Contesting

PHOTO 1: 160m top-loaded vertical during aurora October 2024.

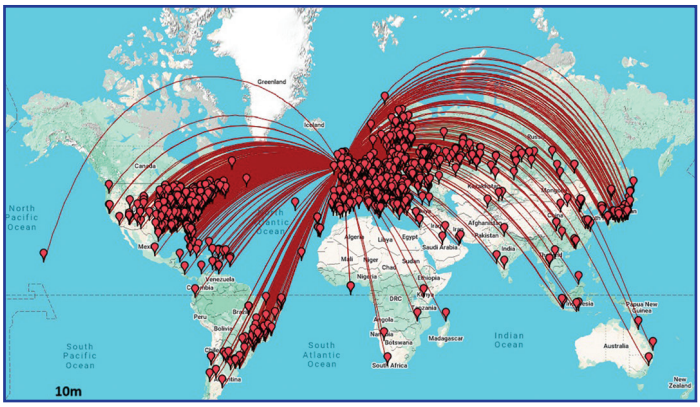

PHOTO 2: 10m QSOs by MD4K (G3NKC) in CQWW SSB 2024.

Contest propagation at HF

Contesting is a series of experiments in propagation. Contest QSOs require a signal path over which contest information can be exchanged; often a callsign and one other variable is the only information that must be copied both ways. Although the propagation available for contests is the same as for all amateur contacts, conditions that would be inadequate for a conversation may permit a contest QSO.

There is a suggestion that contest activity "creates propagation", but it is more the case that activity means that paths that are open become obvious, with stations at both ends looking to exploit them.

For short-duration, single-band contests, there is little scope for strategic decisions, but for multi-band entries over a longer period a combination of experience and propagation tools can help to optimise opportunities.

HF propagation for contesting

For intercontinental QSOs, or DX (long distance), the HF bands from 7MHz (40m) down to 1.8MHz (160m) favour the hours of local darkness; conversely, those from 14MHz (20m) upwards to 28MHz (10m) function in local daylight. Around the peak of the 11-year sunspot cycle, propagation is enhanced on the higher bands; 10m can be open worldwide with F2-layer refraction. Near the bottom of the cycle, the low bands are enhanced

Seasonal variations are significant – late spring and summer conditions on 10m include Sporadic-E propagation – and the DX on the low bands is improved in the winter, when common paths of darkness extend further east and west.

Worldwide propagation on HF prospers near the spring or autumn equinoxes, so these times of year are often chosen by DXpedition teams. International contest dates are usually fixed on an annual cycle, so the propagation is whatever the contest dates offer.

Let's have a look at the HF contest bands in more detail before considering how propagation must be considered for an efficient strategy.

Low bands 160m-40m

40m supports DX and intercontinental communications from late afternoon until some time after sunrise, and local-to-medium distance QSOs during daylight hours. This combination means that 40m is an important band in a multi-band contest, during any part of the sunspot cycle. On SSB, bandwidth is an issue, regardless of propagation, particularly as US amateurs are only able to operate above 7.125MHz.

80m has proven ideal for national contests, as near vertical incidence skywave (NVIS) provides reliable communications in the range 0-400 miles from the transmitter in darkness. The night-time period when DX may be worked is shorter than on 40m but can be very reliable during the less-active part of the sunspot cycle. A low dipole will function well for local QSOs using NVIS and a vertical antenna will generally be better for low-angle F-layer DX propagation.

160m is often the least-frequented band in a multiband contest but propagation can be spectacular on a ful-darkness path, also at its best during the less-active part of the sunspot cycle. There is often enhancement just after sunset or just before sunrise (greyline) at one or both ends of a propagation path. There are a number of 160m-specific contests in the international calendar and these are an opportunity to experiment on this band. Before dusk and after sunrise, 160m signals are likely to be completely absorbed in the D layer.

High bands 20m-10m

20m is often considered the most reliable contest band for DX contacts. It is the first of the high bands to come to life at dawn and the last to fail to support QSOs after sunset. At the peak of the sunspot cycle the maximum usable frequency (MUF) can stay high enough overnight for 20m to remain open for a full 24 hours. Normally, propagation follows the sunlight – so QSOs are made to the east earlier, then to the west later – however, long-path propagation is also a factor on 20m and DX QSOs can be made around the world by a path that is opposite to the shortest great-circle route.

15m can be a very exciting contest band with DX contacts possible at low power levels. Much as 20m, the band normally opens shortly after sunrise and closes at sunset, but propagation continues from Europe to South America after North America is no longer available. The band can also spring surprises with unexpected paths being open – which only become obvious when the band is fully occupied.

10m propagation varies hugely depending on the sunspot cycle. When sunspots are few or non-existent there still tend to be north-south paths open in daylight hours, typically from Europe to Africa. At high sunspot numbers, worldwide propagation can be achieved, more easily than on other HF bands. From late spring into the summer, Sporadic-E propagation can apply. 'E' contacts require very little power; signals are reflected off small ionization patches in the lower E region of the ionosphere.

For some years at the bottom of the sunspot cycle, 10m and to a lesser extent 15m, can be virtually unusable but at the peak these bands become the main focus of activity.

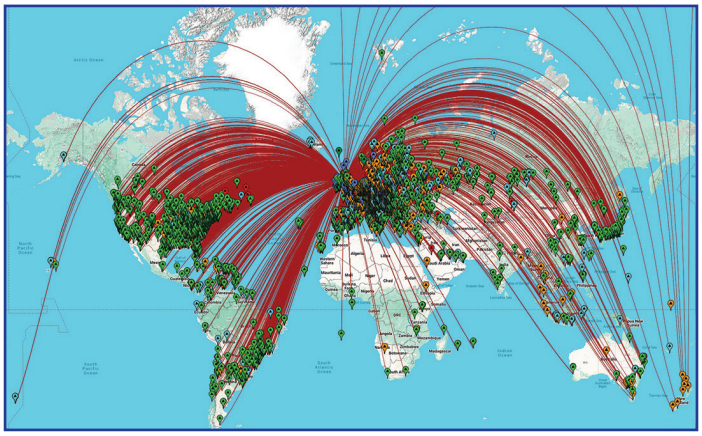

PHOTO 3: GM0B QOSs on all bands CQWW SSB 2024.

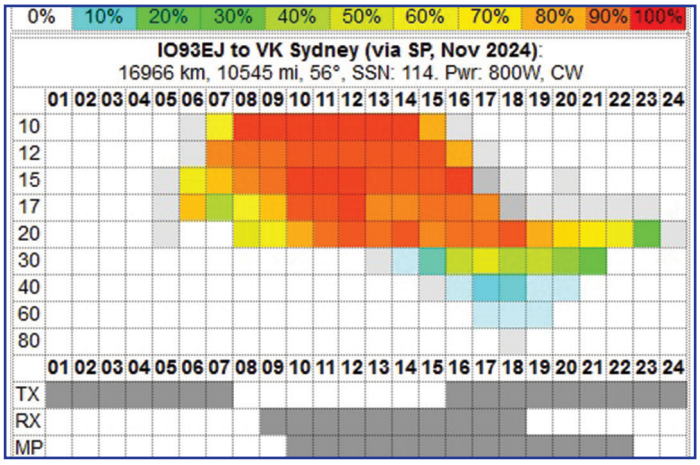

PHOTO 4: VOACAP Example predicting propagation UK to Australia short path.

Single-band contests or single-band entries in multi-band contests

160m contests are really fun although the action is all in the hours of darkness. ARRL160 [1], CQ160 CW & SSB [2] and Stew Perry (Big Stew in December) [3] are the main four with CQ160 CW being the one that I would give priority. For 10m the main international contest is ARRL 10m [4].

Being on a single band for a whole event means that the full range of the 24-hour cycle of propagation can be experienced. This also applies to a single-band entry in a multi-band contest; a multi-band entrant has to change band from time to time, whereas a single-band entrant can experience the full extent of available signal paths and may arguably have some rest, when their chosen band is inactive.

Propagation drives strategy decisions in multi-band contests

Rather than provide answers here, a few questions might stimulate some useful thoughts about how your knowledge of propagation might influence your strategy. Should you move bands to exploit short-lived propagation opportunities? When should you 'run' and when 'search and pounce' depending on available propagation? Rare stations may only 'run'. Are you sure that the band where you can achieve the highest QSO rate is the band which will add most to your score? In contests where low band QSOs are worth more points, are you moving there soon enough?

Propagation tools for advanced planning

Two excellent online propagation prediction tools are available from links on the RSGB website.

VOACAP Charts for RadCom [5] produces predictions for propagation from your chosen location, over 24 hours for the current month, with 56 notable destinations, and allows selection of transmit and receive antennas for each band.

ITURHFPROP RadCom tool [6] uses a similar format - over 24 hours with 32 notable receive destinations. It includes the selection of a month in the future, not only the current month.

Both tools are simple to use and will provide useful guidance. Be prepared for the propagation on the day of your contest to be different from the predictions. Check on the bands above and below the one that you have chosen.

Using examples from previous years to anticipate propagation

Certain contests rely on knowledge of propagation across the bands for success. You can build this knowledge over years of participation, or use analysis of the logs of leading stations from previous years to help identify when opportunities to work particular locations will be available on each of the contest bands. A guide created in half-hour intervals can be very effective. Again, be prepared for the propagation on the day of your contest to vary from that of previous years.

Propagation tools in real-time

For contest modes other than SSB it is practical to monitor the coverage of your transmission online.

For CW or RTTY, the reverse beacon network (RBN) [7] is probably the simplest tool to check how you are getting out, with a world map showing the listening stations that are picking you up and indicating your signal strength.

For FT modes, PSK Reporter [8] gives a similar worldview.

Finally, some words from Dave G3NKC after operating MD4K in CQWW SSB 2024: "When I'd finished 40, I sniffed on 10, and decided it wasn't ready, so ran on 20 for a bit. Then checked 10 again, but still not convinced, so filled out 15 for a bit, then moved to 10. Later, I tried to balance the QSOs, to make sure I had a chance of mults on all bands. I used a template from a previous year as a guide, but I think you still have to adapt."

Much more material on propagation is on the RSGB Propagation Studies Committee pages [9].

Contest of the month – CQ160 CW

One of the band-specialised contests mentioned, CQ160 CW [2] is held on the last full weekend of January. Operating is permitted for 30 of the 48 hours, suiting the hours of darkness for most. Exchange is RS(T) and state for US, province for Canada, and CQ zone for DX (UK is 14). The US, Canadian provinces and DXCCs are multipliers. QSO points are two for your country, five for a different country and 10 for a different continent.

References

[1] ARRL160: http://www.arrl.org/160-meter
[2] CQ160 CW & SSB: https://cq160.com/
[3] Stew Perry: https://www.kkn.net/stew/stew_rules.html
[4] ARRL 10m: http://www.arrl.org/10-meter
[5] VOACAP Charts for RadCom: https://www.voacap.com/radcom/
[6] ITURHFPROP RadCom tool: https://soundbytes.asia/proppy/radcom
[7] reverse beacon network (RBN): https://www.reversebeacon.net/
[8] PSK Reporter: https://pskreporter.info/
[9] RSGB Propagation Studies Committee: https://rsgb.org/main/technical/propagation/
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