More Results on Cloud-Bounce

I have added a Photo Album with a graph showing the signal levels from last Sunday night's tests and also photos of the 30 x 3 Watt LED array with Torch type Lenses and also the full transmitter unit with adjustable brick for elevation control.

Last night Justin VK7TW and Rex VK7MO did some further successful cloud-bounce tests when the cloud was more even distributed and thus produced less QSB. Peak signal levels were no greater than the -5 dB achieved last Sunday night but the signals were present almost all the time.

The first test was to reduce the number of LEDs from the 30 used in the earlier test to see how far down we could go and still get decodes. Initially we were able to achieve decodes with 2 LEDs around 50% of the time. Later after spending some time aligning the receiver in azimuth and elevation we achieved around 50% decodes with a single LED. I have added a graph to the end of the VK7MO Photo Album which shows how the received signal varied with the number of LEDs. A drop from 30 LEDs to 1 represents only around 14 dB and yet the signal level on average dropped from around -6 dB to around -28 dB or a drop of around 22 dB. The graph in the Photo Album includes a Yellow line representing the actual drop in power with the reduction in LEDs to compare with the actual received signal level in Red. The drop is around 8 dB greater than we expected and while it could be just experimental error we are a little mystified as to why this would be so.

During this first test we also ran a single 3 watt LED with a 400 x 400 mm Fresnel Lens which should have produced a far stronger signal but with a far narrower beamwidth and more difficulty with alignment. This unit was run with a tone on 1220 Hz just below the JT65 reference tone frequency to see if it could be seen. There was no evidence of any signal from the Fresnel Lens unit.

We then did a test to see if we could improve the alignment. For this both units were run with continuos tones and the 30 Torch type Lens unit reduced to 6 Lenses. As Justin adjusted the alignment to optimise the signal from the 6 Lenses he noticed the Fresnel Lens tone rise out of the noise to a similar level. However, as expected the Fresnel Lens unit was much more critical to align to and Justin reported that it need to be within 2 to 4 degrees to get a signal at all. On the other hand the Torch Lens unit dropped off only 5 dB over a six degree beamwidth and 10 dB over a 13 degree beamwidth in elevation which made it much more practical to operate.

The final experiment was to run the Fresnel Lens unit once aligned on WSJT and it produced an average signal level of around -15 dB. This is around 15 dB worse than the Torch Lens unit with 30 LEDs but about 15 dB better than a single LED with the torch unit.

Our conclusion is that the30 LED Torch type Lens unit is far more practical for Cloud-bounce because of its wider beamwidth and increased power.