

RADIO SOCIETY

of Great Britain

DRAFT/UNCONFIRMED

PROPAGATION STUDIES COMMITTEE

Minutes of a meeting of the Propagation Studies Committee held in Leicester on 12 April 2008 commencing at 1300hrs local.

1. Members Present

Prof. M. Harrison	G3USF	Chairman
Mr S. Nichols	G0KYA	Secretary
Mr C. J. Deacon	G4IFX	
Mr A. Melia	G3NYK	
Mr R. Smith	G3SVW	
Mr L. Butterfields	G0CIB	
Prof. B. Chambers	G8AGN	

Apologies for absence were received from Gordon Adams G3LEQ and Ray Cracknell G2AHU.

2. Minutes of the previous meeting

There were two small changes (in bold below) to the minutes from the previous meeting.

In "4.3 LF", the paragraph should read: "He is also looking at oblique sounding using stations in Magdeburg and Budapest on **136KHz**."

"The British **Astronomical** Association is also looking at using LF to look at the incidence of solar flares and gamma ray bursts (GRBs)."

Gordon, G3LEQ's submitted report was inadvertently missed out. It read:

GB2RS – Report from Gordon L Adams G3LEQ - GB2RS News Manager: The Propagation Report continues to be included in all the weekly GB2RS news transmissions each Sunday on HF, VHF/UHF and ATV. As well as voice the report also goes out on MT63-1kHz bandwidth long interleave data mode at 100wpm on 3600kHz at 20.15hrs and on 1840/5279kHz at 20.45hrs local time. The latter data service has been provided for some years now but there appear to be only a small number of regular recipients. I therefore intend to review the MT63 service at the end of 2007 and if the take-up does not increase it may then be discontinued.

3. Matters Arising

3.1 Membership

The committee welcomed Barry Chambers G8AGN to the committee. Barry gave a presentation on his work on passive radar detection using VHF sources (see later).

The committee agreed that Marcus Walden G0IJZ should be congratulated for his piece in RadCom on 5MHz propagation and the importance of the extraordinary wave. Martin

G3USF will approach Marcus with a view to asking him if would like to become a corresponding member of PSC.

3.2 Automated beacon monitoring

There was extensive discussion around automated beacon monitoring and logging. The view is still that if we want to encourage state-of-the-art beacon monitoring then software needs to be developed to capture data and a central internet-accessible host be set up to collate them.

There was discussion as to the type of data that would be required. Ron G3SVW is to give some further thought as to what type of software might be suitable.

The FAROS software would also be looked at again to see if it could be used to stimulate propagation research and also to see if it could be used to produce regular charts showing how the IBP chain had been received in the UK and to see how this compared with predictions.

Leslie G0CIB also said he would also talk to the editor of RadCom to gauge his requirements for any future propagation features.

3.3 DUBUS Transatlantic beacon project

The DUBUS 70MHz beacon at Guinea Bissau (believed to be J5FOUR/B on 70.010 MHz) is now up and running. DUBUS is also looking at other potential beacons sites in Africa. No further information is to hand on the progress with the 2m trans-Atlantic beacon.

3.4. Multiband Beacon and other beacon projects

The Multiband beacon project was featured in a recent edition of RadCom.

It was noted that the GB3RAL 28MHz beacon appears to be transmitting a continuous carrier. Chris G4IFX will contact RAL to tell them.

There was also discussion about a new Italian QRP beacon on 14.099MHz, which is causing some interference to the IBP chain on 14.100MHz. As the band plan suggests that there should be a guard of +/-500Hz around 14.100MHz it was felt that nothing could be done about it.

The Spectrum Committee will meet in September and interference to beacons will be an item for discussion. Interference to beacons would also be among matters discussed at Cavtat.

The GM microwave beacon is also now operational

3.5 Propagation piece for RSGB yearbook

Action: Steve G0KYA will contact editor Steve White with a view to writing a piece for the next RSGB Yearbook

3.6 6 and 10 reports

This had not been published since January 2006, but Martin G3USF has now picked up the project again and has initiated a simpler online format. Issues from Oct 2007 – Feb 2008 are now online and MH is attempting to fill in the gaps - see <http://g7kse.co.uk/6and10/>

4. Projects and other discussions

4.1 Grey line

Steve G0KYA reported that he has been doing some analysis of the contacts on 160m, 80m and 40m between VP6DX and G. This may form the basis of a talk at the next HFC. The path between these two areas was extremely good with genuine 59 signals on very simple antennas.

It was felt that this was due to a) the VP6DX antennas being sited very close to the sea and b) the almost all-sea path. It was also a good example of how good low-band conditions can be at solar minimum.

Propagation prediction programs did not do a terribly good job of predicting the best times for such contacts and anyone looking at sunrise would have been disappointed. An analysis of logs showed that UK sunrise +10 to +30 minutes was best for 80m and sunrise +60 to +120 minutes was best for 40m.

An analysis using VOACAP of the angle of radiation and number of concurrent modes showed that on 40m, at least, the peak times coincided with the highest angle and maximum number of concurrent modes. The moral as always is that sunrise/greyline enhancements do not always occur exactly at sunrise.

4.2 LF

Alan G3NYK said that he continues to publish a daily LF report on his web site at <http://www.alan.melia.btinternet.co.uk/>. Propagation has been good through the solar minimum years and he is looking forward to a rise in solar activity to see if we have learned anything over the last cycle.

The new 500KHz activity has adversely affected the amount of 136kHz activity unfortunately. American stations continue to be interested in Alan's reports.

4.3 Posters

No further work has been done on posters and this project has been put on hold due to the work the chairman now has to do on the 6 and 10 report (see the 6 and 10 section in these minutes).

4.4 GB2RS

Report submitted by Gordon, G3LEQ: "We have now reached the stage where just over 80-per cent of GB2RS newsreaders download the script from the RSGB web site. The balance of, mainly old-time readers, still receive their scripts by post. I am hoping that in a year or two we might be able to phase out the postal delivery altogether. If this took

place we could have a shorter deadline with news items and maybe the propagation report being submitted on a Thursday for Friday editing and posting to the web site. What ramifications would this have for the PSC? Would you still prefer the present Tuesday 10am deadline with an updated report for some newsreaders being produced on a Saturday?"

Our view was that whether the postal version of GB2RS should be discontinued was essentially not a matter for PSC. If that decision were to be made we would work within it, probably at that stage producing a single version of the solar/propagation report. We would expect to be consulted about deadlines.

5. Activity reports

5.1 Chairman's report

Main activity since the last meeting included daily maintenance of the 28 and 50MHz beacon lists, participation in the RSGB Spectrum reflector, the UK beacons Yahoo group and the HF beacons reflector and preparation of the annual report for the Society's Board. Also prepared three-year report as HF beacon coordinator for the Region 1 IARU conference.

The RSGB Spectrum Forum meets in September to discuss papers for Cavtat and the Society's line for the conference. Papers will include one defining beacons from G3WKL. The Society has also been active in campaigning over BPL/PLT

The February 2008 VHF/UHF Newsletter suggests possible areas for amateur research. These include thunderstorm effects in tropical regions and the circumstances in which sporadic-E turns into FAI. It notes that the post of regional Propagation Coordinator remains vacant. Volker (DF5AI) page now includes discussion of a 144MHz opening featuring both forward- and back-scatter – www.df5ai.net. Volker also bemoans the lack of systematic observational data in North America, as an obstacle to analysis of VHF propagation.

A letter from Peter Kirby in January noted that committee chairmen had not been receiving periodic reports on their committee spend. When the accounting system was updated this requirement had not been included. This would be rectified when changes were made in the software. As yet this has not happened. However, There is no reason to think PSC might exceed its budget.

Among those potentially affected by cuts in physical science budgets are the Lancaster team that, among other things, run Aurora Watch and (again) the RAL and Stanley ionosondes. No word yet about final outcomes. Needless to say strong representations have been made by all affected parties.

Rice University has refined its short-term Kp prediction capability. See <http://space.rice.edu/ISTP/wind.html>

HAARP and the Long Wavelength Array conducted a lunar echo experiment on January 18-19 and encouraged amateur participation. Word was circulated with almost no notice and although some amateur reports were submitted participation was probably lower than had more people known earlier.

Qinetiq is currently running two projects: Doppler and Multipath Sounding Network (DAMSON) and Wideband HF Ionospheric Sounder for Propagation Environment

Research (WHISPER). See www.cpar.qinetiq.com/damson.html and www.qinetiq.com/whisper.html

Martin G3USF was invited to the Bath Microwave Round Table on April 1919. Programme includes a new web reporting/mapping system for microwave beacon reception by G8APZ. Unable to attend due to birthday/family gathering, but Alan G3NYK is attending.

New propagation reflector from KN4LF can be found at <http://montreal.kotalampi.com/mailmailman/listinfo/kn4lf>

Web pages released since the last meeting include:

Strange Space Weather Over Africa:

www.spacemart.com/reports/Strange_Space_Weather_Over_Africa.999.html

Auroras in Broad Daylight

http://science.nasa.gov/headlines/y2008/06mar_polar.htm1.friend

CONFIDENTIAL TO PSC

HF Beacon Coordinator's Report 2005-8

The table below shows the worldwide distribution of beacons at 1 April 2008. Thanks to national HF/Beacon managers for updating information and to the many beacon monitors worldwide. However, I need even more help with details of changes if the list is to be accurate and up-to-date. This is particularly important during solar minimum when many beacons cannot be monitored directly.

Band	Region 1	Region 2	Region 3	Total
1.8	4	1	-	5
3.5	10	-	-	10
(5)	4	-	-	4
7	12	3	-	15
10	19	3	-	22
14	9	6	7	22
18	9	8	7	24
21	9	10	7	26
24	10	6	8	24
28	88	273	24	385

Total	154	310	53	517
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The current situation is broadly similar to what it was at Davos. However:

Despite low solar activity the number of beacons has increased. Most are on 28MHz, where the beacon sub-band is now very crowded, particularly in North America. In many respects this increase is healthy but, as the 2011 solar maximum approaches, the resulting congestion will reduce the usefulness of some beacons. More frequency sharing (as with the IBP and UK 5MHz beacons) is highly desirable, but little progress has been made.

Some gaps in beacon coverage to which I drew attention at Davos have been filled. Warm thanks to the societies concerned. However, gaps remain, notably in eastern Europe and North Africa. I encourage colleagues to bring forward proposals to fill these empty spaces.

By contrast, some countries are arguably 'over-beaconed'. Colleagues even speak of 'vanity' beacons. Considering the pressures on spectrum, it is increasingly important, to ask what useful purpose any additional beacons will serve. Many HF managers/beacon coordinators already apply this test. I strongly urge all societies in the Region to do so, while acknowledging that often beacons are put on the air without consultation with the national society (or the coordinator).

The problem of QRM to the beacons remains unresolved. It is currently worst at 14MHz – but this probably reflects the fact that there is less activity on higher bands during solar minimum. Monitoring 14100 daily since 2006, I have found little interference on weekdays. However, on at least 20 weekends per year there is serious QRM, often for many hours, making reception of weak beacon difficult or impossible. Most of this QRM arises from contest activity. The problem is present during not only the biggest international contests but also the main regional contests and some national contests. The 14100 frequency is particularly vulnerable because it is affected by both cw and rtty/psk contests.

Since Davos, the number of R1 beacons below 14MHz has increased. They are now at record levels. There are a few acceptable exceptions to R1's policy of discouraging beacons on these bands, notably DK0WCY, OK0EU and the ZS 7 MHz network, which is part of an educational project and is covered by our recognition of special factors south of the Equator. However, the great majority of the new beacons, though mostly QRPP with QRSS3, do not conform to R1 policy and have not been approved by the appropriate national society or the beacon coordinator.

In creating and maintaining their beacons, beacon keepers make a valuable contribution to our hobby, which deserves recognition and thanks. Most beacons are simple transmitters running 10 watts or less to simple antennas. They have served us well and will continue to do so. Yet we must also move forward and innovate. Beside these 'traditional' beacons we need more advanced beacons that meet the standards of frequency accuracy and timing required for serious propagation studies, particularly those employing narrowband techniques. An early example, the UK 5MHz beacon network, has given excellent service for some years and provides a high-grade basis for propagation studies. More recently, a new generation of GPS-controlled DDS chips and fresh design approaches have led to a new generation of microwave beacons in the UK and the GB3RAL beacon cluster at 28, 40, 50, 60 and 70MHz. An appendix to this report describes some of the key features of GB3RAL. A fuller version is provided in a paper by

Mike Willis, G0MJW, for Committee C5 at this conference. This should be a challenge and encouragement to further development to ensure that the amateur beacon service at HF commands the respect of professionals and fellow amateurs.

To enable propagation studies to keep pace with such beacon developments we also need innovation in developing automatic monitoring systems, particularly by employing SDR techniques. Already, SoftRock provides a suitable and reliable way of avoiding the need to commit a main rig to continuous monitoring. It is possible to envisage a further new generation of internet-connected monitoring stations to provide a more consistent picture of propagation patterns.

The IBP/NCDXF beacon network has given excellent service over many years. Regrettably, for various reasons, at any one time several of the beacons have been out of service or functioning below desirable performance levels. More important, the network is ageing and it no longer meets the best technical standards. Its future development is of course in the hands of NCDXF, to which we have a great debt of gratitude. It would be good to know what their plans for the network are.

Work of the Beacon Coordinator

I continue to maintain the worldwide HF beacon list (www.keele.ac.uk/depts/por/28/htm). This is reproduced by several national societies and serves as a useful tool in beacon coordination. This entails checking internet sites and reflectors daily and incorporating information directly from national HF managers and beacon operators - to whom my thanks. There is room for improvement in getting information about QRT beacons. This sometimes slows the process of reallocating vacant frequencies. My thanks are also due to deputy coordinator Ulrich, DK4VW for wise advice and support. I also note with pleasure the appointment of Bill, WJ5O, as Region 2 beacon coordinator, filling a longstanding gap. He has already had a beneficial effect on developments in North America.

Martin Harrison, G3USF Region 1 HF Beacon Coordinator
April 2008

The appendix to the report provides technical detail as per Radcom April 2008

5.2 Reports of activities

5.2.1 Gordon G3LEQ.(sent in advance of meeting)

I have updated my Power Point talk (approx 50-slides) entitled "Near Zenithal Radiation (NVIS)" and present this from time-to-time to radio clubs. I also continue to be very active on the 5MHz channels with the 5MHz experiment - particularly testing different types of antenna. I am testing currently a totally concealed 88ft dipole which extends round two sides of my bungalow and is hidden behind new uPVC white guttering! Yes - it actually works!

5.2.2 Ron G3SVW

Ron G3SVW said that he continued to give talks on propagation and greyline and will be visiting the GMDX convention, but not as a speaker.

5.2.3 Barry G8AGN – Passive VHF radar

Barry gave an interesting presentation on his experiments using “passive radar”. He first showed how he had compared Doppler shift plots from the 2m GB3ANG beacon with the location of aircraft using an SBS-1 aircraft tracker.

This showed that he was able to deduce where the aircraft was by looking for the zero Doppler shift point on aircraft flying between his Sheffield QTH and the beacon.

The next stage will be for two stations to take simultaneous readings.

He then spoke about his experiments with the GRAVES radar on 143.050MHz in France. This uses a 1MW signal and he is able to detect reflections and meteor pings back in the UK.

Other work he is doing is looking at passive radar using Band II signals. This uses a SDR radio with a 5el Yagi surveillance antenna and a piece of wire as a reference antenna.

By notching out the reference signal Barry is able to see Doppler-shifted reflections from aircraft caused by comparing the two signals – one direct and the other reflected from the aircraft. The data needs complex processing and he is currently looking at 10-second segments.

6. Any other business

6.1 Leslie G0CIB had nothing to report from the RSGB Board, other than to say that the move of HQ to Bedford was imminent and that there is strong support for establishing a permanent station at Bletchley Park. He also said that was giving a talk on the IBP at Chelmsford RAC.

6.2 Some papers could not be found on the UKSMG web site, Chris G4IFX said that there had been a revamp of the site and some of the URLs had changed which probably accounted for the apparent disappearance.

6.3 Ron G3SVW said that as part of International Polar Year there were a number of ionospheric research projects ongoing.

6.4 There was discussion of an article in *The Economist* about DRM (Digital Radio Mondiale) that suggested it offered better quality, range and reliability than conventional AM HF broadcasts. The consensus was that the writer did not really understand the facts and science of HF propagation and may have been mistaken.

7. Closure

The next meeting was provisionally booked for Saturday 27 September 2008 at Leicester.

The meeting closed at 1610hrs.

Steve Nichols G0KYA