Amateur Radio Direction Finding

(Fox Hunting)

What is Radio Direction Finding and Fox Hunting?

- The purpose of Amateur Radio Direction Finding (ARDF) is to locate a radio signal. That signal can be some sort of interference, an emergency beacon, or one we transmit for fox hunting.
- Fox hunting is an activity wherein participants use radio direction finding techniques to locate one or more radio transmitters hidden within a designated search area.

Why do we need these skills?

- Locating Harmful Interference
  - Intentional interference
  - Stuck transmitters
  - Bad behavior
  - Local noise sources
    - Computers
    - Electric fences
- Search and Rescue
  - ELT/EPIRBs
  - FRS/ham radios
  - Wildlife location
  - Black boxes
  - Stole cars (lo jack)
- FOR FUN!!

Fox Hunting Fun

- Working with others
- Being outside
- Competitions
- Building own equipment
- Fox hunting can be done anywhere
  - Parks
  - Cities
  - Forests

Equipment Needed

- Fox transmitter
- Radio receiver
- Omni direction antenna
- Directional yagi antenna
- Map and compass

Optional Equipment

- Doppler scanner
- Attenuator
- Loop antenna

Fox Hunting Complications

- Terrain
- Buildings
- Trees
- Power lines
- Water towers
- Reflection
- Multipath
- Antenna

Strategies

- Body blocking
- Removing the antenna
- Signal strength and clarity
- Tuning off frequency
- 3rd harmonics
- Triangulation
- Attenuators

Strategies: Body blocking / Antenna removal

- Body blocking is using your body to block the signal from the transmitter in an attempt to determine direction.
- Remove the antenna and listen if you can still hear the transmitter. This works when you are close to the transmitter.

Strategies: Signal strength and clarity

- Most radios have a signal strength meter on them. This is a signal strength meter.
- The more of the black bars, the stronger the signal.
- Also listen to the transmitter tone, is it clear or is covered by static

Strategies: Tuning off Frequency

Fox transmitter frequency is 146.580, you could tune your radio to:

- 146.570
- 146.575
- 146.585
- 146.590

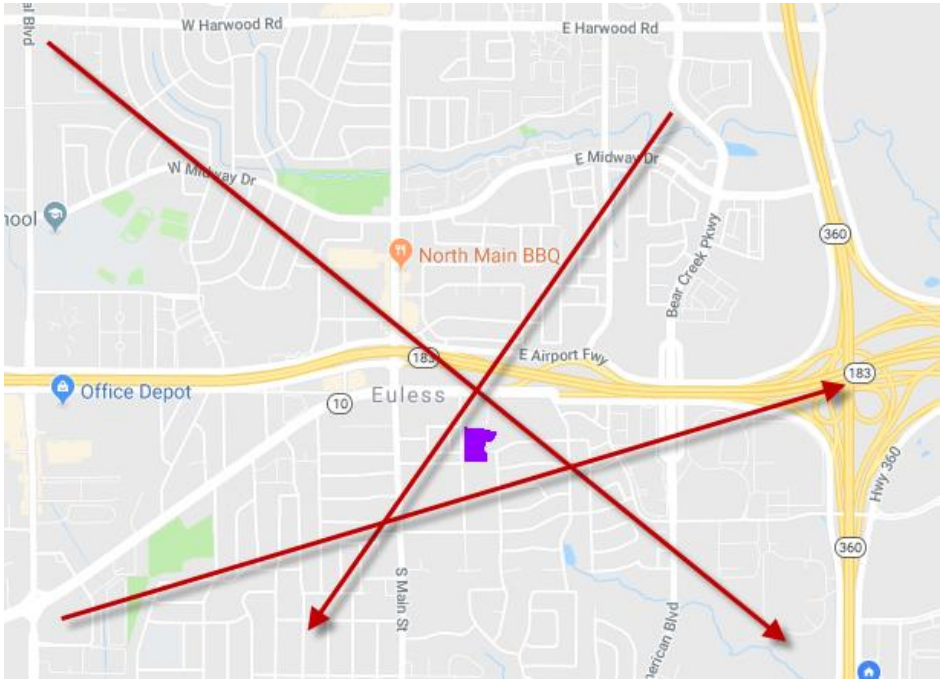
When your radio is tuned off frequency, the close you are to the transmitter, the stronger the signal.

Strategies: 3rd Harmonics

- A harmonic frequency is a regular and repeating multiple of an original wave pattern, known as a fundamental frequency.
- Fox transmitter frequency is 146.580, you could tune your radio to the 3rd harmonic frequency of 439.740.
- To figure the 3rd harmonic multiply your fundamental frequency by 3.
- Using the 3rd harmonic frequency works the same as tuning off frequency. The closer to the transmitter, the stronger the signal.

Strategies: Triangulation

- The area where the 3 lines form a triangle is the highest probability of where the transmitter is located.
- Accuracy depends on the complications mentioned in a proceeding slide.
- Purple is transmitter location.



Setting Up Your Radio

- Tune to frequency
- Turn off squelch
- Attach desired antenna

Final Notes

- If you find the fox:
  - please to not pick it up
  - please do not draw attention to the fox after you found it
  - we want others to have a chance to practice their skills in finding the fox.
- Do not transmit during the fox hunt
  - this could damage your radio
  - interferes with others trying to find the fox

Questions?

Let’s Make an Antenna!!

Antenna Components

- 11.5 in pvc
- 7 in pvc

- 5 in loop wire

- 41 3/8 in reflector (need 1)
- 17 3/4 in driven (need 2)
- 35 1/8 in director (need 1)

- Hose clamps (need 6)
- Coax cable
- Pvc T (need 1)
- Pvc cross (need 2)

Antenna Construction