Working VU7 in December 2006

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With two Indian organizations planning operations from VU7 in December 2006 (the ARSI group will sign VU7LD and the NIAR group will sign VU7RG), DXers worldwide will have an unprecedented opportunity to work this extremely rare DXCC entity.

The path from VU7 to North America will be tough due to going through the polar areas (over the northern polar area for short path and over the southern polar area for long path). Figure 1 gives the VOACAP predicted median MUF (Maximum Usable Frequency) for both short path and long path to the Midwest of North America (specifically WØ and VE5) in December with a smoothed sunspot number of 8.

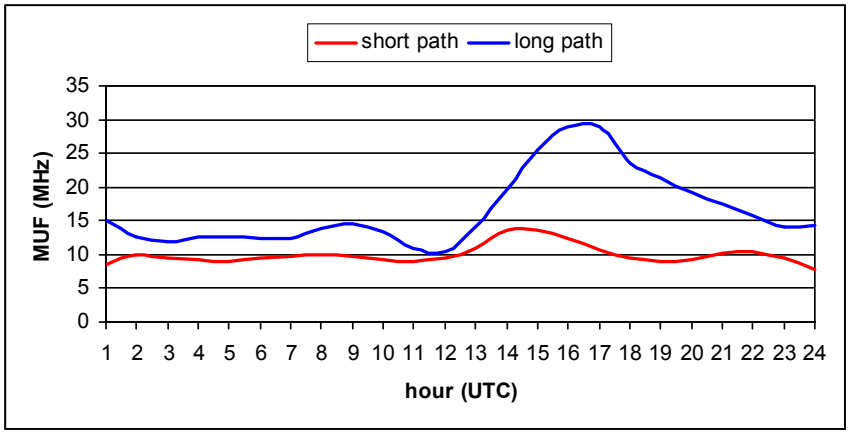

Figure 1 – MUFs for the VU7-to-Midwest short and long paths

The short path MUF during December is fairly low during the entire day. Figure 2 shows the short path when the MUF maximizes around 1500 UTC (from VE3NEA's DX Atlas).

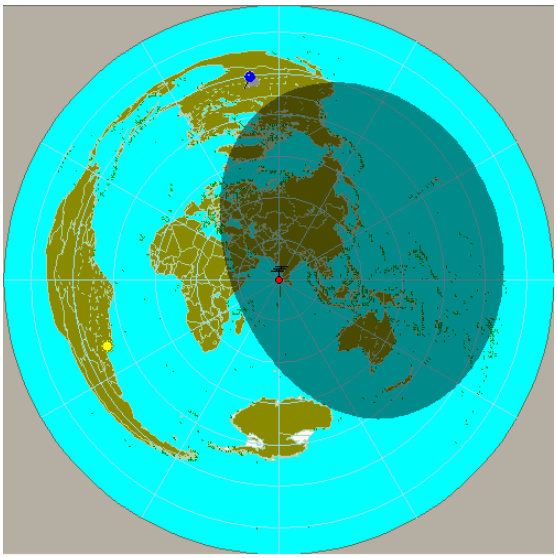

Figure 2 – Short path illumination in December at 1500 UTC

The short path from VU7 (the red dot with the antenna in the center of the map) to the Midwest (the blue pin at the top) is a straight line over the northern polar area. The short path MUF maximizes around 1500 UTC because the Midwest has just come into daylight (Midwest sunrise is around 1345 UTC in mid December) while VU7 is not too far

past sunset (VU7 sunset is 1249 UTC in mid December). It is interesting to note that less than half of the short path is in sunlight at any given time during December – in fact only about one sixth of the short path is in sunlight at 1500 UTC when the short path MUF maximizes. In addition to a lack of solar illumination, December 2006 is around solar minimum and the short path stays away from the more robust equatorial ionosphere. Thus it is understandable why the MUF on the short path stays so low.

Long path is another story. Figure 3 shows the long path when the MUF maximizes around 1700 UTC (also from VE3NEA's DX Atlas).

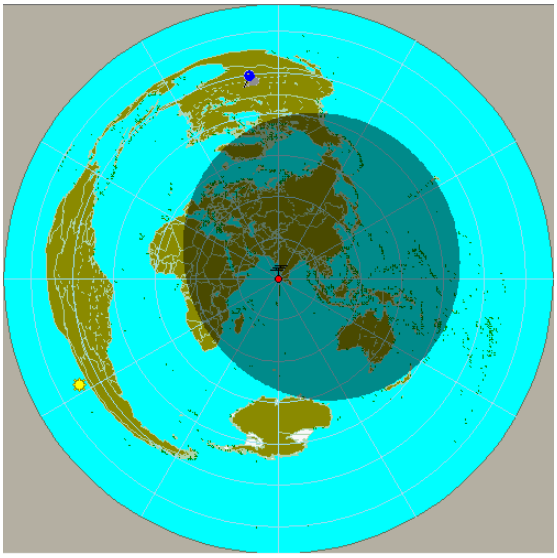

Figure 3 – Long path illumination in December at 1700 UTC

The long path from VU7 (again the red dot with the antenna in the center of the map) to the Midwest (again the blue pin at the top) is a straight line over the southern polar area (Antarctica) and comes up from the south into the Midwest. During December at least half of the long path is in daylight at any given time – at 1700 UTC, when the long path MUF maximizes, about two thirds of the long path is in daylight. In addition to more sunlight, the long path from both ends heads toward the more robust equatorial ionosphere. Thus it is understandable why the MUF on the long path can be so high – even around solar minimum.

But the good news with the MUF on long path must be tempered with signal strength issues. With the VU7-to-Midwest long path almost twice as long as the short path, signal strengths will generally be lower due to more free space path loss and more absorption with more of the long path in sunlight. Thus in reality the probability of a QSO is a balance between MUF and signal strength.

The easiest way to sort all this out is to use your favorite propagation prediction software to determine when you have the opportunity to work VU7. This has been done with VOACAP to seven geographical areas of North America. The assumptions are:

Transmit power = 200W on 30m, 700W on all other bands
Antenna gain = 5dBi for 30m and 40m, 12dBi for 20m - 10m
Noise environment = quiet rural
Minimum angle = 1°
Signal-to-Noise Ratio (SNR) = 0dB in a 500Hz bandwidth (CW mode)
Minimum Discernible Signal (MDS) of receiver = -130dBm

Your specific openings may be longer or shorter than the predictions to follow depending on your transmit power, your antennas, your site, and your noise environment. Openings will be shorter for SSB due to needing a higher SNR than what is assumed in these predictions for CW.

For more information check with Jake, N7WO, at256-5788.