North Texas NTMS Microwave Society

122 GHz update from north Texas

March 12, 2022

KM5PO – KI5EMN

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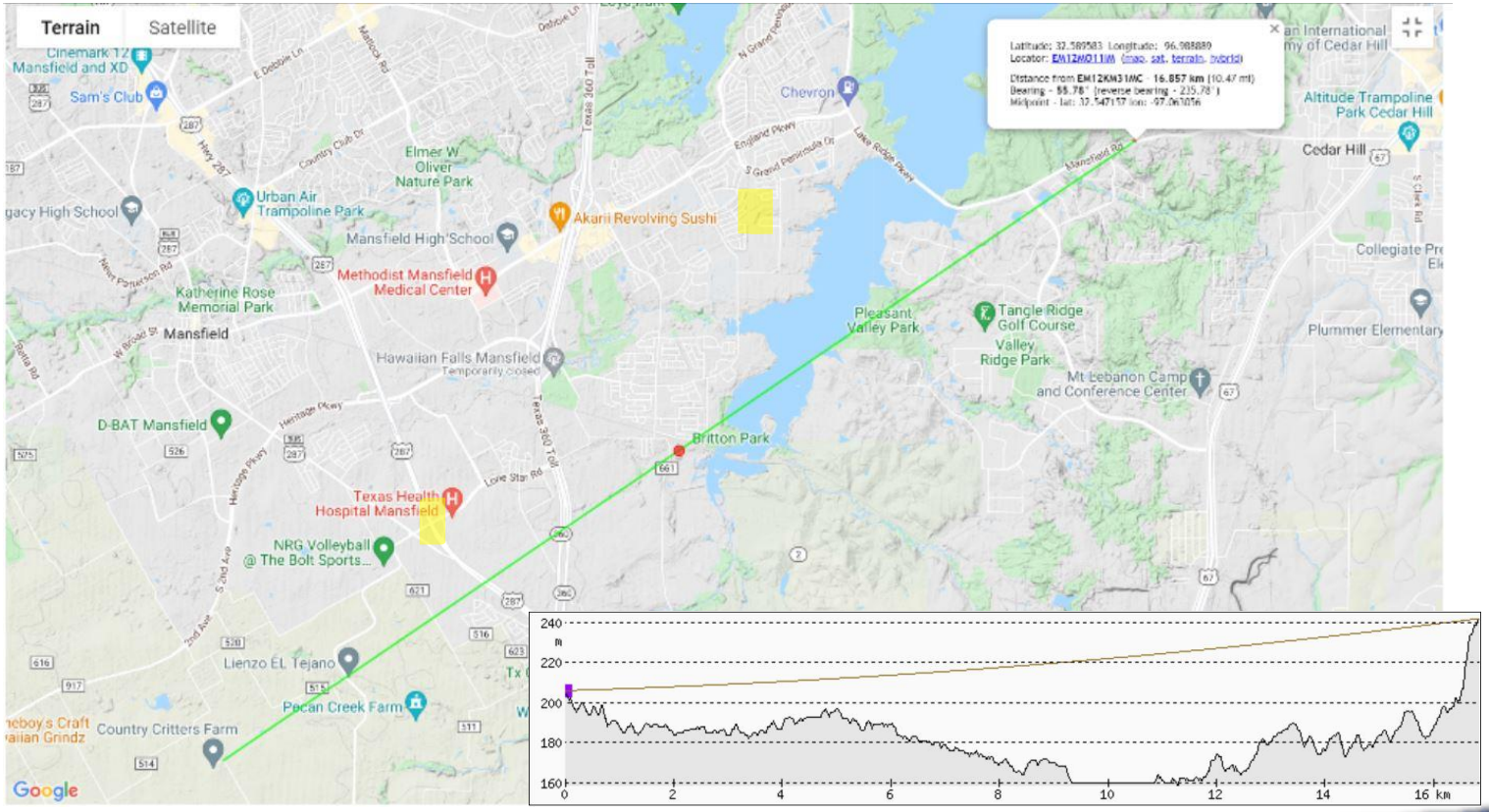
Try for 17 km

- Previous success at 12.2 km
- LOS path found at 17 km
- Evaluate path loss data
- Wait for good conditions



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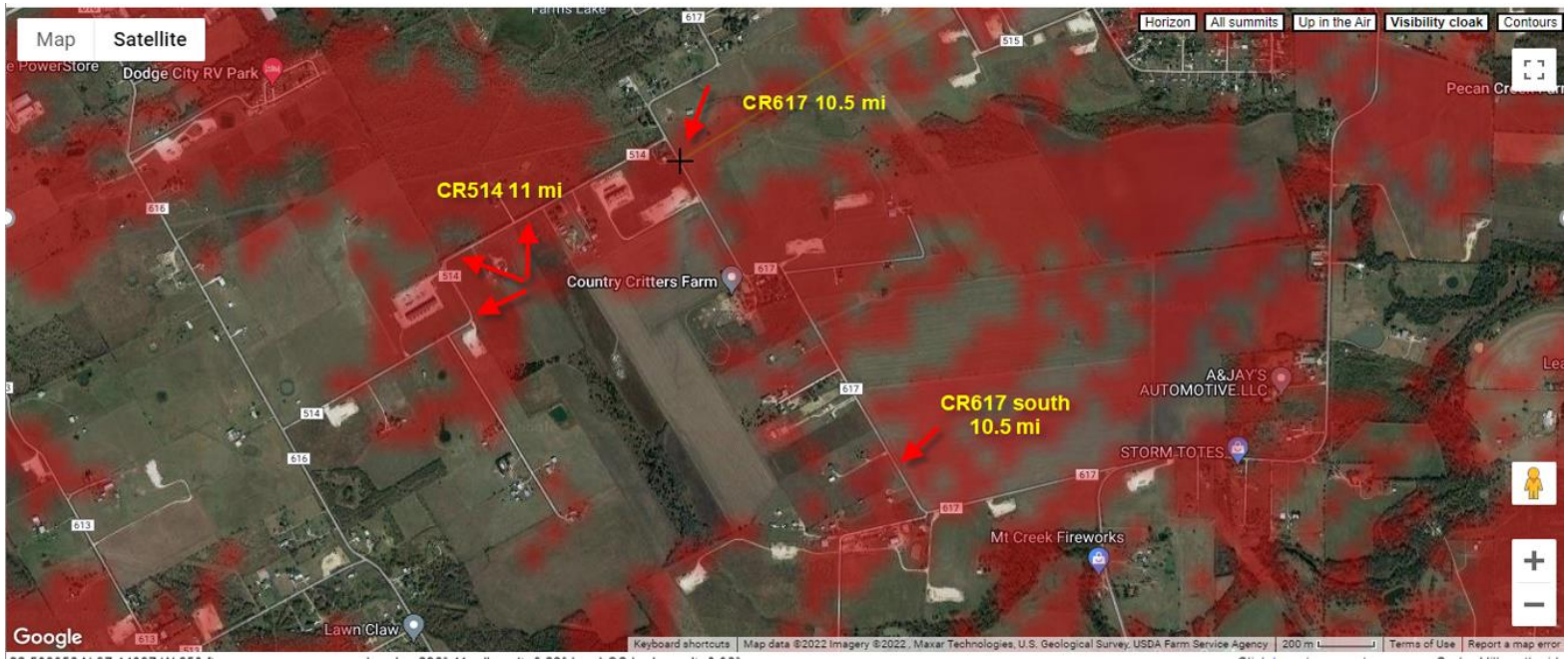
Try for 17 km

- 11 mile locations were blocked
- CR617 showed possibilities



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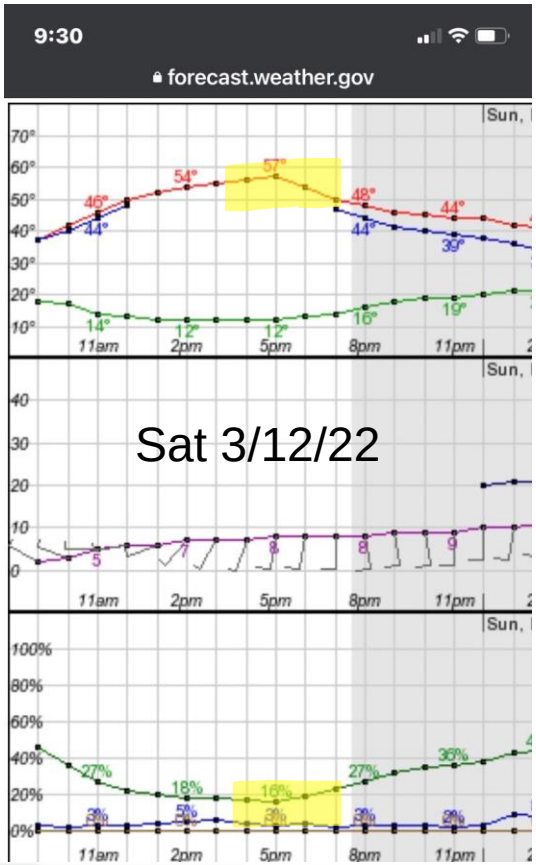
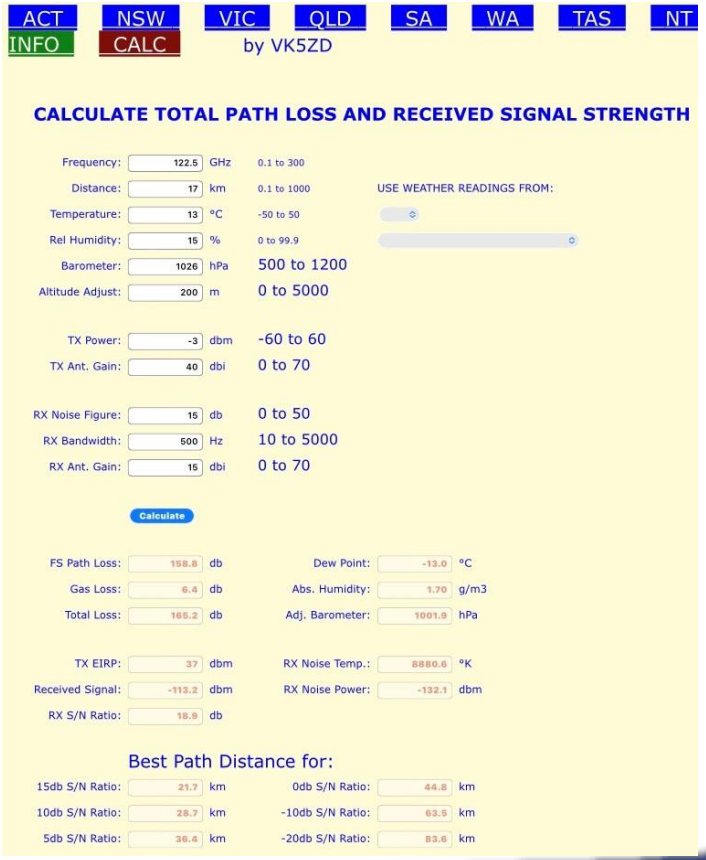
Try for 17 km

- Prediction for March 12 good
- Path loss acceptable





Try for 17 km

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- Confirmed LOS

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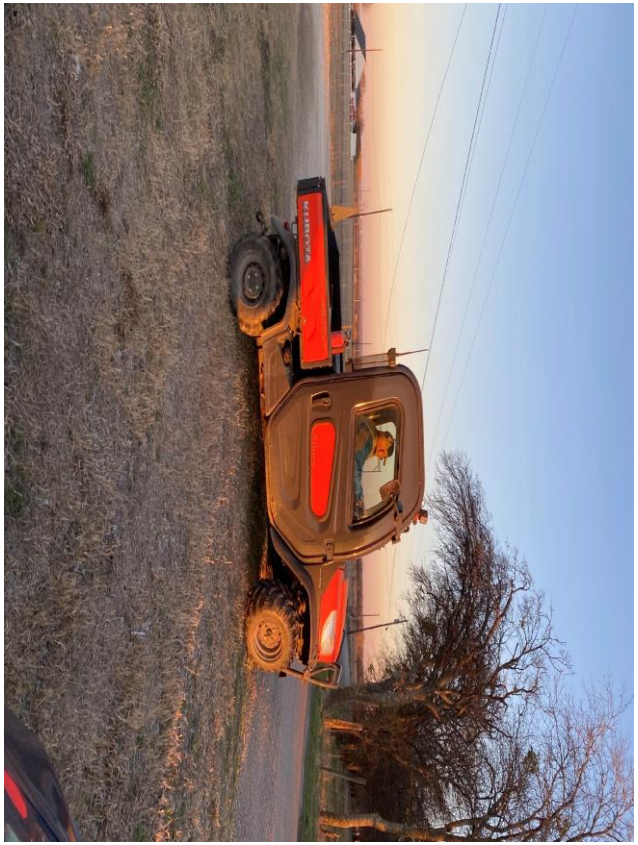
Try for 17 km

- Theodolite app for iOS
- Pressley Ranch – Alvarado TX



Signals 599 at 17 km

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Spurs can be seen in the waterfall

From north Texas

Pointing is very sharp.

Successful 17 km DX with 122 GHz CW. Strong signals in excellent conditions: 15% humidity

More learning

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- The following week 3-19-22
  - Try to extend from 17 km to 20 km
  - Return to 17 km first
  - Signals weaker than before at 17 km
  - Wind gusts began to move dish
  - Signal dropped much lower
  - Signal could be acquired by aiming with use of rifle scope.
  - Heat shimmer noted sighting through scope. Temperature was 81 F at both locations
  - European post referring to red kit birds using thermal = increased path losses at 122 GHz
  - Signal dropped into noise.

Next steps

- Implement 2nd dish
  - Ordered 2’ dish never arrived.
- Build two weather boxes (G8AGN)
  - Capture environmental conditions on micro SD cards
- Confirm more LOS targets > 20 km
  - KI5EMN remote controlled high powered LED

KI5EMN remote LED

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122/134 GHz project

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1 - Updated Silicon Radar RF chip from TRA120_002 to TRA120_045 to give 122G and 134G capability.
2 - Same PCB form factor and PCB / Antenna mounting points to allow hardware compatibility.
3 - Updated power supply to include separate Analogue and Digital supplies with all linear ultra-low noise regulators to improve phase noise, An external heat sink will be required for the 5V regulator.
4 - Microprocessor supervisor to avoid brown outs and glitches sometimes reported in original design.
5 - Updated synthesiser from ADF4153 to ADF41513 to improve phase noise and give smaller frequency increments.
6 - Inclusion of 100MHz VCOCXO for synthesiser reference for improved frequency stability and phase noise with auto switching to 10MHz external frequency reference.
7 - Updated mic pre-amp / mod limiter / pre-emphasis as per latest revision.

122/134 GHz project

8 - IQ quadrature I.F. combiner included on board with auto high side / low side switching.
9 - Improved external GPS / 10MHz reference disciplining with 16 bit DAC reference control.
10 - CH3 channel select Input becomes band switch 122G/134G.
11 - Updated control microprocessor code for new synth and updated dual band functionality.
12 - Cost will increase to around AUD$ 500 per assembled PCB
13 - The 12V DC supply current will increase to 600mA oven cold / 350mA oven warm
14 - The current horn and Chaparral feeds will fit and operate as before. The optimum coupler adjustment will likely be slightly different for the two 122G and 134G bands.

122/134 GHz project

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NTMS interest
6 members
Total pre-orders as of 4/2/22=116

Groupsio information

https://groups.io/g/The122GProject

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Questions?