. Running another portable transmitter on the same frequency, but only using 1W the signal disappeared at 68m

Fascinating!

When the WR5002 is scanning, the little l.e.d. line displays a rising and falling light sequence which becomes a signal strength indicator when it collects a radio transmission. This light show

provides information indicating how quickly the received signal strength diminishes when you reach the limit of the effective range of the set... I found it fascinating, but then I don't go out much.

The main additional feature of the WR5002 is the CI-V port on its roof. Insert a 3.5mm jack plug and suitable lead and this set will reaction tune an appropriately equipped receiver. Now the facility to reaction tune anything really comes into its own when the equipment is being used portable or possibly mobile. The only set that I can get my hands on to test reaction tuning is the Icom R8500 belonging to a friend. These radios are just the tops, but anyone who has seen one will appreciate that they are by no means suitable for portable operation.

Accordingly I visited his home and plugged in the WR5002 and he set up the R8500. As expected, the WR5002 tuned up the Icom radio

swiftly. This enabled us to find the various mobile and fixed services within a minute or so. The taxi driver that lives down the road was taking his break it seems. The reaction tune worked just fine, but a proper trial would have been made with the WR5002 hooked up to a portable scanning receiver.

Having said that, the WR5002 does just what it says and the only reason to try it mobile or portable would have been to satisfy my own curiosity as to who was on what frequencies and where.

Possible Problems

Bearing in mind the constant warnings and near paranoia in the UK regarding the scanning hobby, the use of nearfield receivers, especially those that don't display a frequency, could present legal problems. I mean that you have to operate such a radio and listen to

the messages it receives before determining the user service and realising that it's illegal to listen in the first place.

If you have one of these little radios trundling through frequencies in your vehicle and are stopped by the police, will the officer hear his colleague checking your number plate as he sniffs your breath in the driver's seat. Just you try explaining that you have no control over the set and that it found the cops channel all on its own and really you were just trying to hear the local 2m chatting channel. You could well find yourself spending a night inspecting the cell wall graffiti at the local nick.

Main Advantage

Both these receivers work very well indeed and for sheer nosiness they take some beating. Their main advantage is the speed at which they run through the bands

between 30 and 900MHz.

The WR5001 will cost an eminently reasonable hundred pounds or so, with the WR5002 going for sixty pounds more.

For the dedicated snooper, the WR5002 would be the more useful set because of its ability to hold on to a received frequency, plus of course, the reaction tune capability. They are both useful and simple items of kit that will find homes in the briefcases and glove boxes of the keen hobbyist and the seriously paranoid.

SWM

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DX Television

Sporadic-E conditions continued into the second week of September, this was followed by a sudden drop-off in activity which signalled the end of the current season. Enhanced tropospheric conditions prevailed right up to the end of the month of September.

Reception Reports

On the 2nd, Sporadic-E reception opened up to Italy and south-east Europe. At 0935 **Stephen Michie** (Bristol) resolved a discussion programme shown via the TVR-1 (Rumania) network on R2, while **Vincent Richardson** (Dolgarrog) noticed an Italian wildlife programme from RAI UNO. Later, **Simon Hockenull** (Bristol) tuned into the F1 Grand Prix from TV Nova (Czech Republic) on R2. Austrian signals on E2a (49.75MHz) were also evident around noon.

On the 3rd at 1157, Slovakia (STV-1) emerged on R2 with weather pictures followed by programmes. Vincent Richardson identified Czech TV (Nova) on R1 and also RAI UNO on Channel A from Italy, the latter showing a feature film, followed by *Murder She Wrote*. At 1017 Vincent saw a group of Hungarian girl singers over on R2 from RTL KLUB.

Peter Barber (Coventry) discovered a football match on R2 on the 5th and at 1903 the Russian 'RTR' caption appeared. Stephen Michie also noticed football, but via Estonian TV on R2. Other countries identified included Sweden (SVT-1) E2 with subtitled pictures, Croatia (HRT-1) E4 and Hungary (RTL KLUB) R2.

Conditions were still excellent by the 8th when Peter Barber resolved a Lithuanian female announcer on R2 at 0822. By 0849 Stephen Michie logged both Slovenia E3 and Croatia E4, but within the hour a Spanish pop music show was occupying E2, E3 and E4.

On the 9th **Peter Barclay** received what could be a chunk of DX history - Telediario News until 1345 from the Madrid E2 outlet. It seems strange to think that there may be no further reports of this transmitter due to its imminent closure.

Tropospheric Reception

Tropospheric enhancement occurred towards the end of the month. On the 29th, **Tom Crane** noticed a selective opening with French u.h.f. signals from Lille, but nothing from neighbouring Benelux countries, which is most unusual.

Earlier this summer, Tom notched up a 'first' with the reception of the Swiss 'DRS SF-2' network on E31 from Sântis in the north-east of the country. This is the first report of this relatively new network, at one time distributed only via cable. It seems odd that SF-2 is now broadcast from terrestrial outlets as most homes are cabled, even in some of the more remote villages. In cabled areas, outdoor antennas are generally banned.

TEP Spectacular

Now a spectacular DX report which will blow your socks off! Between September 26th and 30th, 30km east of Darwin, Australia, **Todd Emslie** and **Tony Mann** encountered the following spectacular TV and f.m. reception via TEP (Trans-Equatorial Propagation):-

Hawaii, South Korea and Philippines:	TV Channels A2-6 (55.25-83.25MHz)
China:	Channels C1-5 (49.75-85.25MHz)
Malaysia:	Channels E2-4 (48.25-62.25MHz)
Dubai, Iran and Syria:	E2
Japan:	J1-3 (91.25-103.25MHz)

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



Fig. 1: Swiss SF-DRS (Swiss-German network).

Signals via f.m. (88-108MHz) were identified from Okinawa, South Korea, Brunei, Singapore, Indonesia, Malaysia and unidentified sources in south-east Asia. Also f.m. signals from Japan between 55 and 88MHz were noted.

There were also dozens of Band III TV carriers up to 220MHz from Japan, North Korea, South Korea and China. Reception lasted for around two hours.

Equipment used included: Icom R8500, D100 DX Converter, Panasonic VCR, Toshiba C531 TV, GaAsFET preamp(s), frequency measuring equipment, fringe area log-periodic antenna for Bands I, II and III TV, hand-rotated at a height of five metres.



Fig. 2: Sony colour receiver from the early Seventies with rotary u.h.f. tuning.

Collectors' Item

Robby Bain (West Yorkshire) has recently installed a 3-element rotatable Band I beam feeding a D100 converter system with Sporadic-E alarm. Robby has a Sony KV 44cm colour TV receiver for disposal. He is open to offers and the TV must be collected. The set dates back to the early Seventies, is in excellent working order, but too big for the shack. Robby can be contacted on **(01943) 863339** or E-mailed at: **rbain@its.leeds.ac.uk**



Fig. 3: MTV-1 Hungary with 'M-1' logo top-right, received on R1' by Stephen Michie.

FM Reports

On September 2nd the f.m. band was active by 0919UTC. Simon Hockenull heard various Italian stations up to 98MHz including 'Punto Radio' on 88.6MHz and 'Radio LE' on 87.9MHz.

Patrick Wylie (Ballyclare, NI) enjoys reading the column (thanks Patrick) and has sent details about the many f.m. broadcasts receivable in his area. Equipment used is a Pioneer FT104 tuner with Antiference three-element beam although this will be upgraded to a five-element array later in the year. Several stations are unlicensed and broadcast from the Republic due to the authorities taking a more relaxed view. One of these stations is 'Energy 106'.

George Garden reported hearing this station in the August column. The station is Belfast-based but the transmitter is located in the mountains of Monaghan. Another is 'Kiss 106' (106.0MHz) who have a long history serving Ulster and Leinster. 'Magic 105' broadcasts on 101.5 and 105.1MHz, also from the Energy transmitter site.

Edmund Spicer (Littlehampton) enjoys listening to French f.m. stations when conditions are favourable. However, some services seem to have undergone changes recently. On 91.0 and 98.5MHz, 'France Inter Paris' (RDS code: FIP) has been discovered. 'France Inter' once occupied these frequencies, but tuning into its long-wave counterpart on 162kHz, the programmes did not match, suggesting a new network. Can anyone shed light on this mystery?

During heightened security in Brighton throughout preparations for the Labour Party conference, Edmund was stopped at 'random' by the police and had to convince them there was nothing suspicious about listening to foreign f.m. stations on the car radio!



Fig. 4: This month's 'Down Memory Lane' item: the test chart radiated during BBC experimental colour transmissions via the Telstar satellite. The first colour transmission via Telstar was transmitted on July 16th, 1962.

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.

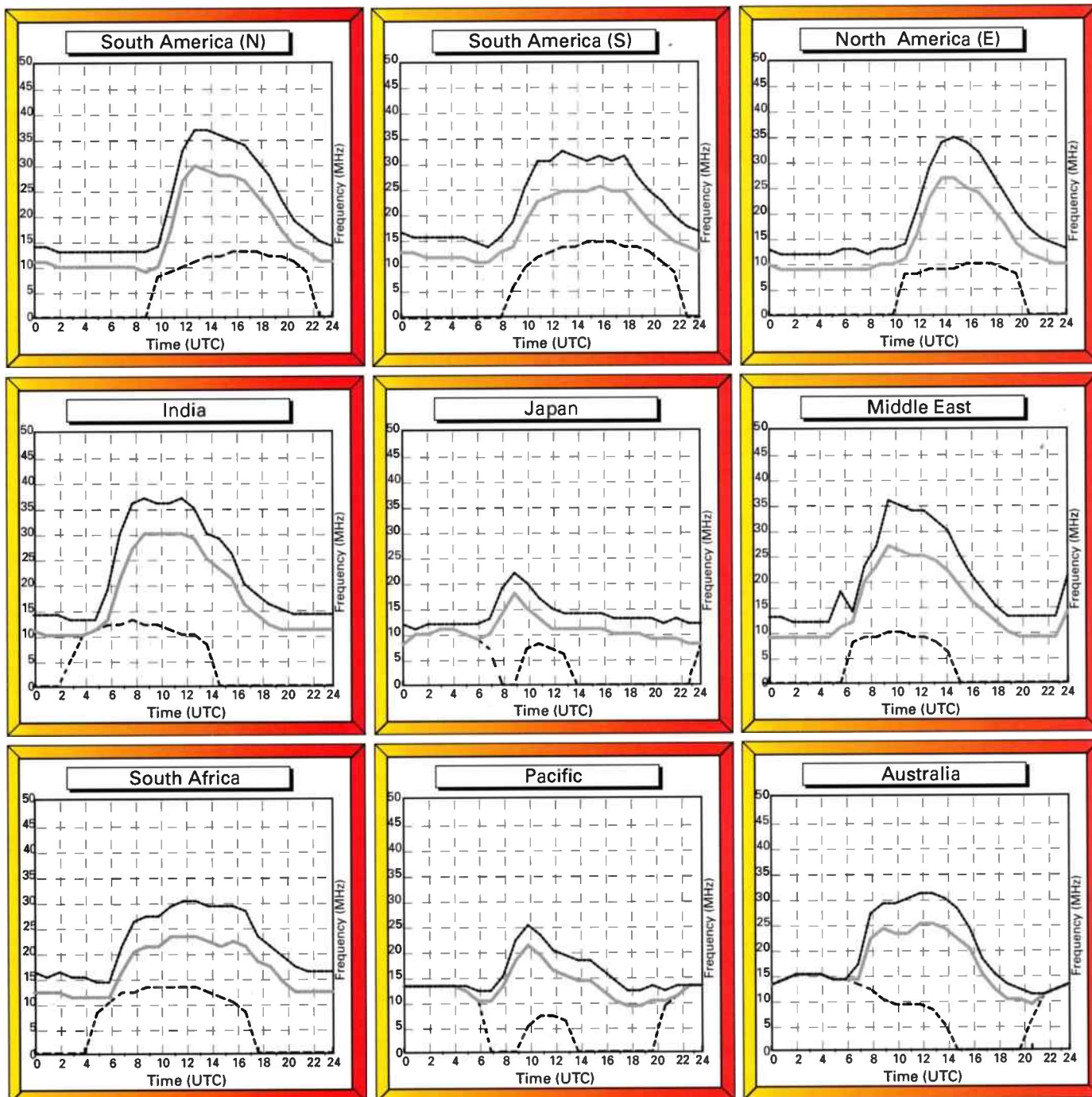
Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50%

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.

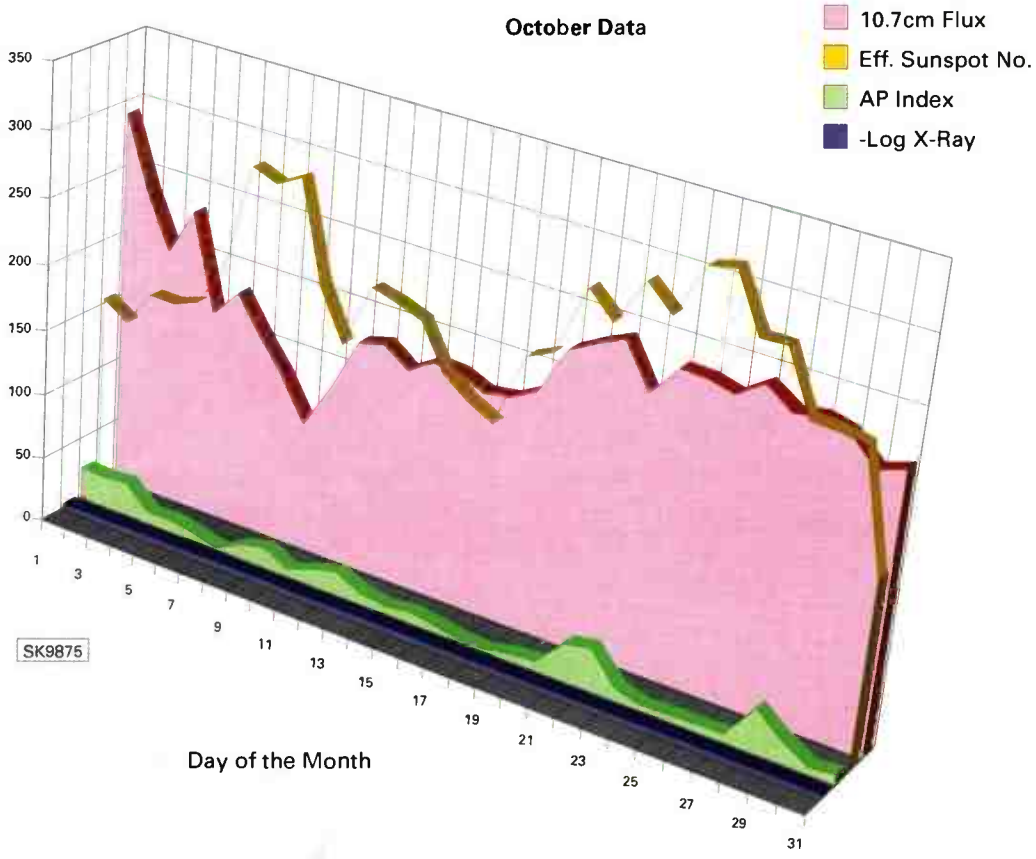
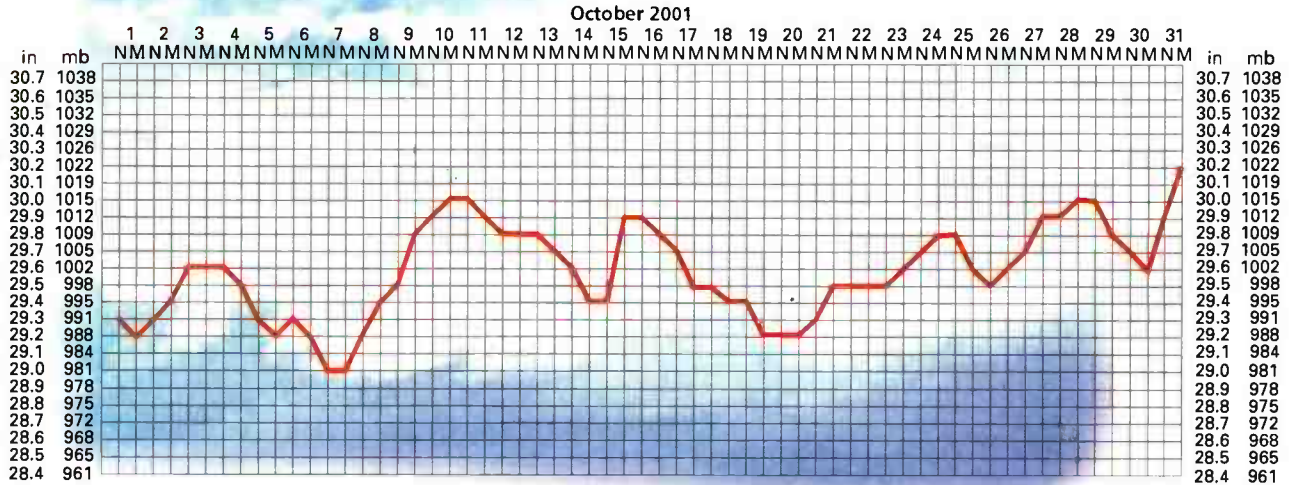
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Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, October 2001.



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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New for 2002

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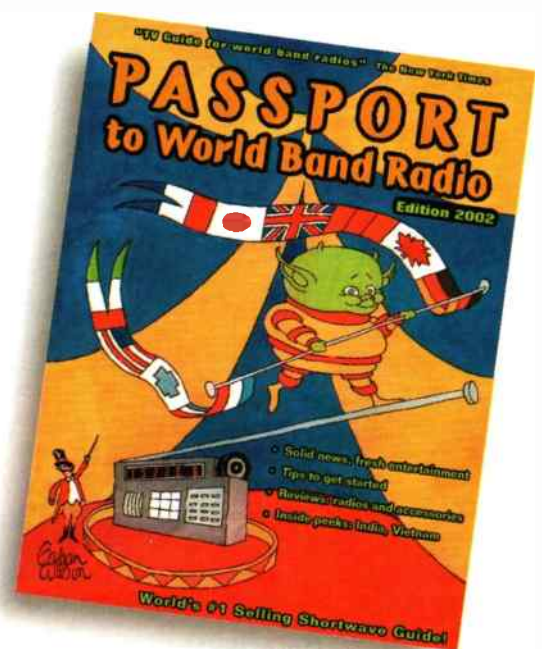
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Attention-123!

Recent Non-Developments

Since the events in New York on September 11th, there has been no marked increase in CIA numbers transmissions. This may seem surprising to many, but we tend to neglect the likely role of MI6 in passing messages on behalf of the CIA. Unlike the CIA's E5, MI6's E3 is far more 'opaque'. It has a fixed schedule sending a fixed number of 45-minute transmissions daily. Each transmission is of a fixed length: 200 groups. Fixed schedules and transmission lengths were features shared by OLX and Swedish Rhapsody, amongst others, and this makes actual message content impossible to determine.

It is therefore certain that much of E3's traffic is dummy and such blocks are merely used as fillers. Actual message text will only take up a proportion of this space, but this proportion will naturally tend to increase in times of international tension. As the transmitters are located in Cyprus, this makes E3 ideally suited for Middle-Eastern reception areas. We can safely assume that agents and illegal operating for the CIA (as well as MI6) will be making use of the Lincolnshire Poacher transmissions and that the true message traffic content will have increased considerably since September 11th.

Special forces may also be using E3, but are more likely to use their own communications systems. On h.f., transmissions from UK (Eywas Harold) and Cyprus (DCN Akrotiri) are likely to be in Morse and erratic. As with the usual numbers stations, groups of figures or letters are used whenever encryption is needed. Regularly changing call signs (made up of mixed letters' figures) and frequencies are a feature of special forces transmissions - so this is what we should be looking out for. Where instant tactical communications between forces is required, scrambled voice transmissions are usual, each 'over' being characterised by a short synchronisation burst. These systems usually operate in a military-style two-way (or multi-way) nets, unlike the Numbers Stations which broadcast 'blind' in one direction.

Some Recent E5 (CIA) Transmissions Include:

Date	Time	MHz	Schedule No	Group Count
14 Jun	1900	10.643/12.197	466	212
26 & 27 Jul	2100	8.080/10.321	863	158
03 Aug	2100	8.080/10.324	707	65
19 Aug	1800	11.072/13.465	297	174
02 Sep	1800	11.072/13.465	?	?
10 Sep	1900	11.564/13.450*	?	189
16 Sep	1800	11.072/13.465	446	164
20 Sep	1800	11.072/?	?	?

* in broadcast band.

The above is an example of typical evening activity, (SNs and GCs given). 11.564 was colliding with Mossad's EZI on 11.565MHz. Unlike the Russian stations, scheduled tend to be short lived and lack yearly or monthly patterns. GCs have a maximum of 225

Single Letter Transmissions

Talking of Russians, there was an odd E6 transmission at 0908 on 19th September. A rare 'F' Single Letter Transmission was operating erratically on 6.870MHz seemingly in m.c.w. - very strong and clear. At 1915, the E6 call 178-00000 started possibly on the same carrier with the 'F' superimposed for a few minutes before suddenly stopping. It isn't certain whether the SLT and E6 were sharing the same carrier. Possibly the E6 carrier was running at 1908 and the SLT was sending in i.c.w., but at around 1kHz offset from this carrier - giving the impression of m.c.w. - but the timing of these transmissions and the closeness in frequency and strength all suggest that both came from the same transmitter.

A while ago, people were speculating that the SLTs were dying off. This is far from true for the cluster SLTs period of erratic activity has stabilised into the usual continuous 'C' and 'S'. These can be heard in all cluster bands: 4.556, 5.154, 7.039, 8.495, 10.872, 13.572, 16.331 and 20.048MHz when conditions are favourable. (I'm not sure whether the 3566 band is operating at present). 'M' and 'F', normally only audible in the Far East, are now being heard here. It's no longer unusual to hear four SLTs clearly in the same band - all offset in frequency by fixed amounts. Solitary (non-cluster band) SLTs are also still very active,

either continuously or for short periods. SLTs are still a mystery, although they've been with us for 40 years or more.

Family III

E11 (the English language member of Family III) sent an unscheduled transmission at 1830 on 19th September on 5.624MHz. Although the ID was missed, it was almost certainly the 'Special' ID of 121. This ID, usually used by M3, has no fixed schedule, always sends messages and has far less conservative GCs than any other Schedule Number. Instead of the usual GC of around 50, ID 121 GCs can run from the 20s to over 100. In this case, the GC was 32. The mode of transmission was u.s.b., rare for this family, but also noted as being used by certain other English language SNs.

A Very Strange Clandestine

Although not strictly a numbers station 'Seda ye Mojahed' (Voice of Mojahed) does send messages of some kind. Operating around 10.230 and 13.430MHz, a repeated loop is sent for hours, usually with jamming. To avoid this, the frequency regularly moves by up to 25kHz either way. The loop tape consists of brief announcements followed by about a minute of speech, sometimes interspersed with music. Any information on this station, not least what the announcers are saying, would be very welcome.

Sudden Change On 4.710

A 24-hour teleprinter transmission transmits on 4.710MHz from the US site at Barford St John, Oxfordshire. It has parallels on 6.702 and 9.000MHz, which come from elsewhere. On the evening of September 11th (day of the terrorist attack), this transmission was very busy and seemed to have changed speed. It would appear that the usual signal heard is an idler as the post-September 11th traffic is much slower and has far fewer breaks.

The CIA and US Embassy, London, have long operated from Barford (and have their own secure compound at USAF Croughton, the receiving and control site), and it's very likely that this transmission is associated with them, rather than USAF operations, and it could well have replaced the CIA's KRH50 call which operated in Morse for many years until it ceased in the early 1990s. KRH50 sent a continuous 24-hour idler loop from Barford on several parallel frequencies.

V2 Goes Public!

An interesting piece appeared in the *Miami Herald* on 22nd September. In an article about the arrest of a Cuban spy, Ana Belen Montes, a senior analyst at US Defence Intelligence HQ, an enlightening reference to her communications channel was given. She 'maintained contact with her handlers by calling their beepers from pay 'phones and punching in coded numerical sequences'. Secretly entering her flat, the FBI found her computer and recovered on its hard drive, tips for radio reception and references to 'the numbers that you receive via radio'. A short wave radio was also found, and the FBI identified 'text consisting of 150 sets of numerical groups'. The text begins '30107 24624...' and continues until 150 such groups are listed. The FBI has determined that the precise same numbers, in the same order, were broadcast on February 6th 1999 on a frequency of 7.887MHz by a woman speaking Spanish, who introduced the broadcast with the words, *Atencion!*

Here is our familiar V2, unmistakably described! And here also is evidence that the NSA take our Cuban friends seriously enough to laboriously copy down every single message sent out by this very busy Family XVIII (M8/V2) - as if we didn't already know this!

PQ of London asks what the name of the French Stay-Behind network was called. Actually there were two names: *Rose-des-Vents* (wind-rose) and *Arc-en-Ciel* (rainbow) - a change from the usual sword-names used by most other countries.

Thanks to Chris for his contributions. In the next issue, we'll include his thoughts on those mysterious 'Jet' noises heard all over the h.f. bands over the past few years. Also, don't forget that ENIGMA 2000 can still be contacted at their usual E-mail address. Until next time, 73 and good listening and please send us logs of anything interesting you may hear.

■ PETER BOND, c/o EDITORIAL OFFICES, BROADSTONE

■ E-MAIL: skyhigh@pwpublishing.ltd.uk

Sky High

The monthly look at Civil and Military Airbands with Peter Bond.

Strike Against Terror

Whilst troops and equipment were deployed to the region, after a restrained 26 days, the combined forces of the USA and the UK finally made their move against the terrorist forces on the 7th October. As possibly expected, the UK saw very little extra air traffic, apart from transport flights and several deployments of tankers, (KC-135 and KC-10), which passed through Mildenhall on the weekend of the 22nd/23rd September and in early October.

Initial attacks were made from Aircraft Carriers and by sea launched cruise missiles, and then by B-1s and B-52s, operating from Diego Garcia. These were complemented by B-2s making the long round trip from their home base of Whiteman, with an engine running crew change at Diego Garcia. One B-2 flew a 44 hour mission, which is the longest

combat sortie in the history of aviation.

One significant movement through Mildenhall was NKC-135B 63-8050, callsign AGAR 50. This aircraft was converted in 1996 to take part in the Airborne Laser Programme and can deploy dramatic Electronic countermeasures. It was at Mildenhall awaiting Diplomatic Clearance and when issued, was deployed to the Middle East. The NKC-135B was refuelled by a KC-10 out of Moron in Spain, callsign ETHYL 01. Does anyone know which unit uses this callsign?

The carriers USS *Carl Vinson*, USS *Independence* and USS *Kitty Hawk* are already in action with the USS *Theodore Roosevelt* due to arrive by late October. (It would be quite a sight to see four carriers operating simultaneously). By mid October, air superiority seemed to have been achieved relatively easily and this brought a slight change to the plan with the mighty AC-130 Gunships being brought into action.

As predicted, varying forms of self imposed censorship have been applied to Internet Newsgroups, etc., and current information for this column is rightly scarce. There is the argument that if airband/aviation Internet newsgroups were in any way a threat to the security of our forces, then they would have been shut down by the government some time back. There is of course a lot of credence to that argument, but I still think that an element of self regulation is prudent.

I do not subscribe myself, but on a friend's computer I have recently seen some of the postings in the past month on mil-spotters-forum. It just proves to me that within this hobby there are many people with common sense and I am sad to say some very misguided people!

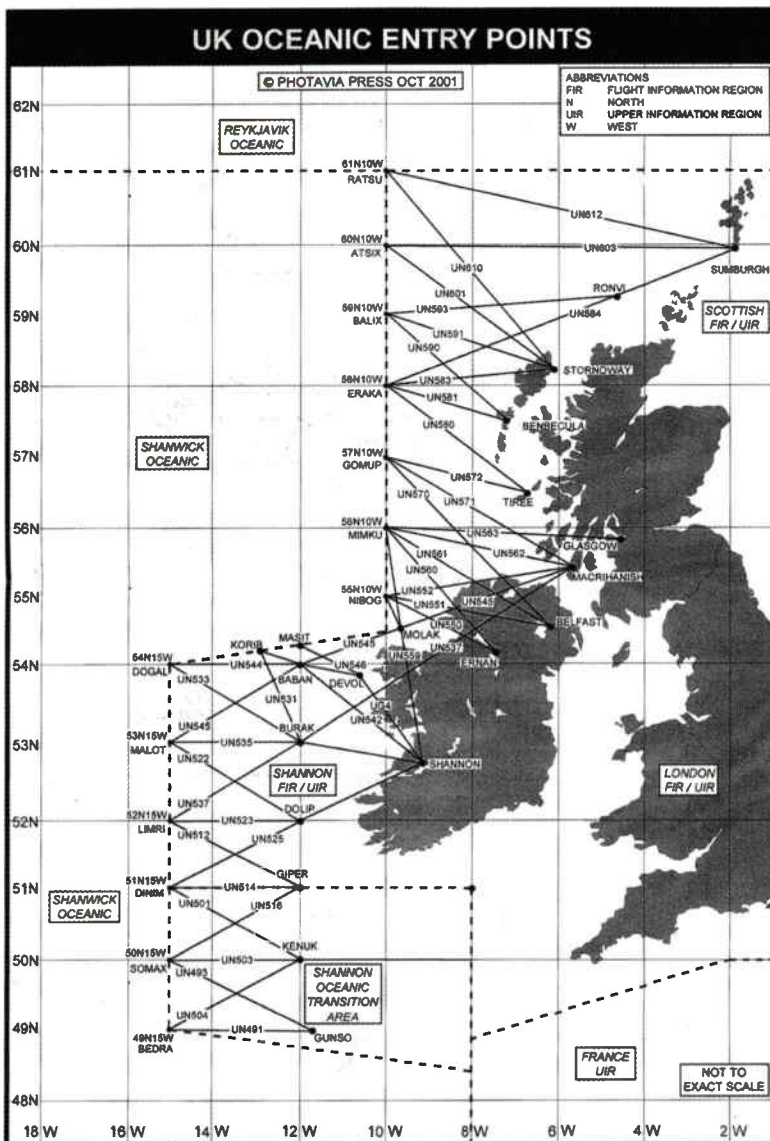
Unlike the Gulf War, this conflict is going to be much less 'Televisual', particularly from an aviation/airband point of view. Because of security, the remote location, lack of direct Television reporting and few aircraft operating from Europe, access to information such as callsigns, etc., (even as historic information), is going to be greatly reduced, especially compared to the conflict in 1991. I will report back whatever I can, but if the conflict does continue for a long time, how much information becomes available is open to debate - watch this space.

The actual number of aircraft deployed from the USA seems to have been limited with resources already in Europe and the Balkans being possibly re-deployed. The few aircraft noted crossing the Atlantic seemed to route well south, with one report indicating that some routed via the Azores. With air traffic on v.h.f./u.h.f. not being as prolific as might have been expected, several correspondents have been monitoring h.f. with a reasonable amount of success. Propagation has been a bit up and down with signal strength variable, but Emergency Action Messages (EAM), from Andrews and Offutt have been heard booming through on a number of occasions.

As might have been expected in the month since the attacks, there have been loads of REACH transport flights across the Atlantic with tankers noted using regular callsigns such as ESKAN, RAID, RATS, RESORT, SHELL and STARKY. The only Trans Atlantic fighter movements reported to me, (all on 11.175), have been on the 15th September when GOLD 51 was heard escorting TREND 31-35 and GOLD 61 with TREND 41-43.

On the 9th October SLIP 71-72 were heard talking

Fig.1: UK Oceanic Entry Points



to Lajes, but no tanker callsign was noted. **John M** reports hearing Stray 11-16 Flight talking to Lajes on 11.175, (22nd Sept), which is odd in the fact that they are not using a deployment callsign similar to the other flights? Two callsigns were noted on h.f. during this period which are not known to me, on the 14th September, CORSA 74 called for weather information, plus on the 23rd September HIBALL 91-92 were heard asking for a 'phone-patch to CHINDIT or CHINDIP Ops. Can anyone identify them?

An intriguing report from **Martin M** who reports that he has heard aircraft calling Diego Garcia Tower on h.f. on 13.254. On the 16th and 17th October he heard NOVA 71 and 72 asking for weather and a 'phone-patch and also several REACH flights, (REACH 713Y, 724Y and 730Y). One of the REACH flights asked for arrival information to be passed to RED CROWN, which I guess could be AMC Ops? I have tried the frequency myself and an aircraft was heard faintly giving its type as a Boeing 747, but I could not identify the station as Diego Garcia.

Oceanic Entry Points

Entry into Oceanic airspace on the West side of the UK is made via thirteen primary Oceanic Entry Points. These are all spaced by one degree of latitude from the Northernmost at 61°N 010°W down to 49°N 015°W in the South. In the past they have always been referred to by their Latitude and Longitude co-ordinates, but from the 4th October 2001, they have all been given five letter reporting point names.

Six further Oceanic transition points on the boundaries of Shanwick, Madrid UIR and Santa Maria Oceanic, (45°N to 43°N), have also been allocated names. Unfortunately the AIRAC that refers to these changes is not on the official web site so the following list has been assembled with the help of several informed sources, (see **Fig. 1**).

Position	New Ident
61°N010°W	RATSU
60°N010°W	ATSIX
59°N010°W	BALIX
58°N010°W	ERAKA
57°N010°W	GOMUP
56°N010°W	MIMKU
55°N010°W	NIBOG
54°N015°W	DOGAL
53°N015°W	MALOT
52°N015°W	LIMRI
51°N015°W	DINIM
50°N015°W	SOMAX
49°N015°W	BEDRA
45°N010°W	DIXIS
45°N011°W	BERUX
45°N012°W	PITAX
45°N013°W	PASAS
44°N013°W	OPAS
43°N013°W	RASIX

GHFS/Architect

As soon as my copy had gone off to the Editorial Offices last month my suspicions were apparently confirmed. It appears that the RAF in the guise of 'ARCHITECT' were guarding the US Global station Croughton whilst maintenance work took place. On

the 20th September, 'CROUGHTON MAINTENANCE' were heard making calls to ANDREWS for a radio check, there was no reply from Andrews, but a reply did come from CROUGHTON GLOBAL, (presumably Andrews controlling it remotely). Further calls were made to Croughton Global and Ascension indicating that the system was not yet reliable. Further test calls took place over the next few days and then Croughton came back on line as normal.

It was also noted that the RAF 'CYPRUS FLIGHT WATCH' was also guarding Croughton during the first two weeks of October. A call was heard on the 12th to Cyprus from Croughton stating that all frequencies were now back on line as normal, but Croughton were still doing radio checks with RAF Cyprus Flight Watch on the 20th October. (*Still ongoing at time of going to press, 1 November - Ed.*)

Snippets

- By the time you read this Concorde will hopefully have restarted operations on the 7th November.
- Aberporth has new 4 letter ICAO airfield code of EGFA.
- The Naval Air Days at Plymouth used 265.7 for a display control frequency, this is a Royal Navy Fighter Control frequency.
- Bournemouth/Hurn has replaced their Approach frequency 119.625 with 119.475.

Digital Airband?

My thanks go to one of our American readers, **Bob** in Cleveland who has E-mailed me a magazine cutting, regarding Digital Airband, (source unknown).

The Federal Aviation Administration have awarded a multi-million dollar contract to a US Aerospace Communications company to develop a multi-mode v.h.f. digital airband radio system. The new system will be the FAA's first step towards the next generation of air/ground airband communications, which will be centred around digital replacing analogue transmissions. It will also provide the necessary equipment, capable of coping with the expected future expansion of Air Traffic in the USA. (The current situation is obviously going to alter the predicted rate of expansion). The 'NEXCOM' digital radios will enable Air Traffic to expand the number Sectors/Frequencies available within the limited v.h.f. airband spectrum.

These new digital radios will be more cost effective as they will apparently require less maintenance, the chance of interference is much reduced and they can provide better security by reducing the chances of unauthorised use. The new radios will be capable of using both the a.m. analogue 8.33kHz and 25kHz double side bands plus VHF Digital Link Mode 3 technology which can integrate both digital voice and data.

The predicted time scale is for the radios to be available as an upgrade to existing analogue radios towards the end of 2002. Initially, the two systems will run as a coupled system at US ATC On-Route Centres, once they have been fully evaluated and tested the plan is to install them at over 1500 remote transmitting sites which serve the 21 Air Traffic Control Centres in the USA.

With the world of Satellite TV and radio already moving rapidly into the world of digital technology, we are looking at the shape of things to come for the airbands. Looking at the time-scale involved for evaluation and installation, I would imagine it would be at least 5-10 years before it is fully operational in the USA and possibly longer before the UK makes the transition to digital airband. The time and money involved in converting the radios in thousands of aircraft in itself will take many years. That in theory gives AOR, lcom and the others plenty of time to design some new digital airband receivers for the enthusiasts market, but it will be very much subject to the type of digital system in use.

All digital systems are subject to some form of encoding/decoding, but the important thing is as to whether any form of encryption is used. My interpretation of the US system is that the signals will not be encrypted, but if some of the modern digital encryption systems are employed then the hobby of monitoring the airbands may become a thing of the past. At least it will be quite a few years before we have to worry about that!

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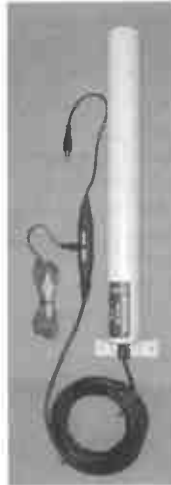
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Roberts

The first subject this month covers similar questions from two different people using receivers from the same manufacturer.

First up is **Andy Robins** who listens to s.w. radio using a Roberts portable radio. It has s.s.b., c.w. and b.f.o. and will receive frequencies of 1.711 - 29.999MHz, and a 10m wire antenna which was bought with the radio. Unfortunately, Andy does not reveal the exact model of radio he has, but I am going to assume that he has one that can resolve s.s.b. signals.

Andy says that he has been reading recent copies of *SWM* (always a good start!), and he realises that there are a great deal of interesting signals to listen to, but he does not seem to be hearing any of them. Andy wants some advice about what type of equipment he needs so that he can listen to aircraft, marine band, etc.?

Well Andy, assuming that your Roberts radio does have some kind of setting to allow you to hear s.s.b. signals, then you should have all that you need. Attach the 10m wire antenna that you got with the radio, and try to get it as high and as straight as possible, ideally down the garden if possible. The next thing is to tune to a suitable frequency (see below) and then set the radio so that it will tune an s.s.b. signal. Without knowing which model of radio you have, this is very difficult to describe, but it will be fully documented in the handbook for the radio.

A very good starting frequency for marine signals is **2.182MHz**, which is the 'International Distress & calling Frequency'. After listening for about five minutes, you may wonder why you have not heard anything, but this is quite natural - some frequencies remain inactive for many hours. This particular frequency is a very good place to start because there is a set 'silence period' of three minutes starting at the top of each hour (known as H+00) and also at 30 minutes past each hour (H+30). However, immediately following these 'silence periods' you will find that many coastal stations will broadcast messages about navigation warnings, and also 'ship lists' (the call signs of vessels for which they have messages).

So the first test is to make sure that you can hear these coastal stations and their broadcasts. Assuming that you can hear them, the coastal stations will usually announce that they will be transmitting more messages on another frequency, so now you get the opportunity to practice re-tuning your radio to the new frequency, and making sure that you can hear the signals on that frequency. At first you probably will not understand much of what is said, but initially that is not important, because you are now hearing the signals, the next lesson (and it's a big one!) is understanding them.

At about the same time I received a letter from **A.H. Harrison** (if I can read his signature correctly) up in the north of England. He has a Roberts R9914 radio, but says that he is a bit disappointed because he has not heard any aircraft transmissions. Unfortunately, A.H. has discovered that he cannot have an external antenna, and he has no access to a loft so he cannot place an antenna in there.

A.H. told me all about the markings on his radio, about all the various broadcast bands that it covered, but not whether it was able to resolve s.s.b. signals. Following a quick session surfing the Internet, I found details of his radio, including a picture of the radio and also the fact that it *does* resolve s.s.b. signals.

The markings on the front of the radio are the broadcast bands, using a.m., where the radio can be tuned to, but to hear aircraft transmissions you will need to tune to other frequencies between the broadcast bands. I am not familiar with the operating of the Roberts R9914, but once again there will be full instructions in the user guide for the radio.

A good place to start when listening to aeronautical h.f. signals is the various VOLMET broadcasts across the h.f. bands. These may seem to be boring and repetitive, but if you can manage to tune into these broadcasts and understand what they are saying, then everything else is just as simple. There are several good frequencies to start with if you are in the UK. Try **5.505** and **8.957MHz** - these are both used by Shannon Aeradio in Ireland for weather broadcasts, so they should give a good signal over most of the UK. Next, I would try the RAF VOLMET service on **5.450** and **11.253MHz**; these are also very good signals over the whole of the UK, but they do use some different terminology. The object of this exercise is to ensure that you can tune your radio to the correct frequencies, and that you can hear the transmissions.

You do not necessarily have to fully understand everything that you hear, so long as you can hear the voices and understand a little of what they are talking about. These VOLMET broadcasts are almost continuous, with usually no more than a few minutes break each hour,

so you should hear something quite soon after tuning in to the above frequencies.

The next step is to find a 'real' aeronautical frequency - one that is actively involved in controlling the passage of flights from 'A' to 'B'. From the UK there can be no better than flights crossing the North Atlantic. These flights are controlled by Shanwick, New York (USA) and Gander (Canada). I would strongly recommend that you start with **5.616** or **5.649MHz**, as these seem to be regularly busy with flights.

Even a short 30 minute listening period will find plenty of flights and signals to listen to. Once again, you may not understand everything that you hear, but that comes with patient listening. Please keep in touch and let us know how you get on.

One of the most important things to remember when listening to ATC communications on h.f. is that the signals vary in strength from aircraft to aircraft, and from the various ground stations - there are times when you will only hear one side of a conversation. There may be periods with very little activity, and then suddenly the airwaves will seem to come alive with a burst of activity.

Afghanistan

I have deliberately avoided mentioning the events in Afghanistan in recent columns, primarily because I had so little to write about. Another reason is that the long lead-times between column preparation and magazine publishing dates means that anything that I prepare today may be radically different from what is happening six weeks later when the magazine appears.

As I started to write this column the bombing flights against Afghanistan have been operating for a few days, but the support flights have been operating for the past four weeks.

The support flights are using standard 'Reach' call signs with a numeric 'fight-number' with a 'Y' suffix. The first few days were quite chaotic as flights tried to keep quiet about their ultimate destination - including some very interesting ones in the former Soviet republics. The communications via the standard GHFS frequencies have been very interesting and quite revealing at times.

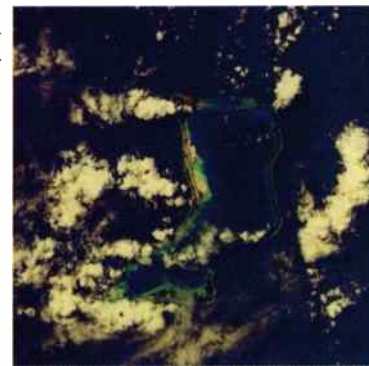
Once bombing flights commenced in early October it took a few days for active frequencies to be found. The island of Diego Garcia in the Indian Ocean has become a hub of activity, and their h.f. ATC frequency on **13.254MHz** has been extremely active with long-range bombers and support flights arriving and departing at all times of the day. Many of the flights have been heard working civil ATC stations in the SEA-1 network on **11.285MHz** (also try the other SEA-1 frequencies - 3.470, 6.556, 13.318 and 17.907MHz).

One significant change is that the Cyprus Flightwatch part of the RAF h.f. network has taken on additional responsibilities. With effect from the middle of October it has been operating on several GHFS frequencies, including passing EAMs and 'Skyking' messages. See else where on this page for a copy of the official NOTAM announcing this change.

This is the situation as I write these words during the middle of October, but who knows what might happen between now and the end of November when you will be able to read this column.

Cyprus Flightwatch NOTAM

"AIR/GROUND FACILITY CHANGED EFFECTIVE IMMEDIATELY, CYPRUS FLIGHTWATCH WILL PROVIDE HF VOICE FREQUENCY SUPPORT TO ALL US AIRCREWS, GROUND STATIONS, AND SHIPS IN SUPPORT OF OPERATION ENDURING FREEDOM ON 8.992 AND 11.175MHZ UNTIL FURTHER NOTICE. CYPRUS FLIGHTWATCH WILL BROADCAST HF ADVISORY TRAFFIC VIA 8.992 11.175 AND 11.244MHZ WHEN REQUIRED BY THE APPROPRIATE RECONNAISSANCE OPERATIONS CENTER. PHONE PATCH SUPPORT WILL BE SUPPORTED AS WELL. 12 OCT 18:25 UNTIL 31 DEC 23:59"



Diego Garcia, as seen from the orbiting Space Shuttle Courtesy NASA.

Web Watch

You may find the following web pages useful in conjunction with the above items.

<http://www.robertsradio.co.uk> - Roberts Radio

<http://www.dg.navy.mil/> - official US Navy Diego Garcia web-page

<http://www.cwnetdg.io/> - one of the few civilian companies with a presence on Diego Garcia

<http://www.infoplease.com/spot/dg.html> - just where is Diego Garcia?

<http://members.tripod.com/~cartoonlife/diegoinfo.html> - a diagram showing the layout of the island and where it is located in the Indian Ocean.

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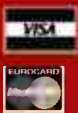


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Amateur Bands

As the evenings draw in I suspect we'll all be spending a little more time in front of our radios listening intently and collecting call signs. This month I've been doing some research on where to find out what's happening on the DX scene. Most of the research involved looking on the Internet, which is the obvious place to go for up-to-date news.

If you're one of those readers who doesn't expect to ever get a computer, then don't worry. This column isn't going to become all about computers! But there's no denying that the Internet is an extremely useful tool, and if you're after up-to-date information, it's the only place to go.

Which Receiver?

Before I get to the results of my Internet enquiries, you may recall that in last month's column I discussed the features to look for in an amateur band receiver. No sooner written than I had to put theory into practice, and buy a receiver for my father-in-law. Taking my own advice, I looked at the second-hand market. With a fair selection to choose from, I went for an AKD HF3. Apart from being well within budget, it was so easy to use!

Important for a listener whose last serious radio operating was done on a 19 Set (pause for old signallers to emit nostalgic sighs) surrounded by hot sand. One of the radio's features which I particularly liked was the speed with which it could be tuned around the bands, an area in which some more expensive sets didn't score as well in my book.

I'd like to hear your views on the receivers you use. What's good and what's not so good. Are there some features on your set that you really couldn't do without? I'm not looking for mini reviews, just some brief comments that might be worth passing onto other readers.



What's Going On?

So how do you find out where the interesting amateur activity is going on? I could be arrogant and suggest you only need to read my column! In fact, there's no great magic to discovering where the rare DX will be popping up as it's virtually all on the Internet. A good site to check for DXpeditions is 425DXNews at www.425dxn.org/425/indbulle.html which is regularly updated. If there's going to be any out of the ordinary operating taking place, it will be on the site. In fact, most other sites seem to get most of their information from this site.

Inevitably, a fair amount of operating from rarer locations involves visiting obscure little islands. This brings me nicely onto IOTA (Islands on the Air). The purpose behind this very popular activity is for amateurs to operate from as many of the world's islands as possible.

Have a look at www.rsgbiota.org/ for more details. It can involve a major logistical exercise making visits to some of the islands, not to mention considerable expense. So spare a thought for those mad souls who go to the ends of the earth to activate those rare call signs so that you can fill in your logbook.

Here are a few island related snippets that I've pulled off the 425DXNews site. Ann FS/W2AZK and Brian FS/KF2HC will be active from Saint Martin in the

West Indies from November 26th to the December 2nd.

Look at www.qsl.net/ce9c for more information about the Southern Cross DX Group's plans for DXpeditions, including to the Chilean Island of Hornos (Cape Horn) CE9C around December/January.

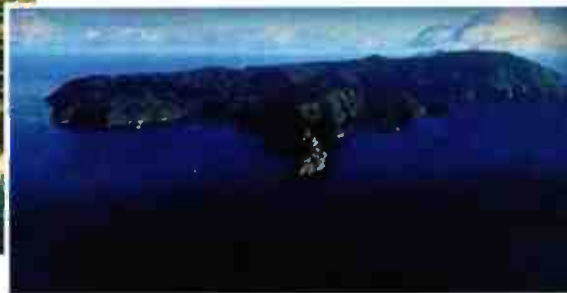
Adi YC3MM

hopes to operate from Siberut Island off the south west coast of Sumatra as 8A5 something during the latter part of December. This location was activated for the first and only other time less than five years ago. Must be rated as pretty rare!

An expedition to Costa Ricas Cocos Island TI9M is scheduled to run from February 17th 2002 for 16 days. Once again there's a web site for the Cocos DX Group which can be found at

www.qsl.net/ti2hmg/cocos.htm The pictures on the site tend to suggest that being on that island won't be too arduous!

Unless your geographic knowledge is encyclopaedic, a good atlas is somewhat essential



to locate some of these islands. As good as the usual amateur radio maps and atlases are, the scales used mean that many of the smaller islands are not shown, or if they are they aren't labelled. This is particularly so for those islands which don't have their own prefixes.

More Sites

Back to the web sites. The **International Short Wave League** can be found at www.iswl.org.uk I don't have space this month to do the organisation justice, other than to say that it's a major player in the listening arena, so more another day.

Finally, take a look at G4NJH's amateur pages at www.innotts.co.uk/~asperges/mmenu.html which cover a variety of amateur radio related subjects.

I hope that you'll find something to help on some of those pages. I'm sure you will.

Finally

Do keep the logs rolling in please, and address them to **Clive Hardy, SWM, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or to clive@pwpublishing.ltd.uk If you write, a daytime 'phone number would be very helpful.

Good listening!

The Amateur Bands (h.f.)

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40	7.000 - 71.000	
80	3.500 - 3.800	
160	1.8000 - 2.000	

By convention, c.w. (morse) is used in the lowest frequencies of each band.

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Info in Orbit

My thanks to those who wrote about their own experiences of dismantling and re-installing WXSAT systems in new premises. I am obviously not alone! Repeated forecasts of stormy weather made me nervous about leaving my h.r.p.t. dish outside while it remains temporarily installed at ground level. As at mid-October, I have been unable to find the time to install the new steel mast that I have ready to provide a sturdy mount for the dish. It is to be set in concrete and will provide an excellent permanent mounting for the rotator and dish, but the combination of a few days of illness, writing commitments and job-hunting delayed installation yet again. The illness was little more than a common cold, delivered unwittingly by daughter Cathy whose son (at nursery) picks up any illness that is available! It is really nice to be able to host such visits, even if they do sometimes bring unwelcome viruses! On their next visit, I plan to show grandson Joseph (aged two and a half) how to drive the dish...no better way to catch them young!

WXSAT Operations

I really thought that we had lost NOAA-16's WXSAT capability, following the significant drop in transmission power from an h.r.p.t. transponder. NOAA-16 was launched last year, and had been anticipated as the provider of mid-day (and therefore the best) a.p.t. and h.r.p.t. imagery. Unfortunately, following a period when its a.p.t. (137MHz band telemetry monitored by thousands of users) was temporarily switched off, then re-activated, the 137.62MHz transmission failed. The problem was later identified as most probably due to a faulty r.f. (radio frequency) switch and could not be fixed.

On 28 September, the power output from the 1707MHz h.r.p.t. (high resolution) transponder - called SBAND-3 - unexpectedly decreased, causing great concern amongst a large number of users, both professional and amateur, particularly those with antennas less than 3m. On 9 October, NOAA scheduled a frequency switch for NOAA-16 from 1707 to 1698MHz at 0009UTC, and on NOAA-14 from 1698 to 1707MHz at 0008UTC. To the great relief of all h.r.p.t. users, this restored power levels to their former values - and possibly even higher, according to some reports.

Just prior to the early reports of power reduction, I had dismantled my h.r.p.t. dish because of forecast storms. These failed to materialise, but new storms were then forecast before I had even re-mounted the dish - so I waited a few more days. NOAA operations performed the frequency switch for NOAA-14 and NOAA-16, and one day later (on 10 October) my dish was re-installed. I saw no reference to observations of the new transmissions, so I waited with anticipation for the first NOAA-16 pass - and was delighted with the result.

The image shown in Fig. 1 shows the image

with artificial colour enhancement (channels 1, 2 and 4 simulating red, green and blue). Signal strength seemed to be greater, and this was apparently confirmed by measurement. Meanwhile, NOAA-15 has continued to provide both h.r.p.t. (high resolution) and a.p.t. (low resolution) images, of which Fig. 2 shows a near infra-red (channel 3) image of Italy received during the evening. The clarity of the lakes and terrain is quite outstanding in these images.

Meanwhile, we really do seem to have lost RESURS 01-N4, at least according to my log. I have not recorded any signal from this WXSAT for over a month, despite the routine issue of predictions from the Bureau of Meteorology in Melbourne, Australia. As at mid-October, I have sat through several passes of RESURS without recording a single transmission.

Winter - Low Illumination

The approach of winter seemed very rapid when I looked at my NOAA images on a mid-October weekend. Afternoon NOAA-12 and NOAA-14 visible-light images received in October had lost their summer sparkle, leaving only the western parts with any degree of illumination.

Kevin Hughes E-mailed an image of METEOR 3-5 received in October. It is a bright image because of the time of the pass - nearly mid-day. The orbit of METEOR 3-5 precesses fairly rapidly, and by 30

November the WXSAT will be passing north-bound around 1900UTC during the evening in late autumn, and therefore may not be transmitting. Morning passes then occur around 0600UTC and are therefore in darkness over Britain, so again the spacecraft will not be transmitting. By 31 December, we might just hear METEOR 3-5 transmitting during north-bound passes around 1500UTC, assuming the WXSAT has been switched on.

STOP PRESS: NOAA-14 Hits Problems

At approximately 1955UTC 18 October, the NOAA-14 AVHRR scan motor current suddenly increased



Fig. 1: NOAA-16 1219UTC 10 October h.r.p.t. image.



Fig. 2: NOAA-15 1819UTC 14 October channel 3 enhanced.



Fig. 3: NOAA-12 1445UTC 14 October 2001 h.r.p.t. image.



Fig. 6: NOAA-16 14 October 1317UTC from Mike Jupp.



Fig. 7: NOAA-16 7 October enhanced h.r.p.t. image from Jeff Kelly.

indicating a probable failure similar to the problem on NOAA-15. At 1205UTC 19 October, the NOAA-14 Manipulated Instrument Rate Processor was switched to internal synchronisation so instrument data other than the AVHRR could be processed. At this time, AVHRR will be severely degraded most of the time. NOAA and NASA engineers are investigating the problem and possible solutions.

SICH-1 & OKEAN Transmissions

These are rare! **Ian Deans** reported signals heard from SICH-1 on 137.375MHz in late August. This is therefore still off the nominal frequency of 137.40MHz, and may not be receivable using a non-tunable receiver. This followed another report of a SICH-1 transmission that apparently broke the silence from SICH-1 since July 2000. **Mike Jupp G1HWY** kindly provided a superb image from OKEAN-O received in late September.

Mike has a web site that includes an archive of recent OKEAN-O images, with the latest received on 14 October totalling nine. Also on his site are WEFAX images from METEOSAT-7, obtained using his 800mm offset-dish, RIG active-feed and downconverter (an excellent system that I reviewed some months back). Mike uses a Timestep Proscan receiver for a.p.t. reception, and has also installed the Timestep h.r.p.t. system, including the receiver and interface for the Chinese c.h.r.p.t. satellite FENGYUN-1C. I am pleased to say that I have just received the latest receiver from Timestep that includes the specification to receive FY-1C, and hope to report on it - particularly after re-adjusting the figure of my h.r.p.t. dish that still has the scars of wind damage!

As Mike comments: "If you really want superb WXSAT images, have a go at h.r.p.t. Resolution is 1.1km/pixel against 4km for a.p.t.". As Mike says, you can buy a complete system, or you can build one yourself. Mike's page <http://get.to/g1hwyt> includes three links where advice can be obtained: **Wil Pfeifer**, **Rob**

Alblas, and the NOAA95 page. For my own review of the Timestep h.r.p.t. system, this was

published in *SWM* a few editions back (*February 2001 - Ed.*)

The image shown in **Fig. 7** is a false-colour NOAA-16 h.r.p.t. image of Afghanistan received and initially processed by the Satellite Active Archive at NOAA, from 7 October.

Following the inclusion in this column of contrail pictures sent in by readers, **Stan Ames G4OAV** E-mailed me: "I have seen the circular contrail patterns recorded by Mike Jupp and David Taylor before. They are almost certainly military aircraft - AWACS - flying in endless circles for hours. The previous image seemed to start in East Anglia and move out into the North Sea showing a circular trail of approximately the same appearance. I wonder if there is a NATO or other airbase near Oslo where the trails are oldest and most diffused". Stan added that he has had some nice Greenland images from METEOR 3-5, reaching well out to the west, with occasional glimpses of Newfoundland.

Software - Three Updates

It occurred to me that although I have spent some time acquiring and then upgrading WXSAT-related software for my own use, others - particularly beginners who have not gone through the search process - might welcome some pointers to essential software. The well-equipped WXSAT station has to have a satellite tracking program, and we are blessed with an excellent choice of freeware. Note that in some cases users are asked to consider making nominal contributions to support further software development.

If you use Les Hamilton's *Footprint* program, you will be pleased to hear that it has now been implemented in 32-bit code, as well as having some other improvements. Download the latest version from: <http://www.riglib.demon.co.uk/footprint.htm>

Craig Anderson recently issued the final release of *wxtoimg* 2.0.8. This is weather satellite decoding software for Windows, Linux, FreeBSD and AIX. This release is a major departure from the previous version, and provides a graphical user interface described below. The software is available for download at <http://www.weather.net.nz/wxtoimg/> and can be used for non-commercial purposes free of charge.

The latest features include: a graphical user interface that combines recording, decoding, viewing and editing functions; doppler correction on NOAA, Meteor and Resurs satellites; NOAA a.p.t. and WEFAX thermal i.r. temperature calibration,



Fig. 4: METEOR 3-5 1115UTC 8 October from Kevin Hughes.



Fig. 5: OKEAN-O 23 September 0833UTC from

temperature under cursor display; automated determination of satellite, command line operation for complete automation; user configurable filtering, despeckling, sharpening, gamma correction, and JPEG quality; creation of AVI animations from a series of images; over-sampling and interpolation option produces larger, more detailed images; automated and user definable image comments; works with communications receivers and scanners, and supports a wide range of enhancements.

David Taylor's program *wxsat* has undergone near continuous development over a period of years, during which David has even set up a mailing list for users to discuss its operation. The program is currently in version V3.1.0, but possibly by next week...! From David's web site - <http://www.satsignal.net> - the main program can be downloaded, followed by the downloading of several libraries that are linked from the same page. I have reviewed this excellent piece of software in previous columns, so I am including it here for completion. If you have never used a tracking program before, this is a must.

Internet Site Update

The Naval European Meteorology and Oceanography Centre (NEMOC) - http://www.nemoc.navy.mil/cgi-bin/sat_page.pl - in Rota, Spain, is the United States Navy's centre for the production and distribution of 'value added' meteorology and oceanographic products within Europe, Africa, the Mediterranean, Baltic and Black Seas.

Images on this page are described as being posted in near real-time, with the inevitable exceptions due to maintenance. Over a period of several days, I noticed that a few images are actually blank - notably the *METEOSAT-5* full disc infra-red and visible - though there are variations. Images from NOAA polar orbiters, DMSP (the USA Defence Meteorological Satellite Program), *METEOSAT-5* and *METEOSAT-7* are available, and in many formats. Those from the DMSP were unsuitable for inclusion here - some having picture faults, and others lacking detail. Most interestingly (to me, anyway!) was the inclusion of reduced resolution PDUS (Primary Data images from *METEOSAT*) from slots that are encrypted.

DMSP Satellites

The American Defence Meteorological Satellite Program (DMSP) started in the 1960s and is run by the American Air Force Space and Systems Centre (SMC) as part of the programme of the USA's Department of Defence. The DMSP satellites are near-polar orbiting spacecraft in sun-synchronous orbits about 830km high, monitoring the meteorological, oceanographic and sun-earth environment - not totally unlike NOAA WXSATs!

The scanners onboard DMSP satellites provide visible and infra-red imagery from the Operational Linescan System (OLS) and the data is archived. Instrumentation includes two telescopes - one for visible, the other for infra-red - and a Photo Multiplier Tube (PMT). The image scanner detectors sweep back and forth, producing a continuous analogue signal. This is sampled at a constant rate such that the pixels produced

represent ground data 0.5km apart, totalling 7,325 pixels across the swath.

OLS data records not only routine weather imagery for the American Defence department, but also aurora and infra-red emissions from the sun and moon, reflected off clouds and other features. Night-time imagery records city light pollution and man-made fires.

International Space Station - Component Launches

STS-108 *Endeavour* is scheduled for launch on 29 November for an 11-day excursion to the *ISS*, therefore passing over Britain each day during the mission. This will be the 12th flight, and carries a payload comprising the Multi-Purpose Logistics Module *Raphaello*, together with another crew rotation.

Next Month

I hope to include the simulated digital images produced by EUMETSAT for development of their next generation satellites. The images are in raw data format and EUMETSAT has provided me with the software to process and display them; unfortunately the program is for a non-PC computer.

The data (on a CD-ROM) has been given to son Timothy (who recently completed his PhD degree in computer science at Cambridge university) who told me that he can probably get access to a suitable computer. When I first started writing this column in the late 1980s, Tim was at school. Prior to that, at the age of six, I showed him how to program our Vic-20 computer that came with 16K RAM, and was our first domestic computer. I learnt machine code and taught him the principles, and he quickly worked out how to interrupt programs and change their direction - thereby guaranteeing to win every game. Now he is writing operating systems for...well that is another story!



Fig. 8: METEOSAT-7 0959UTC 14 October PDUS visible-light image.

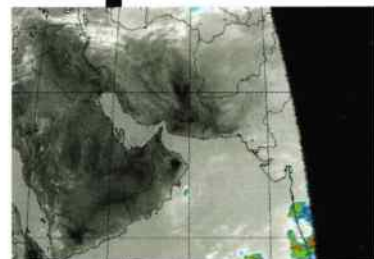


Fig. 9: METEOSAT-7 1019UTC 14 October infra-red image.



Fig. 10: DMSP data flow and control system - courtesy NOAA - see <http://www.ngdc.noaa.gov/dmsp/>

Frequencies

NOAA-12 and NOAA-15 transmit a.p.t. on 137.50MHz.
 NOAA-14 transmits a.p.t. on 137.62MHz.
 NOAA-16 has a failed a.p.t. system.
 NOAAs transmit beacon data on 137.77 or 136.77MHz.
 METEOR 3-5 uses 137.30MHz in sunlight only OKEAN-O, OKEAN-4 and SICH-1 use 137.40MHz for brief transmissions.
 RESURS 01#4 has previously transmitted a.p.t. on 137.85MHz.
 METEOSAT-7 (geostationary) uses 1691 and 1694.5MHz for WEFAX.

Maritime Beacons

During July, August and September the band was searched at night by some listeners for the sky waves from distant beacons, but the streams of data radiated by DGPS stations and a few unmodulated carriers made reception difficult.

Beacons along the coast of Spain at Cabo Machicharo (MA) on **284.5kHz**; Cabo Finisterre (FI) **286.5.....288.57...**; Punta Estaca Bares (BA) **309.5**; also on Majorca at Cala Figuera (FI) **286.5** were heard at night by **Fred Wilmshurst** in Northampton. Strong hetrodynes around **290** and **312kHz**, which Fred was unable to remove by using the facilities on his Icom R70 receiver, prevented him from hearing several beacons logged previously. From the opposite direction he picked up the beacons on the Faeroe Is at Myggenaes (MY) **337.0**; Akraberg (AB) **381.0** & Nolso (NL) **404.0**; also the beacon at Prins Christian Sund, S.Greenland (OZN) on **372.0**.

The Faeroes beacon at Myggenaes (MY) on **337.0** was also noted in a very welcome first report from **Roy Mewse** in Boston, Lincs. There were quite a few other entries in his log, but they proved to be aero beacons, which are outside the scope of this article.

Sky waves from a beacon along the Mediterranean coast of Spain at Cabo de Palos (PA) on **313.0** were picked up by **Fred Pallant** in Storrington. He also heard the beacons at Cabo Machicharo (MA), NE.Spain on **284.5** and Cabo Finisterre (FI), NW Spain on **288.5**.

Some of the beacons along the coast of Spain, Morocco, the Balearic Is, Italy and Sardinia were also heard at night by **Robert Connolly** in Kilkeel - see chart. The most distant from a southerly direction was Ponto Moriea, Cape Verde (MO) on **308.0**.

From other areas he heard Klaipeda, Lithuania (KA) on **305.0**; Ristna, Estonia (RS) **307.5**, which according to Latvian officials has been closed down, but it is still transmitting; also M.Khersonesskiy (SW) and M.Tarkhankutskiy (TR) in the Ukraine, which share **309.5**. On **312.5** he logged Baltijsk, Latvia (BK); Mys Taran, Baltic Russia (BT); also M.Kyz-Aul, Ukraine (KA). Three beacons on the Faeroe Is (AB, MY & NL) and one on the southern tip of Greenland (OZN) were among the entries in his interesting report.

Robert has drawn attention to a number of changes to the beacons service, which have either been, or are about to be, implemented. From the DXing point of view perhaps the most important are those which affect the stations now radiating data in the form of differential corrections (DGPS)

for use with the Global Positioning System (GPS). Apparently this service has currently about 10% coverage in Europe and suffers from sky wave co-channelling. The authorities have therefore decided to try to remedy this and increase the ground wave coverage.

To prevent sky wave co-channelling the operating frequencies of all DGPS stations were re-allocated with effect from September 19. In an attempt to improve ground wave coverage, the mean power output of some is being increased considerably, e.g. from 30W to 300W or even more.

Some stations in the UK, France and Ireland have already been modified. To avoid interference to the Spanish beacons, which will remain in service until the end of 2001 or beyond, they too are being allocated new frequencies. Some have already been altered and others will follow.

The new frequencies allocated to the Spanish maritime radiobeacons are: Cabo Mayor (MY) **283.5**; Cabo Trafalgar (B) **283.5**; Punta Entallada (NA) **283.5**; Cabo Machicharo (MA) **284.5**; P.Rosca (?) **284.5**; Castellon (AS) **285.5**; Torre de Hercules (L) **285.5**; Llanes (IA) **287.0**; Ceuta (CE) **288.0**; Pnt Llobregat (OR) **288.0**; Punta Silla (?) **289.5**; Cabo Salou (UD) **290.5**; Estaca de Bares (BA) **292.5**; Mahon (MH) **293.5**; Cala Figuera (FI) **294.0**; Cabo Penas (PS) **295.5**; Cabo Finisterre (FI) **296.5**; Cabo de la Noa (NO) **297.0**; Cabo Gata (TA) **299.0**; La Isleta (LT) **300.0**; Malaga (GA) **300.0**; Cabo Villano (VI) **300.5**; Cabo Palos (PA) **301.5**; Tarifa (O) **303.0**; Rota (D) **304.0**; Cabo Silleiro (RO) **306.5**; Cabo San Sebastian (SN) **314.0**.

May I take this opportunity to thank most sincerely everyone who contributed to these articles during the year. With best wishes to all readers for Christmas and good DXing in 2002.

Long Wave Maritime Radiobeacon Chart

Freq (kHz)	C/S	Station Name	Location	DXer
283.5	MY	Cabo Mayor Lt	N.Spain	A*.....(New Freq, was 304.5)
284.5	MA	Cabo Machicharo	NE.Spain	A,C*,D*
286.5	FI	Cala Figuera	Majorca	D*
288.5	FI	Cabo Finisterre Lt	N.W.Spain	A,C*,D*
288.5	UD	Cabo Salou	S.Spain	A*
291.0	SN	Cabo San Sebastian	S.Spain	A*.....(Now on 314.0)
292.0	MH	Mahon, Minorca	Balearic Is	A*.....(Now on 293.5)
293.5	MH	Mahon, Minorca	Balearic Is	A*.....(New Freq, was 292.0)
293.5	RO	Cabo Silleiro Lt	N.Spain	A*
301.0	HA	Pt del Hank	Morocco	A*
301.5	L	Torre de Hercules	N.Spain	A*
303.5	OR	Punta de Llobregat	S.Spain	A*
304.5	MY	Cabo Mayor Lt	N.Spain	A*.....(Now on 283.5)
307.5	RS	Ristna	Estonia	A*
308.0	MO	Ponta Moriea	Cape Verde	A*
309.0	CI	San Benedetto Lt	Italy	A*
309.5	BA	Punta Estaca Bares	N.Spain	A,D*
309.5	SW	M.Khersonesskiy	Ukraine	A*
309.5	TR	M.Tarkhankutskiy	Ukraine	A*
310.0	IP	Capo Sandalo Lt	Sardinia	A*
310.5	AS	Castellon	Spain	A*
311.5	SA	Senigallia	Italy	A*
312.5	BK	Baltijsk	Russia	A*
312.5	BT	Mys Taran Lt	Russia	A*
312.5	KA	M.Kyz-Aul	Ukraine	A*
313.0	PA	Cabo de Palos Lt	S.Spain	A*,C*
314.0	SN	Cabo San Sebastian	S.Spain	A*.....(New freq, was 291.0)
314.5	TL	Punta D.Penna	Italy	A*
337.0	MY	Myggenaes	Faeroe Is	A*,B*,D*
372.0	OZN	Prins Chris's Sund	Greenland	A*,D*
381.0	AB	Akraberg	Faeroe Is	A*,D*
404.0	NL	Nolso	Faeroe Is	A*,D*

Note:

Entries marked * were logged during darkness.

All other entries were logged during daylight or at dawn/dusk.

DXers:-

- (A) Robert Connolly, Kilkeel.
- (B) Roy Mewse, Boston, Lincs.
- (C) Fred Pallant, Storrington.
- (D) Fred Wilmshurst, Northampton.

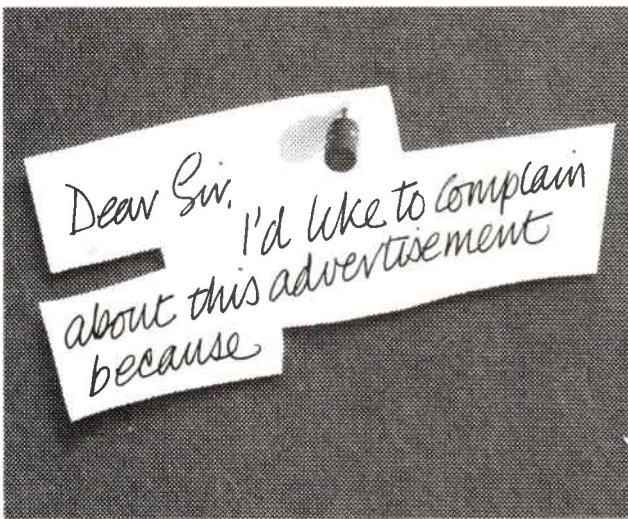
APPENDIX - List of equipment used:-

Robert Connolly, Kilkeel: JRC NRD-525 + Timewave DSP9+ filter + Datong AD-370 active antenna.

Roy Mewse, Boston Lincs: Kenwood R-2000 + random wire antenna.

Fred Pallant, Storrington: Trio R-2000 + Howes CTU-9 a.t.u. + random wire antenna.

Fred Wilmshurst, Northampton: Icom IC-R70 + Global AT-1000 a.t.u. + random wire antenna in loft.



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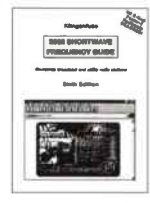
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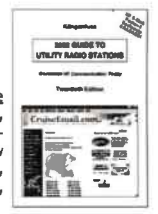


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Decode

Antennas

This month let's start with an E-mail question from **Bill Straughan**. Bill has bought himself a Kenwood R-5000 receiver complete with a v.h.f. converter and has been looking around for a suitable antenna system that will work well for utility signals. Although there's no such thing as a specialist utility signal antenna, you do need to look for a system that features good noise rejection. Interference remains the bane of our lives and a well-chosen and installed antenna system can go a long way to make life a little easier. The problem is which one to go for?

One of the first things to consider is the amount of space you have available for antennas. If you are fortunate enough to live out in the country with a large garden, you can really start to get serious with large antennas. However, most of us either have restricted space or aesthetic requirements, which severely limit the space available for an antenna. Let's start with this latter situation as I think it's probably the most common situation.

The temptation is to try and erect some form of random wire antenna by bending the wire around the available space. Whilst this is cheap and simple, it rarely produces a good result. For a start, bending the antenna within a confined space produces a totally unpredictable performance and you will inevitably end up with a very complex and lossy impedance presentation at the receiver. An additional complication of this arrangement is the high noise levels. By bending the antenna in a confined space, you are probably running close to a number of different sources of interference such as TV downleads, mains wiring, computers, etc.

If you can't erect a decent length wire antenna clear of such obstacles, you are better off choosing a totally different route. Not surprisingly a whole industry has evolved around solutions to this perennial problem of insufficient space for antennas. One of the best alternatives is to use what has become known as an active antenna. The active bit simply means there's some electronics associated with the antenna. In most cases, the electronics are used primarily to tame to very high impedance of these electrically short

antenna systems and so present the receiver with a sound 50Ω load.

As soon as you start to introduce electronics, you also introduce compromises and there are two main factors: a) noise introduced by the electronics and b) overload caused by strong signals. Of these, overload is usually the most significant problem, particularly in the cheaper/simpler designs.

One of the best systems around is the Active Loop Antenna Systems produced by Wellbrook Communications. I have one of their ALA1530 systems as my main antenna and it really does work a treat. For a start, the antenna has a usable bandwidth from 150kHz right through to 30MHz and its design features built-in rejection of local noise. The local noise reduction properties of the design are significant and have been verified by a number of independent reviewers.

When compared to active whip and dipole designs, the magnetic loop features local noise reduction of up to 30dB plus up to 60dB of mains borne noise rejection. This is really impressive performance and makes the ALA1530 and its indoor ALA2000 cousin ideal for utility listening. At just 1m diameter you really can use these antennas in just about any listening situation. *(For more information regarding the benefits of active loops, take a look at page 23 of last month's SWM (Nov) - Ed.)*

If you have the luxury of space for antennas, there's a huge choice of designs available. In fact, a look at any decent radio bookshop or the SWM Book Store will reveal an almost bewildering range of choice. So which ones are best for utilities? Not an easy one to answer and no doubt whichever one I go for someone will have a better idea.

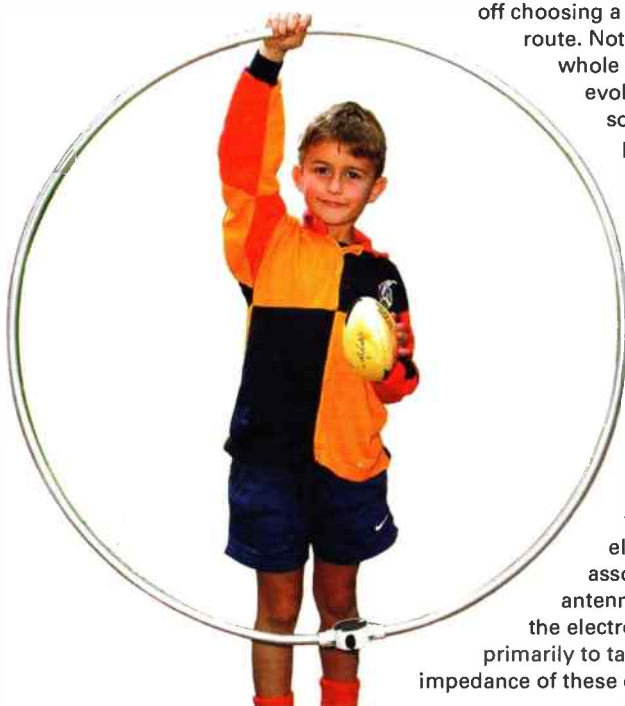
However, there is one that I really can recommend that has been in use in the professional monitoring field for many years and that is the TF2D. So what's so special about this one? Well for a start, it is relatively simple to build and is designed to be erected as a sloping antenna (i.e. chimney to garden fence). It features a wide bandwidth of around 3 to 30MHz and has a lower noise level than a long wire.

If you run the antenna at a 30° slope it exhibits omni-directional properties ideal for utilities. Its design features a static discharge path to earth to offer a degree of protection during electrical storms. The only difficulty in building one of these antennas has been the requirement for a 9:1 balun to match the 50Ω feeder and a 500Ω load resistor.

Thanks to the nice people at Wellbrook, this is no longer a problem as they now produce a purpose built magnetic balun that includes a 5W 500Ω load resistor and a 9:1 balun, matching transformer. This is all housed in a neat weatherproof unit, so all you need is the wire and a few spacers. I've shown a diagram of a 3-30MHz design so you can see that it really is simple to build.

As far as materials are concerned, the antenna wire needs to be hard-drawn copper of about 16s.w.g. with a total antenna length of 17m for a 3-30MHz design. The spacing between the wires needs to be 0.5m and the best type of spacer to use is lengths of lightweight 15mm plastic tubing. If you

Wellbrook ALA1530
1m diameter
Magnetic Loop



want to see some more detailed information, take a look at the Wellbrook web site which can be found at

<http://www.wellbrook.co.uk/UMBT2FD.html>

PACTOR II

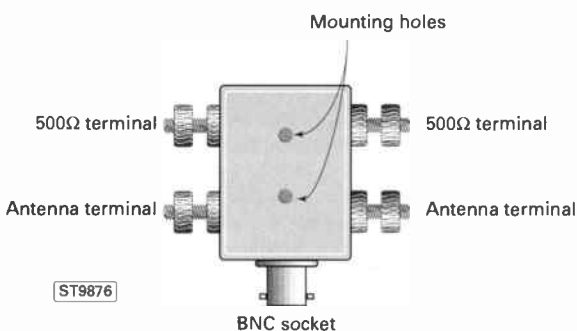
With the increased activity from the Aid agencies in the Far East, you will note a lot more PACTOR traffic appearing on the h.f. bands. If you've tried to decode it you will probably find that you can't. The most common reason being the use of a PACTOR I decoder to try and resolve the PACTOR II that most of these agencies use. Unfortunately, there's not a simple answer to this as the PACTOR II system is a lot more complex than PACTOR I and there's only a very few decoders around that can handle the signal.

An added complication is the fact there are several variations of PACTOR II. The only decoders that I know can handle this mode are the top-of-the-range Wavecom and Hoka units. If you have any further information on this, then please let me know.

NAVTEX

Lawrence Alexander writes asking if there are any simple designs around for NAVTEX receivers. He also asks about the transmission system used for NAVTEX. As far as simple receivers go, the most tempting choice is to go for a direct conversion receiver. These are really dead simple and the main elements are a balanced mixer audio filter and amplifier and a local oscillator for the frequency you want to receive. (We published a design for a dedicated NAVTEX RX in the July 1997 SWM - Ed.).

The principle of operation is also very straightforward and the balanced mixer is the key. This device has two inputs and one output and the output signal contains the sum and difference of the signals applied to the input. Just by way of an example, if the signal on one input was an FEC transmission using a shift of 200Hz with the two frequencies being a mark of 518kHz and a space of 518.2kHz. On the other input a fixed



Wellbrook T2FD antenna balun.

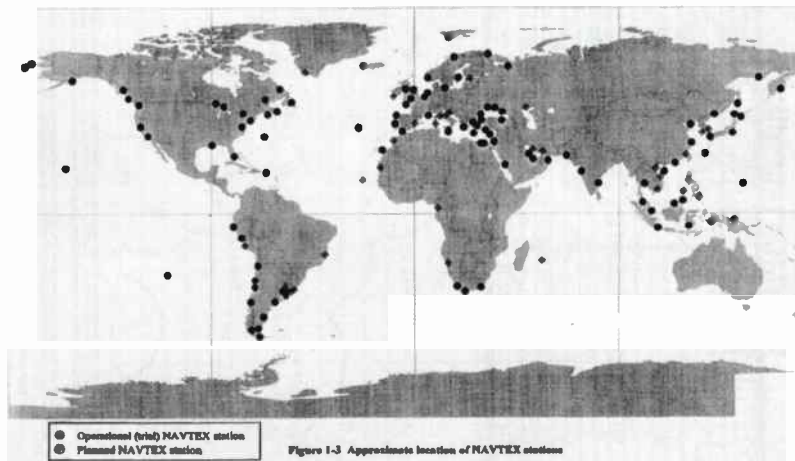


Figure 1-3 Approximate location of NAVTEX stations

Global NAVTEX map.

oscillator of 516kHz. The output from a mark signal would be $518 + 516 = 1034\text{kHz}$ and $518 - 516 = 2\text{kHz}$, i.e. an audio signal.

If we do the same calculation for a space signal the result is $518.2 + 516 = 1043.2\text{kHz}$ and $518.2 - 516 = 2.2\text{kHz}$. If you look at these four frequencies, you will see that there are two audio tones at 2 and 2.2kHz that are just right for sending to a decoder and two unwanted signals at around 1043kHz these need to be filtered out.

One that looked quite hopeful was the TenTec Any Band Direct-Conversion s.s.b./c.w. Receiver model 1056 that sells for around \$29 in the US.

Although this is designed for operation on the amateur bands you will probably find that you can tweak it down to 518kHz providing you have some r.f. experience.

As far as NAVTEX reception goes, it really is a very simple mode to resolve. The transmission system is SITOR-B, which conforms to ITU recommendation CCIR476-5. This is basically the broadcast mode of SITOR with a shift of 170Hz. Because the system is designed for automatic reception, the signals are sent using a strict protocol with a four-digit header. The first digit is an alphabetic character that identifies the transmitting station. Next comes one of 14 letters that indicate the message type whilst the final two digits are used for a serial number.

Here's a typical message:

ZCZC PA10
NETHERLANDS COASTGUARD
NAVIGATIONAL WARNING NR10 WUPTPTUTC JUL
LIGHTBUOY PEN-21
53-33.4N 005-57.3E
TEMPORARILY WITHDRAWN

Here's a run-down of the message category indicators:

- A Navigational warnings
- B Gale warnings
- C Ice Reports
- D Distress alerting plus SAR/Piracy information
- E Weather forecasts
- F Pilot services information
- G Decca messages
- H Loran messages
- L Omega messages
- J atnav messages
- K Other navigational messages
- L Rig movements
- V Amplification of Nav warnings in A
- Z No messages on hand

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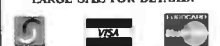
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