

Propagation
WorldRadio March 2012
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10-Meter Long Path

Last month's column discussed the best height for a 10-Meter Yagi by superimposing propagation elevation angle statistics on elevation patterns of a Yagi antenna at various heights. Although last month's column focused on 10-Meters, the analysis could have been for any band since propagation elevation angle statistics by Dean Straw N6BV are available for the other bands on the CD-ROM that's in the 22nd Edition of the ARRL Antenna Book.

Ok, you have your 10-Meter Yagi up and you're working lots of DX thanks to Cycle 24's ascent (hopefully you participated in the ARRL's 10-Meter Contest last December – there were lots of DX stations available). To put some spice into your DX activities, take the challenge to go after 10-Meter long path QSOs. March and April are good months to get going on this, so let's review 10-Meter long path.

As a refresher, we normally make most of our DX contacts via the shorter great circle path between us and a DX target. This is, of course, short path. But there's also the other way around the globe – the longer great circle path, which is long path. For example, short path from my QTH to Japan is 10,538 km on a heading of 327 degrees, which is to the northwest for me. To get the long path heading, add or subtract 180 degrees. In the K9LA-to-Japan example, long path is 29,493 km on a heading of 147 degrees (327 – 180), which is now to the southeast for me.

Which of these two 10-Meter great circle paths is available depends mostly on the amount of ionization along each path (absorption is not a major player on 10-Meters). The amount of ionization in turn depends on the time of day, the season, the amount of solar activity, and where the path is with respect to the equatorial ionosphere. The type of ground (land or water) for the ground reflections could also affect which of the two great circle paths is best.

To do this review of 10-Meter long path, we could use the data in the CD-ROM titled "N6BV Propagation Predictions", which was discussed in my August 2010 column. N6BV put together propagation predictions from over 240 worldwide locations on all nine HF bands by month for six phases of a solar cycle. This would be a good way to determine the best long path times from a specific target, but this would get cumbersome in trying to describe 10-Meter long path in a general manner from anywhere in the world.

So what we're going to do is look at a typical 10-Meter long path to determine what factors make it work. We'll use a 10-Meter long path with which I am quite familiar – from my QTH in northeast Indiana to Japan. Visit <http://myplace.frontier.com/~k9la>, click on the HF link on the left, and download "10m Long Path During Solar Cycles 21 and 22" to read about my early adventures with 10-Meter long path.

Figure 1 shows great circle paths (the dotted lines) out of my QTH for every ten degrees of azimuth. It also shows the terminator (the thick black line) for mid April at 1100 UTC (when this

Table 1 – Factors for Northern Hemisphere 10-Meter Long Path

factor	condition
solar activity	smoothed 10.7 cm solar flux > about 120 smoothed sunspot number > about 70
month	mostly March thru September
sunrise end of path	first F ₂ hop in daylight
sunset end of path	not later than about 4 hours after sunset
headings	in the morning: southeast through south in the evening: south through southwest

Please note that 10-Meter long path can occur when the smoothed indices are lower than specified in Table 1, and these are generally tied to short bursts of higher-than-normal solar activity.

As for target areas for long path, Figure 3 (the map is from the old DX Edge tool) gives a broad picture of what you can work on 10-Meter long path depending on your location in North America.

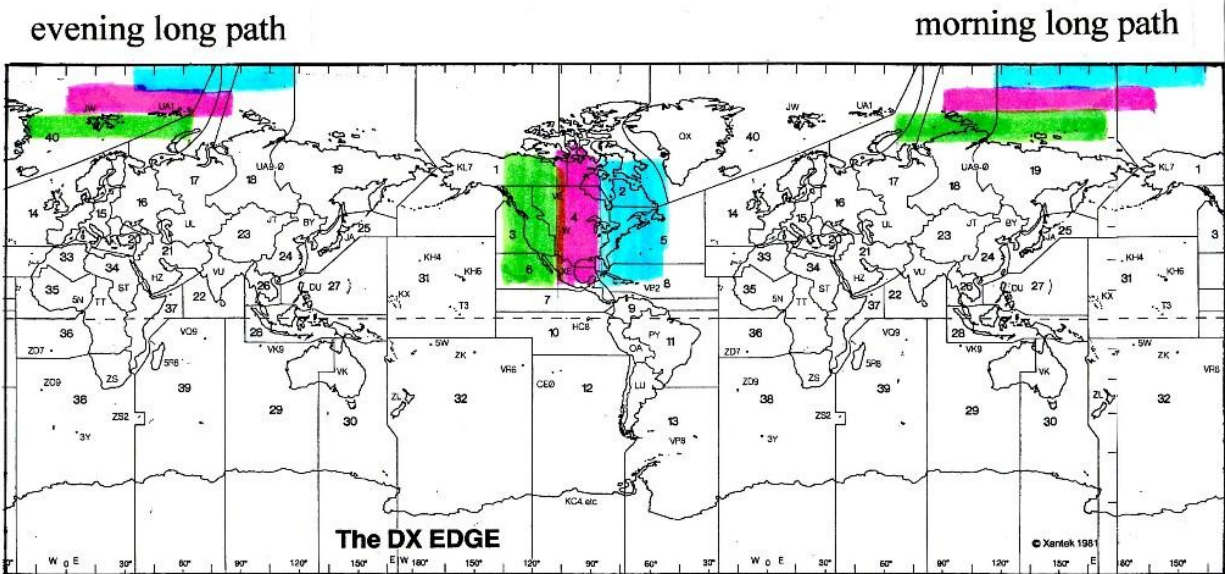


Figure 3 – What You Can Work on 10-Meter Long Path

For example, if you're on the East Coast (the blue shaded area) look for stations in the blue longitudes on the right in the morning and in the blue longitudes on the left in the evening. Remember that summer brings earlier sunrise, which means long path will start earlier. These results are somewhat on the optimistic side, which assumes the ionosphere is cooperating well and you have a better-than-average station. Of course your mileage will vary due to your station capability – your transmit power, your noise environment, your antenna gain, your type of ground, and any obstructions to low angle radiation.

There are some more exotic long paths, too, and they are seen in N6BV's predictions. For example, W9 is predicted to have a long path opening to W3. So if you get tired of the "normal"

10-Meter long path, take a look at the N6BV predictions for your QTH and set your sight on some of these more exotic paths. If you do, I'd love to hear of your experiences.

I've only talked about northern hemisphere long path openings. What about the southern hemisphere? If we flip things over, we would expect PY to have a good 10-Meter long path to ZL in October around PY sunrise. I've never heard of anyone working this path, but it doesn't mean it isn't there. I'll repeat what I've said before – I think the bands are open a lot more than we think. There's just no one there.

Some of you may have already experienced 10-Meter long path in recent months. For example, the K3LR Multi-Multi contest station in Western Pennsylvania worked 9M2IDJ and 9M8YY via long path during the CQ World Wide CW contest last November. And I worked several BY and VR2 stations via long path on December 17 and 18. I've also read of many other 10-Meter long path QSOs in December in Tad Cook K7RA's ARRL Propagation Bulletins. So 10-Meter long path is already there – get on and join the fun.