



RSGB Propagation Studies Committee

Report for Spectrum Forum, 23rd October 2021

The Propagation Studies Committee (PSC) continues to do research and provide support across the RF spectrum.

Steve G0KYA gave a talk at the RSGB Convention, looking at the positives and negatives of the upcoming Solar Cycle 25. He also keeps the 10m beacon list up to date as far as possible and has made more than 100 changes to it in the last year. Steve also continues to supply the HF content for the weekly GB2RS news.

We had one comment re. GB2RS asking why we didn't use Met Office space weather data instead of NOAA's. After corresponding with the Met Office they confirmed that it wasn't able to supply the data we need ie 30-day sunspot/geomagnetic predictions.

Jim G3YLA continues to deal with email queries on Es-related propagation from amateurs.

He has also been very busy developing the EPI index and logging the data from the 2021 Es season with a view to eventually providing some verification statistics. He is looking at EPI/foEs/300hPa jet stream winds and directions plus 300hPa vorticity (spin). It is a winter project to get some data ready for his presentation to the HAMSCI workshop in the US next March.

Jim also gave a few online talks on propagation to various clubs:

- 04-Mar-21 Wigtown ARC Propagation talk
- 19-Mar-21 Participated in HAMSCI workshop
- 28-Jul-21 NARC Talk about Propquest
- 10-Oct-21 UKSMG AGM Talk about EPI and foEs/h'Es plots

In October Jim was awarded the Jersey Trophy for Outstanding Services to 50MHz.

Gwyn G3ZIL has been looking at two projects:

- A. Systematic estimates of noise at same time and same frequency as receiving WSPR spots using two algorithms* within WsprDaemon. and...
- B. Measurements at G3ZIL, Southampton, UK of noise and signal levels with a short active dipole rotating in the vertical plane.



Chris G4IFX has been working on three papers linked to his PhD. These are:

Paper 1: Demonstrate the validity of using amateur radio data to indicate the presence of sporadic-E. Case study 13.00 – 17.00 UTC 18 August 2018. Plot ionosonde data v/s amateur radio reports (collected by DXMaps.com)

- Discussion: amateur radio Es identification is consistent with the available ionosonde data
- Conclusion: amateur radio data can be used to confidently identify Es, including where there is no nearby ionosonde

Paper 2: Summary report of all 2018 findings without modelling using histogram representation of distribution of polarisation states per beacon. Use amateur radio reports as evidence to justify the Es identification.

- Discussion: every beacon demonstrates consistently elliptical polarization
- Conclusion: strong evidence that mid-latitude Es propagation is magnetoionic, not specular reflection or scatter.

Paper 3: Data and modelling for paths perpendicular to the geomagnetic field (Hungary & Slovenia) only. Case study using data captured from Hungary and Slovenia within a 15-minute period on 18 August 2018 (15:38 and 15:48) Plot Hungary and Slovenia paths vs contemporaneous amateur radio data to confirm identification as Es Use Poincaré sphere representation to demonstrate that in each case there is a 'home' state with superimposed deviations. Use PHaRLAP magnetoionic ray tracing model to try to predict the polarization characteristics of the 'home state'.

John G4BAO has been working on ways to mitigate noise with a number of low noise HF antennas, chokes and noise cancellation and has made some interesting progress.

Particularly the effectiveness of "short" > 1 wavelength Beverages. A positive article describing what can be done, could counteract some of the "Negative waves" about noise we see in RadCom. He has also been working on a remote cheap VHF Web RX.

Barry G8AGN has been doing more work at 30THz since our last meeting. Best DX so far is 130m but that was site-limited rather than equipment limited as received signals were huge.

The latest 30THz source is based on a combined heliograph/heliostat which reflects 30THz radiation from the Sun towards a distant receiver and uses slow morse QRSS1 (1 second dot time). The source system uses two Arduino microcomputers, one to track the Sun in real-time and one to tilt the mirror slightly to send the QRSS message (entered via a standard computer keyboard). The source location and time are obtained using GPS.



The 30THz receivers use a thermopile detector (with integral filter to allow only 5 - 14um radiation to pass) which is similar to those used in inexpensive Covid-19 remote reading thermometers. The sensor is placed at the focal point of a parabolic reflector. Another Arduino provides signal processing and display functions.

Some of this work has been written up for publication in QEX next Spring. He has also given a talk and demonstration on 30THz to his local club. Much of the "in-field" testing so far has been published as videos on YouTube.

Ron G3SVW continues doing a series of transmissions on 14 MHz hoping (very hoping I guess) to hear some Long Delayed Echoes. He has three other stations listening, but so far nil heard.

He says he will keep trying.

Ends

Steve Nichols G0KYA