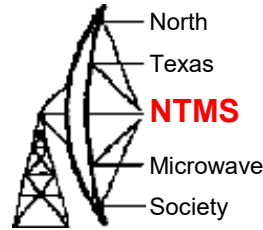


# More Rover Tips for Operating

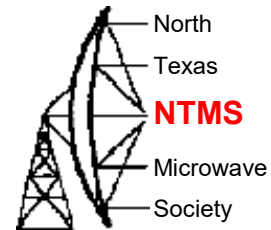
**KM5PO – Jim McMasters**  
**September 12, 2026**

# Safety

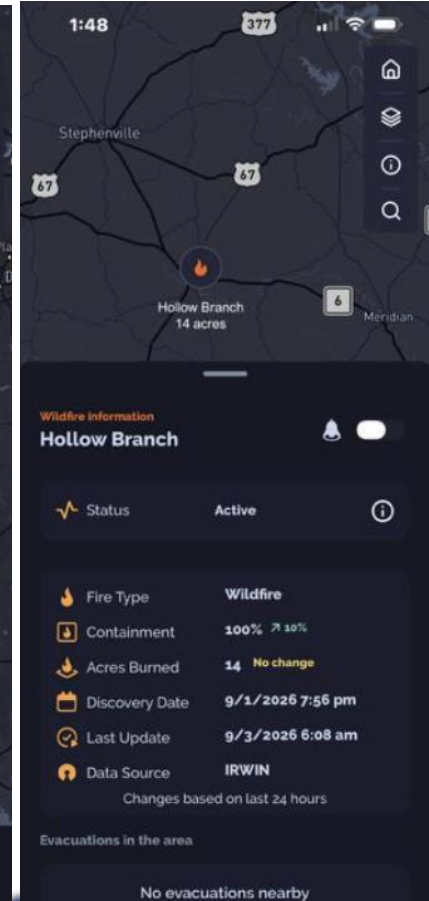
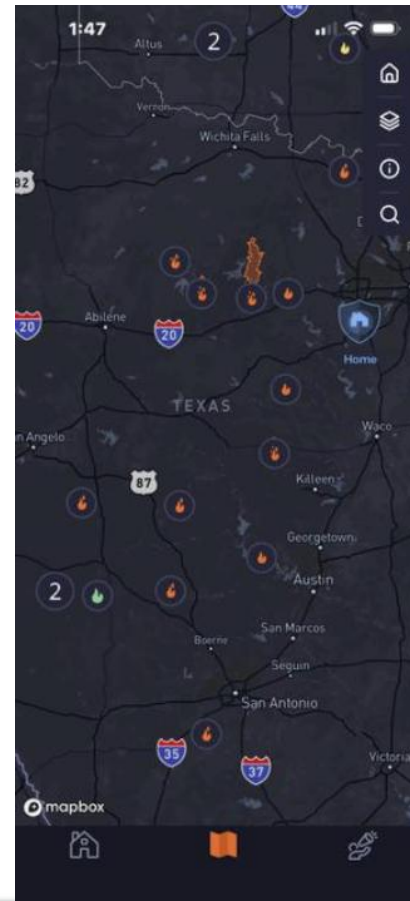
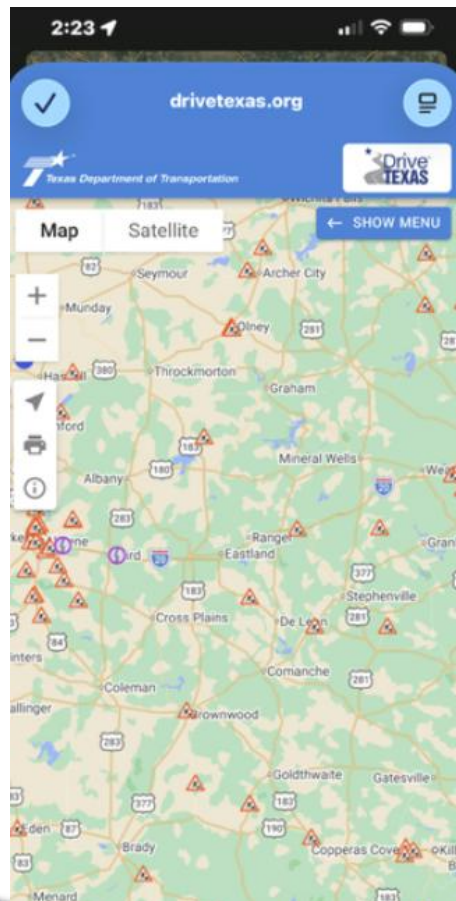
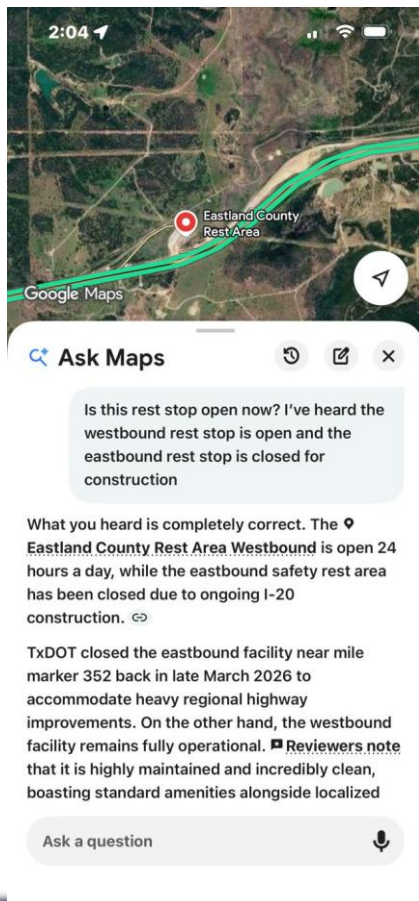


- Beware of fire danger
  - Carry fire extinguisher(s)
    - Do not park on tall grass
    - Try to find gravel or dirt to park on
  - Be aware of active fires
    - Use the app: Frontline Wildfires
    - Traffic can be stopped/congested near active fires
  - Be aware of data center/powerplant construction
    - Traffic can be a problem in these areas

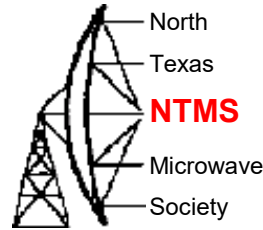
# Apps



- Google Maps – drivetexas.org - Frontline Wildfire

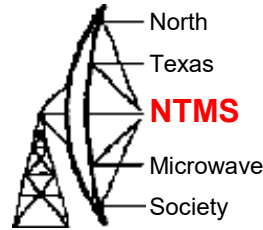


# Stay alert



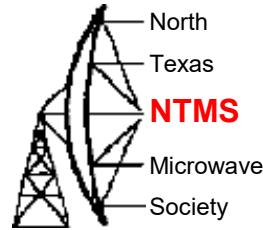
- Stay focused but not distracted
  - Audio books
- Cell phone holder to follow routing
  - Pull over to use the phone or use Mic (speech to text)
- Nourishment and hydration – pay attention to body
  - Ice, carry at least one Ice chest.
  - Eat often
    - Hard boiled eggs, dipped in salt/pepper solution. Tabasco or ?
    - Lunchables
    - PB sandwiches
  - Drink often
    - Water, carry one or more gallons
    - Cherry/Strawberry/Lime (Sonic mixes) + La Croix carbonated drinks

# Technology



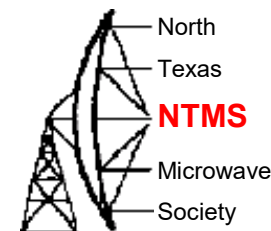
- Cell phone
  - Keep the phone charged
    - Use 5v bricks as needed
    - Don't forget a charge cable
  - Phone dependencies
    - Hot Spot for laptop if needed
    - Slack
    - Text
    - Theodolite
    - Other apps
  - Carry a compass handy and know how to use it
  - Book of maps and hard copy of route

# Homework



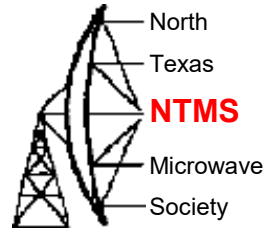
- Using beacons
  - Gain experience in verifying the path to beacon
  - Compare relative beacon strength to other rovers and fixed station signals
- Validate the paths if they are new
  - Record the SNR over time and learn how the bands are behaving before contest day (more on this later)
- Is your strategy aligned to the band propagation?
  - Is it better to start at max distances to catch the diurnal enhancement and work closer as the day goes on?

# New to roving? Use vetted locations



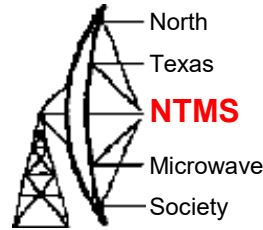
- Location! What makes a good one? You can learn from vetted locations why they are good...
- NTMS rover locations listing on the website
- Brad WQ5S, Pat W5VY, Jerry K5SOP, Ross K5ZSJ, Steve K5MNZ, W5OC & AB5SS and me. Also others that came before us

# Location



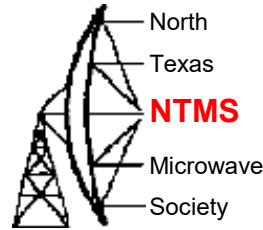
- Using LIDAR
  - National Map Viewer
    - [TNM Downloader - The National Map](#)
    - Download LIDAR maps
    - Elevation Products (3D Elevation Program Products and Services)
    - Select (Extent) the area you want with bounding box selector
    - “Find Products”
    - Pick 1 meter data if it’s available
    - Download the file
  - SAGA GIS
    - Open the downloaded file and select it on left side
    - Select Geoprocessing> Visualization>Grid>Terrain Map View
    - It runs algorithm over LIDAR maps
    - Map>Save>Export to Google Earth
    - It will auto open in Google Earth

# Google Earth Pro



- Google Earth Pro – It's free (used to cost \$)
  - General rover organization
    - Plot good existing locations and observe their success factors
      - They are free of obstructions
      - They are high ASL
      - They are accessible or we have property owner permission
    - Research new locations
      - High ASL
      - FAA/FCC data
      - LIDAR maps show ridges and peaks

# Viewshed



- **Edit the viewshed.h configuration file to adjust the kMaxWorldSpaceLength parameter.**
- This value represents the maximum viewshed distance as a fraction of the Earth's radius (6,378,137 meters).
- to extend the viewshed to 100 km, calculate the fraction:
- $100000 / 6378137 \approx .015678559$
- C:\Program Files\Google\Google Earth Pro\client\shaders
  - Demo Dorchester path

```
viewshed.h
File Edit View

#if defined(GL_ES) && defined(GE_PIXEL_SHADER)

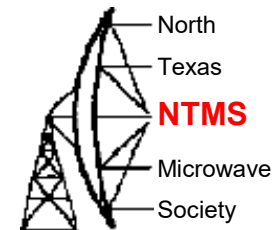
// This is needed to use fwidth().
#extension GL_OES_standard_derivatives : enable

#endif

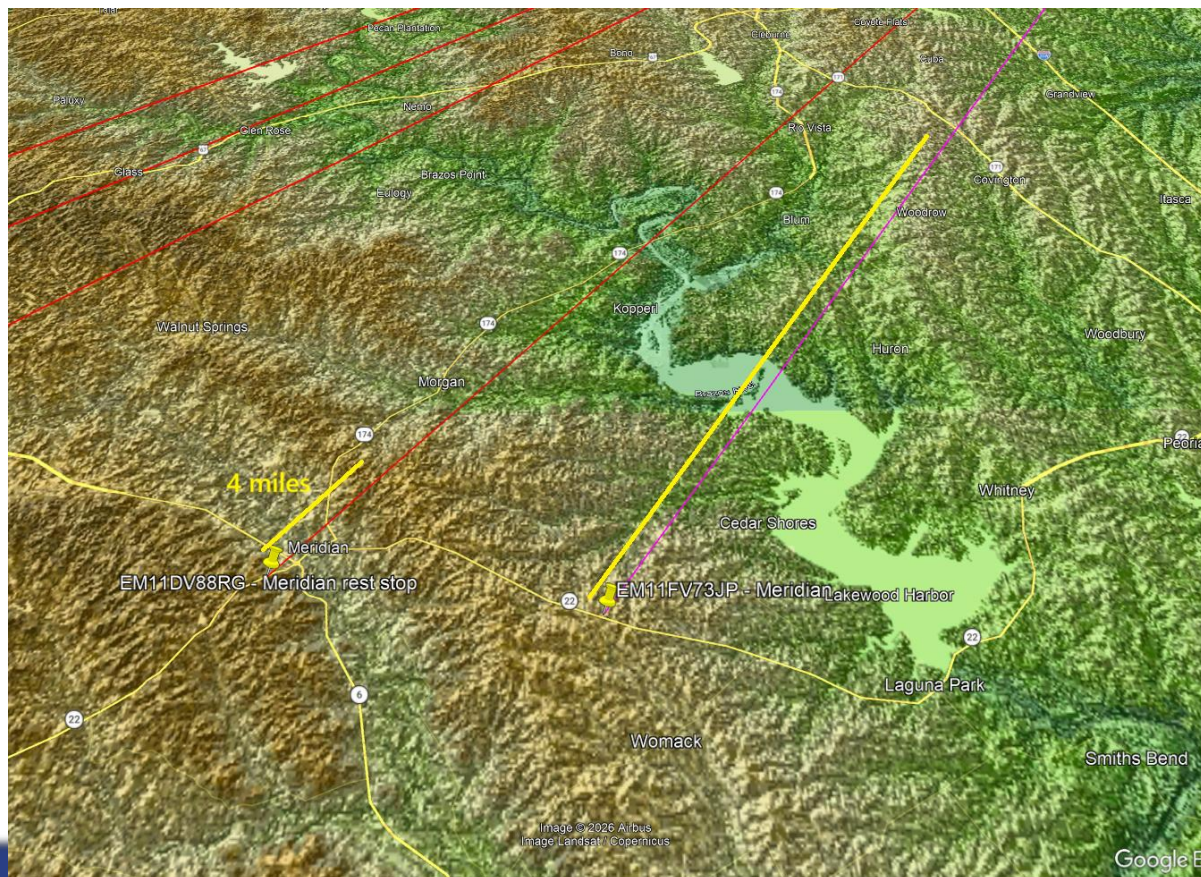
uniform highp mat4 viewshedMatrix;
varying highp vec3 viewshedDir;
varying highp float viewshedLen;

// Maximum world space radius of viewshed in fraction of Earth radius.
// Currently, kMaxWorldSpaceLength = 10000m / kWGS84Radius
// See earth/client/libs/math/units.cc
// #define kMaxWorldSpaceLength 0.007839278
#define kMaxWorldSpaceLength 0.015678559
// Offset in distance to reduce shadow acne.
#define kViewshedDepthOffset 0.0000031357119
// "Fringe" distance to fade nicely from good color to bad color.
#define kViewshedFringe 0.0000031357119
```

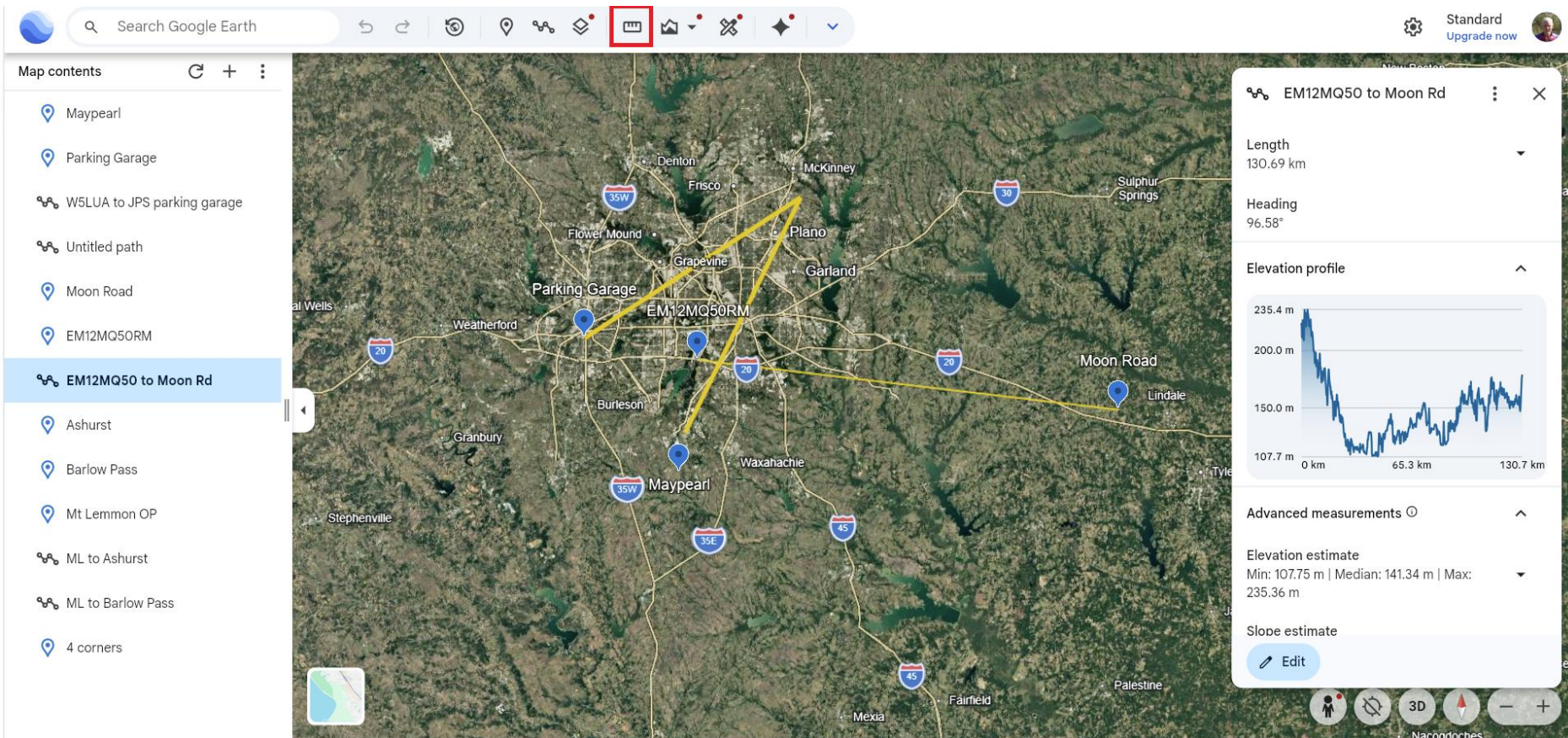
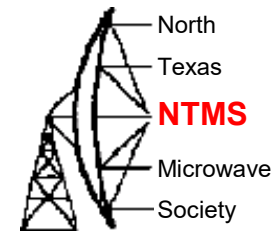
# Be aware of ridges on boresight



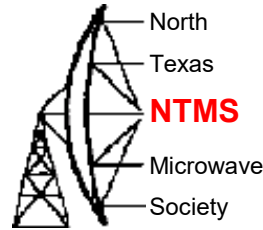
- Demo viewshed. Also demo of Bryan parking garage.



# Google Earth Web

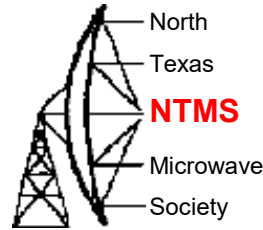


# Using NTMS prop website



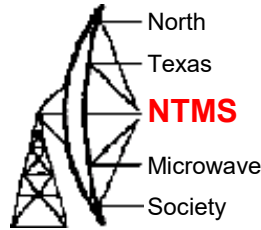
- **In your browser: <https://prop.w5isp.com/>**
- NTMS propagation engine/website upgrades (click “What’s new”)
- How to check beacons? Look at the monitors (demo)

# Map/Path Analysis



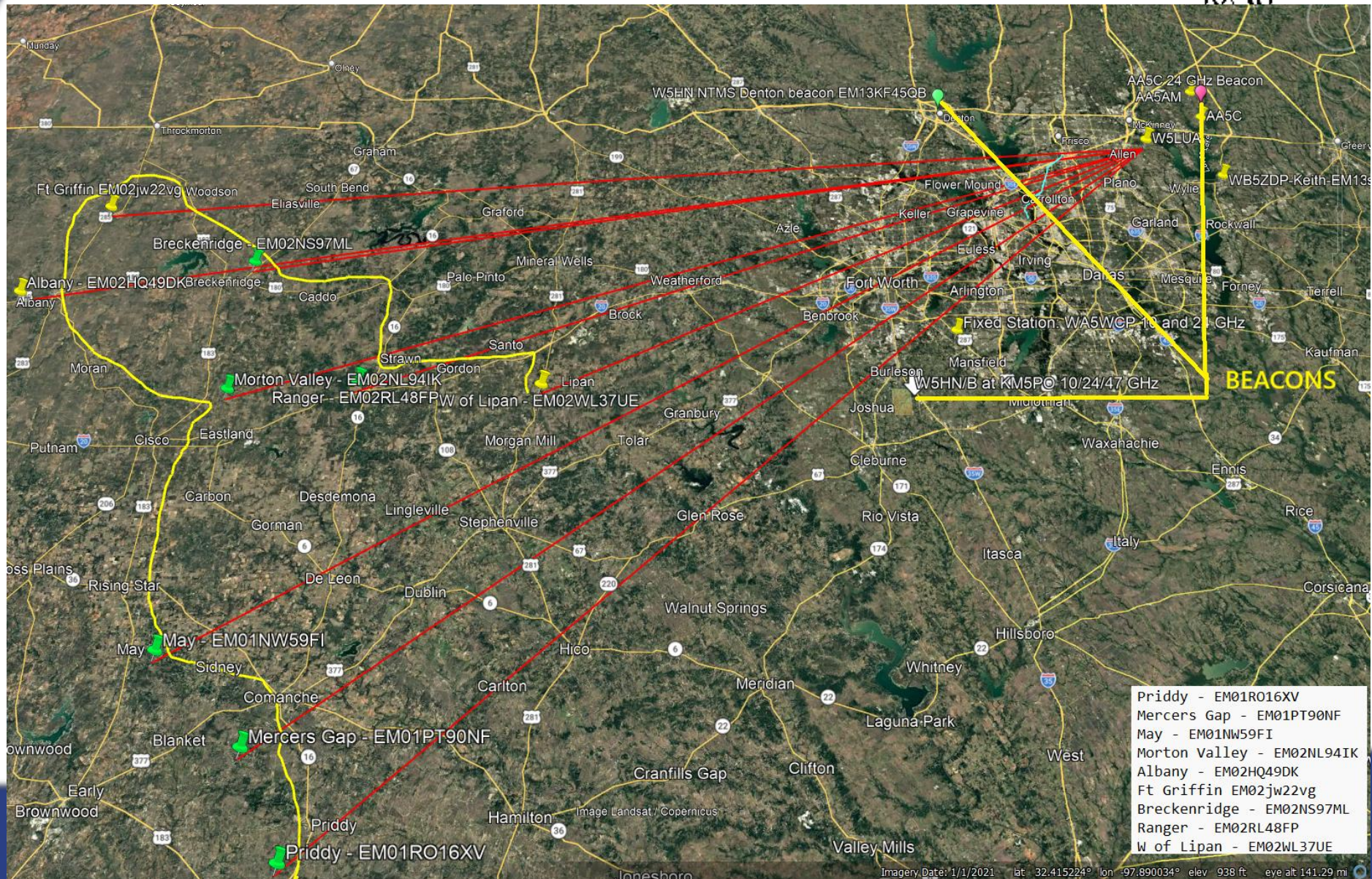
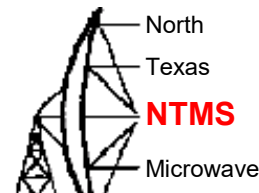
- **In your browser: <https://prop.w5isp.com/>**
- You will land on the “Map” (we will demo)
  - Locate me
  - Select frequency band
  - Observe “now” conditions and graphed forecast
  - Put forecast in motion
- On menu bar at top click on “Path” (we will demo)
  - Populate two grid locations
  - Select band
  - Update “Station” metric values
  - Click Calculate
  - Observe: Margin, Metrics, Future trend/predictions

# Multiple path analysis

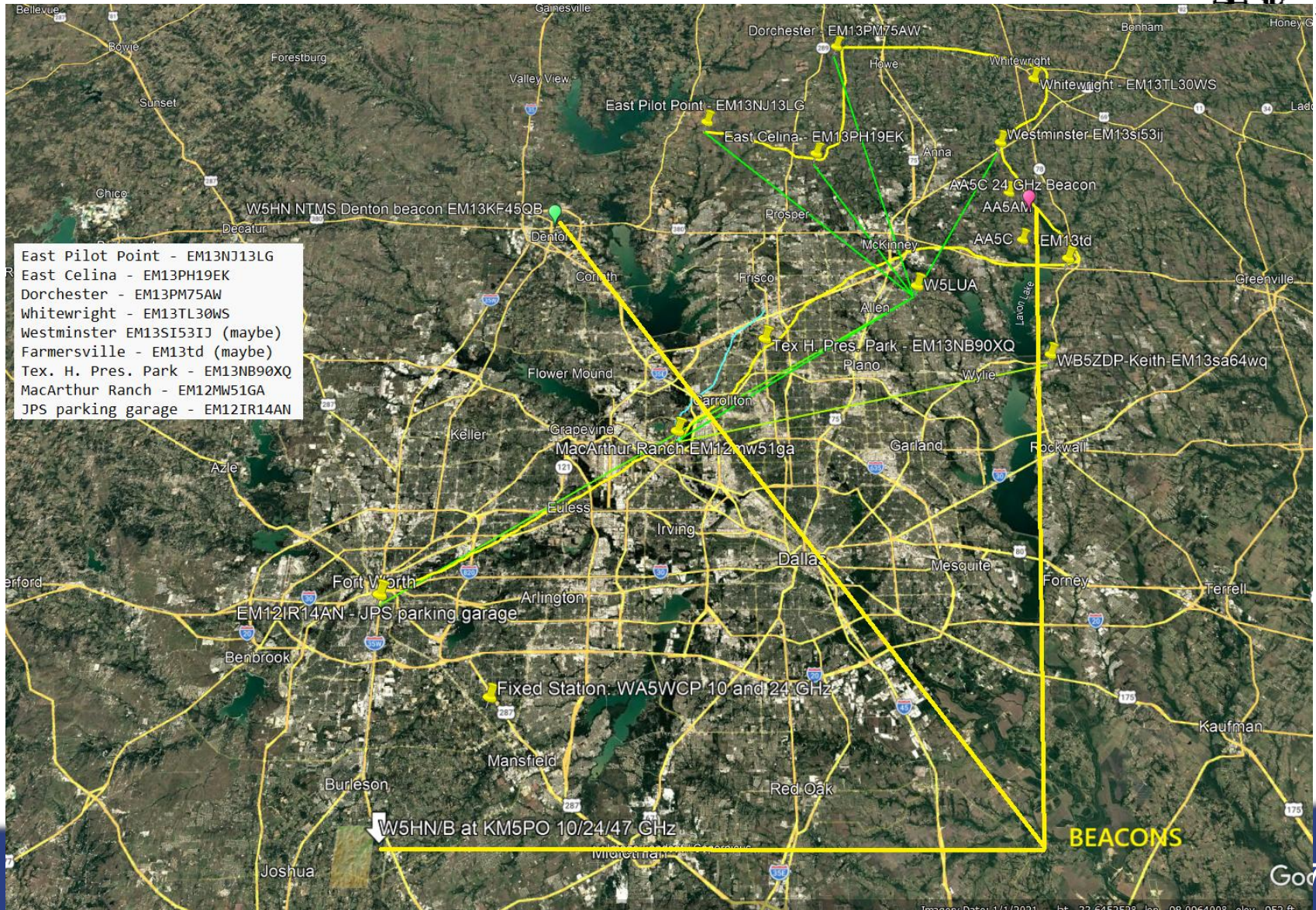
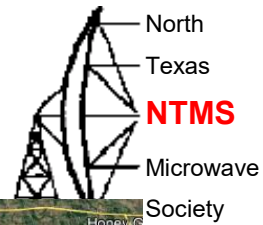


- **Create csv file of location/station data**
- Use a wrapper script that calls each csv file on the hour
- Aggregate hourly files
- Evaluate data versus weather phenomena and other observable factors
- Have one table of known good locations that have been successful in the past. This is the sanity check that the propagation engine is giving reasonable results.

# Saturday routes



# Sunday routes



# Questions?

