

RADIO SOCIETY

of Great Britain

PROPAGATION STUDIES COMMITTEE

Minutes of a meeting of the Propagation Studies Committee held in Leicester on Saturday 5th April 2014, commencing at 1300hrs.

1. Members present

Steve Nichols	G0KYA	Chairman
Chris Deacon	G4IFX	Secretary
Alan Melia	G3NYK	
Ron Smith	G3SVW	
Dr John Worsnop	G4BAO	
Gwyn Williams	G4FKH	
Prof Barry Chambers	G8AGN	
Dr John Rogers	M0JAV	
Dr Marcus Walden	G0IJZ	
Sam Jewell	G4DDK	

Apologies for absence had been received from Dr Geoff Grayer, G3NAQ and Prof Martin Harrison, G3USF.

2. Minutes of last meeting held on 21st September 2013

The process for approval of PSC minutes has been changed to be in line with the RSGB requirement to publish minutes within three weeks of all committee meetings. Approval will in future be via email. The minutes of the 21st September meeting had already been approved, following the new process.

3. Matters arising from the minutes

Section 4 PSC Membership: An item was put in RadCom advertising for a new full member with an active interest in HF propagation. Only one response was received, from an individual who unfortunately turned out not to be suitable.

Section 5.2 2014 Objectives: No response has been received to the PSC request for permission from RSGB to re-issue the propagation eBook with the addition of recent VHF/UHF articles from RadCom.

Action: G0KYA to follow up

Section 5.2 2014 Objectives: G0KYA has established that the IARU Region 2 beacon coordinator is William Hays, WJ5O. It appears that there is no beacon coordinator for Region 3.

Section 5.4 Propagation Forum: It was agreed to explore the use of the new RSGB website forum facility to set up a way for members to ask propagation questions and receive answers.

Action: G0KYA

4. PSC membership

It was noted that Jim Bacon, G3YLA and Andy Talbot, G4JNT have joined PSC as corresponding members.

It was agreed that the search for an additional full member with an interest in HF should continue.

Action: All to suggest candidates

The on-line list of PSC members and their interests will be reviewed and updated as required.

Action: G4FKH

5. Topics for discussion

5.1 RSGB Hamfest 26th/27th September 2014

It was agreed to mount a stand at the 2014 RSGB National Hamfest, subject to availability of members to man it. It was suggested that it could be useful to have RSGB-stocked propagation books on the stand, with a referral to the RSGB book stall if an enquirer wants to buy one.

Action: G0KYA

5.2 RSGB Convention 10th – 12th October 2014

At the RSGB Convention there are expected to be a number of talks on propagation. Specifically, WA1ZMS will talk about transatlantic VHF propagation, G0KYA is due to present on how to interpret HF propagation predictions, and possibly G0IJZ may be making a presentation based on his forthcoming paper on tropospheric ducting.

6. Projects

6.1 Noise Measurement Campaign (G4FKH)

The first part of the project, involving manual monitoring of noise with submission of data via spreadsheet, initially had 10 or 11 respondents but that has now dropped to only one or two.

The second part of the project, the use of standardised equipment with automatic submission via APRS has grown and now eleven people have bought the equipment and all are reporting online. This data is about to be linked to the RSGB website, on which seeking advice from RSGB website technical lead, and will be available to all for analysis.

Geographical coverage is good but does not yet cover the whole of the UK. There are some concerns about data quality and it is expected that there will be guidelines published on how to site antennas, working with the EMC committee.

Action: G4FKH/M0JAV

The separate Leicester University project has not yet started.

6.2 Transatlantic 2m beacons (G4BAO/G0KYA)

GB3WGI is operational but the antennas (2 x 6 ele) were damaged in the recent storms. Replacement antennas have been received and will hopefully be rigged in the next five to six weeks. A photograph was shown at the meeting which demonstrated the excellent take-off towards North America that the beacon enjoys.

GB3SSS, sited at Poldhu in Cornwall, has been off the air for a couple of years since the antenna mast blew down. The Poldhu club apparently did not prioritise re-establishing the beacon because of concern about electricity costs, potential interference with other 2m operations on site, and uncertainty about whether any NA stations were actively monitoring the beacon.

It has recently been announced that a North American group is planning to try a serious attempt at the Brendan Trophy from Newfoundland, during the period 3rd – 12th July 2014. In the light of this, discussions have taken place between PSC and the Poldhu club and the club has agreed to re-establish the GB3SSS beacon for at least the period of operation of the Newfoundland group, with Cliff, G3UYN leading the reconstruction effort. G0KYA has offered assistance with putting out some PR associated with the attempt.

It was agreed to consult with Jim, G3YLA on the possibility of transatlantic tropo rather than Es, and specifically to raise the possibility of adding Jim to the Brendan Trophy reflector, www.brendanquest.org

Action: G4BAO (done)

6.3 IARU 50MHz Synchronised Beacons (G4IFX)

The new IARU Region 1 50MHz bandplan, agreed in 2012, the allocation for most six metre beacons out of the 50.000 – 50.080 segment to a new beacon band between 50.4000 and 50.500. It also established a set of three regional sub-bands (50.000 – 50.010 for Region 1) for a limited number of new 'strategic' beacons operating on a frequency sharing, synchronised basis and which will incorporate MGM techniques to facilitate automatic monitoring.

The basic parameters for the synchronised beacons were agreed last year. Building on that, in order to propose a framework for future development, a new paper has been

developed by Murray Niman, G6JYB with significant PSC input, for submission by RSGB to IARU Region 1 (see Attachment 1 to these minutes). Among other things, the paper proposes that the next stage should consist of a pilot project among a small number of societies, incorporating automated receiving techniques as well as beacon transmission.

6.4 GB2RS propagation bulletins (G0KYA)

A recent RSGB review of the GB2RS news service led to a proposal to significantly reduce the length of the propagation forecast element of the weekly broadcast.

G0KYA argued strongly, on behalf of PSC, that the propagation news is of value and interest to the wider amateur radio public because it demonstrates how past events were influenced by solar activity and helps to develop wider understanding of, and interest in, propagation.

For the moment, publication continues. G0CAS has taken over the lead from G3USF.

Propagation predictions will be the subject of an agenda item for the September PSC meeting because of the release of a new forecasting model from the ITU.

Action: G4IFX

6.5 Six and Ten Report (G3USF)

Publication of the Six and Ten Report is currently suspended.

6.6 Potential New Projects (G0KYA on behalf of G3NAQ)

Corresponding member Geoff, G3NAQ has proposed three areas which he believes would be worthy of investigation by or on behalf of the PSC – see Attachment 2 to these minutes.

After considerable discussion on the merits and feasibility of these proposals, the following next steps were agreed:

Proposal 1: Field-Aligned Irregularities

It was agreed to ask John Regnault, G4SWX for comment on this proposal because he is an active FAI operator.

Action: G0KYA

Proposal 2: Es periodicity

It was agreed that this question could potentially be addressed now using Reverse Beacon Network data, picking one or two beacons and analysing reception reports. A project proposal should be produced.

Action: G0KYA/G3NAQ

Proposal 3: Wind-shear as the mechanism for Es

The general view was that this is unlikely to be feasible in the light of current knowledge and availability of equipment to amateurs, but Marcus will dig into Digisonde to see what data might be available there.

Action: G0IJZ

7. Reports

7.1 Chairman's Report (G0KYA)

The Chairman reported that he had written a letter in support of the propagation research-related benefits of siting the proposed GB3UHF 70cms beacon co-located at the same site as the GB3VHF 2m beacon.

G0KYA continues to edit the RSGB Beginners Newsletter and there is an item in this month's issue introducing solar effects on propagation. Consideration is being given to turning this into a presentation and/or a YouTube video.

Items from the RSGB Leadership Team meeting:

- a) It is recommended that all amateurs should re-validate their licence every year (e.g. on his/her birthday).
- b) It is emphasised that full members of all RSGB committees are required to sign up to the society's Code of Conduct and Core Ethos.
- c) A concerted effort is being made to lower the age profile of the hobby and of the RSGB, starting by asking a core group of young people what they actually want to do. The initial response has been very good and a youth delegation has been sent to the upcoming YOTA event in Finland. It is not clear at this point what, if any, contribution will be required from PSC.

7.2 RSGB Board Report (M0JAV)

In the interests of liaison with other RSGB committees, M0JAV reported that the EMC Committee is getting seriously worried about the impact of the introduction of new VDSL2 (fibre to cabinet) broadband services on noise floor. Deterioration of +15 dB has been observed locally in the range 3.75MHz and 5.2MHz due to upstream data, particularly when the distance to the cabinet is close to the 1km maximum. Two other higher frequency bands are planned to be available for VDSL2 in the future.

It was noted that many of these signals are in the frequency range where NVIS (near vertical incidence) propagation is prevalent and this is likely to lead to increased noise everywhere, not just in the vicinity of an active VDSL2 link. There are also two new draft standards in preparation for PLT which might have similar impact.

Additionally, M0JAV emphasised that the society is still very keen to look for ideas for additional services to members and PSC was asked to consider options.

8. Any other business

Ron, G3SVW: reported that he continues to give propagation-related presentations to clubs and will be adding propagation-related material to his club's stand at the forthcoming NARSA rally.

Barry, G8AGN reported that the weather has been too bad for nanowave tests recently but preparations are underway to try a number of new long-distance paths later in the year. He has given two talks to local clubs on nanowaves (including propagation aspects) since the last PSC meeting.

Sam, G4DDK's recent activities have been focused on the development of the new 'Nacton' 4m transverters, a prototype of which was shown at the meeting. There will also be a new 2m transverter the 'Anglian'. Sam also collaborated with G4BAO to produce the recent 'Getting started in Microwaves' piece in RadCom.

Marcus, G0IJZ reported that he is preparing an article about tropo ducting. He also made a request that the reports that we share of interesting propagation events should provide as much detail as possible, to help others explore the various possible propagation mechanisms.

Alan, G3NYK reported, following on from the earlier discussion about local noise sources, that interference from switch-mode power supplies has reduced on LF in recent years, presumably because switchers now tend to work at higher frequencies around 1MHz. He also noted that some US stations currently have permission to operate on 29kHz and that reception has been reported from Europe.

John, G4BAO has delivered his VHF propagation talk at a number of clubs - PDF/PPT version is available for others to use on request. He is also working on hardware for 70cm beacons and 12 synthesiser-based kits have now been built, funded by the residue of the £500 G2FKZ funding mainly used for the 2m beacon GB3WGI. Finally he is planning to operate very low power 23cm EME Isle of Lewis expedition during the last week in April and the first week in May.

Chris, G4IFX reported that he is in the process of erecting a cross-polarised seven-element yagi for six metres, in order to investigate polarisation-related fading. The two antennas will be fed to the shack via identical feeders in to enable dual-channel reception and possibly the use of circular polarisation.

Steve, G0KYA conducted medium wave tests using US broadcast signals for a considerable time this winter, but propagation was very poor because of the proximity to solar maximum. He also reported that 'The Woodpecker' is back on 20m, possibly related to heightened military tensions. Finally he also reported increased interference on 10m from Russian taxis, Mediterranean fishing buoys etc.

John, M0JAV noted that he is seeking expert opinion about different types of antenna for measurement of different aspects of the noise floor and asked for input from PSC members.

9. Closure

The date of the next meeting was provisionally agreed to be Saturday 18th October 2014.

The meeting closed at 16.20 hrs.

Chris Deacon G4IFX
PSC Secretary

Attachment 1: RSGB Paper to IARU C5

C5: 50MHz Synchronised Beacons

Introduction

As requested at the 2013 Interim Meeting at Vienna, further information is provided regarding the implementation of the 50MHz synchronised beacon scheme.

Background

At the 2011 Region-1 Conference in Sun City, the re-plan of the 50MHz band made a reservation for new synchronised beacons (50.000-50.010 MHz in Region-1). This was against the background as illustrated in the appendix of a large number of beacons in the 50.0-50.1 MHz segment reducing the available space for CW operation. It also recognised that propagation in 'the magic band' is highly variable.

At the 2013 Interim Meeting at Vienna some technical parameters were agreed including: 1kHz frequency spacing, 1-minute CW/MGM sequence and a 4-minute repeat period. It was also suggested that the scheme might need to accommodate some frequency reuse if some of the sparser parts of Region-1 were to gain 50MHz capability.

Proposals / Objective

At Vienna, two papers provided key technical recommendations but it was recognised that further information was needed in order to enable coordination, on-air tests and a demonstration of the benefits, so that the concept could become reality.

The objective should be that we could take all the final recommendations and create such an attractive guide for both users and beacon builders, that this encourages widespread implementation. Depending on the timescale, we should also extend the original Sun City deadline for other beacons to migrate to their new 50.4-50.5 MHz allocation.

Below we propose some key topics we believe are needed. We welcome comments in the lead up to the 2014 conference (and offers of participation for the initial tests)

Pilot Scheme / Demonstration

We believe that a pilot scheme is vital for an early demonstration of the benefits of the system and encourage its wider rollout. In addition to the beacon hardware, a key ingredient for the pilot should also include monitoring software/reports, so that the propagation benefits can be maximised and good feedback is obtained during this development phase.

A pilot scheme would also enable comparative testing of the various options for MGM, etc. It might also enable testing of features for in-situ upgrades, robustness to power outage etc., before deploying to remoter locations.

A group of Societies should therefore cooperate and create a small-scale demonstration. This could perhaps be a single frequency (nominally 4-beacon) system. In such a case 50.002 MHz may be appropriate, as it has relatively few beacons and could then be progressively expanded.

User Friendly

Priority should be given to make this easy and attractive for users. Frequency/time slots should be easy to look up. MGM modes must be published and chosen that are well supported.

Advanced Features

As MGM modes and propagation conditions can change over time, it may be appropriate to specify that the hardware design can adapt to the time of year, or can be easily updated for a new MGM mode or frequency/timing-slot without a major effort/interruption. Modern digital beacon sources offer many possibilities to create a more advanced system than the HF IBP. For example a modern synthesised source might also include carrier-phase reversals for measurement of propagation delay. However, we also need to consider the balance between simplicity/reliability vs adaptability.

Advanced Monitoring

Given that the multiplex will incorporate precise frequency/timing and MGM, this will create considerable opportunities for remote/automated monitoring. This might include software that may exploit SDR techniques to monitor a complete multiplex, or even satellite reception experiments that can survey and profile sporadic-E.

Frequency Re-Use:- Extra Slots & Propagation

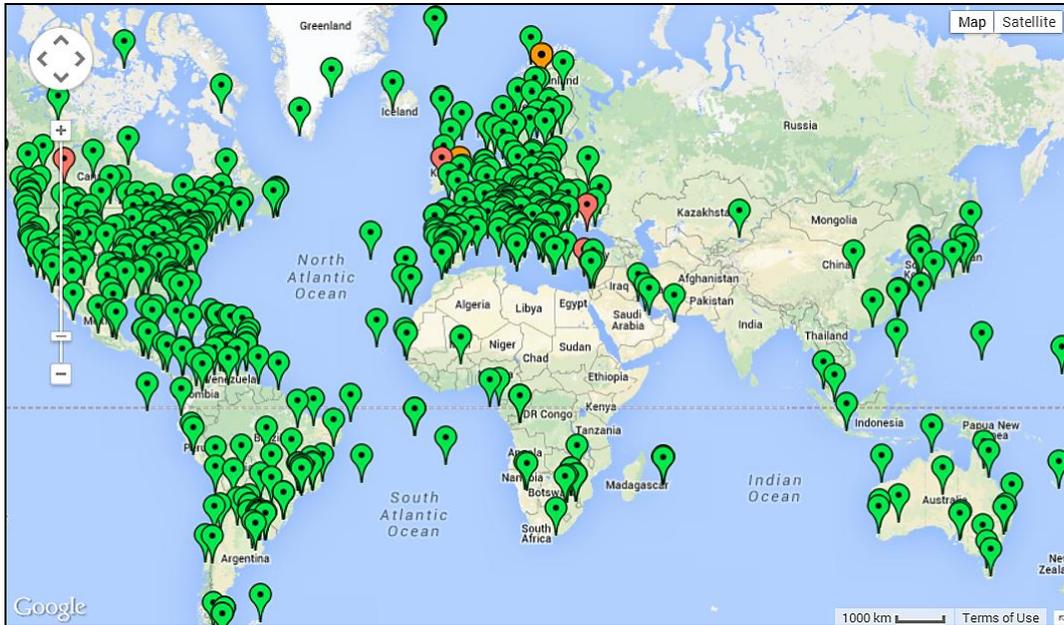
Region-1 covers a huge area and the band has highly variable propagation. As a guideline, a separation of at least 500-1500km between multiplex beacons seems to be appropriate depending on local circumstances. Should the system prove popular and the overall number of beacons rises beyond the capacity of a single multiplex (with ~40 slots), then frequencies could be reused in parts of the region (eg Europe, Southern Africa, Middle East etc). This would take advantage of the beacon hardware design being flexible so that it could be easily reconfigured.

Recommendations

- That Region-1 proceeds with the scheme as agreed in the 2011 and 2013 recommendations and uses this paper to help develop the final implementation guide and an initial pilot scheme demonstration
- To keep Region-2 and Region-3 informed of progress should they wish to start implementing their own beacon multiplexes.

Attachment 1: Appendix-1 50MHz Beacons

The following are taken from the www.beaconspot.eu interactive database and maps, which collates real-time reports of beacons from DX Cluster data.



50 MHz active beacons – March-2014



As above – but close-up over Europe

Source: Beaconsport website <http://www.beaconspot.eu/beaconm.php?bandmhz=50>

Attachment 2: Potential PSC Projects G3NAQ

Steve,

in my opinion there are three outstanding problems, arising from past amateur observations, to which the PSC can contribute, and would be of serious scientific interest. They are:

1) Field-Aligned Irregularities

I have seen a lot of weak-signal contacts on the 2 and 6m band assigned by amateurs to FAI. Examination of them have shown that the majority do not satisfy the definition, by using my software developed for Ar (now available freely and interactively on G7RAU's web site). The question remains, how often are FAI contacts made, and what is the origin of the other weak signal contacts (I suspect they are tropo forward scatter). A 2m beacon pointing NE would be useful for investigating FAI contacts (see the isoflectional maps), and would also be useful as an Ar monitor.

2) When I carried out a correlation analysis of the Es data collected by Martin G3USF on 10m, I found narrow regular periodicities, which I reported at an IEE conference. Later an amateur in the USA independently reported similar regularities in the VHF-FM BC band received via Es, but *having a different periodicity*. I am not aware of any work being done on this since. Clearly a continuous recording of beacons on the 6, 4, and 2m bands over an Es distance, such as was done by Martin on 10m, could provide a lot of interesting data. In this case, a small grant could provide the necessary equipment for such a project.

3. The mechanism for Es has never, to the best of my knowledge, ever been fully explained. The Whitehead wind-shear theory of ion concentration seems the most likely to me, though he himself had doubts. This could be easily tested if one measured the winds vs.height during an Es event. Now, the Mesospheric Radar Array at Aberystwyth measures the wind profile with height up to about 90km. I once suggested they might extend their time gate to measure up to 120km, but their answer was 'We are a mesospheric, not an ionospheric radar'. There's scientific enlightenment for you! Anyway, Es over Wales probably isn't very common. I don't suggest we can build an ionospheric radar array for 500 pounds, but maybe we can think of something. After all, the response from the ionosphere is going to be a lot stronger than from the mesosphere. I think maybe four ionosondes placed in a square array might be sufficient to indicate wind speed and direction. Alternatively, could we use the reflection from meteor trails?

Anyway, I would like to hear the reaction of the other experts on the PSC to these ideas. What do you think?

Geoff G3NAQ