Radio Direction Finding, aka the Fox Hunt

A Primer on VHF Radio Direction Finding for Montgomery County ARES

Stephen Burns, N5VTU

What is Fox Hunting?

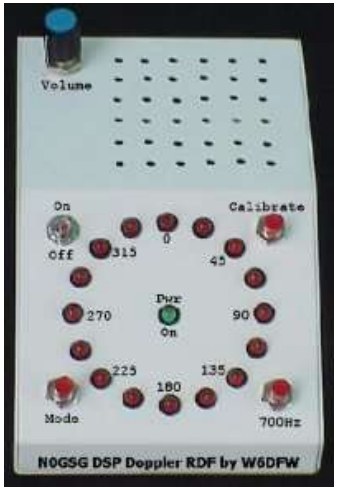
- Also called Transmitter Hunting, T-Hunting, Radio Direction Finding (RDF), or Radio Orienteering
- An activity in which participants use radio location techniques in an effort to locate one or more radio transmitters.
- May be done for sport, search and rescue work, law enforcement activities, or to locate sources of noise or other harmful interference.
- May be done in vehicles or on foot.

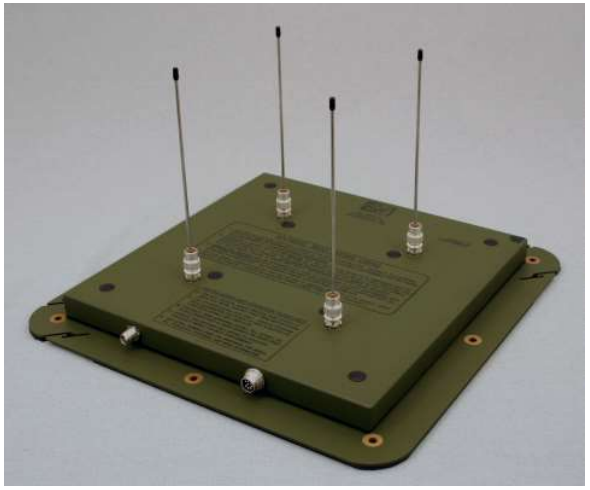
Types of Amateur Radio Foxes

Fox Hunting Myths

- I need sophisticated Doppler based equipment to successfully participate in a foxhunt.
- I must have a Yagi or other beam type antenna.
- I need a passive or active attenuator (step, rotary, frequency offset, etc.).
- I must have lots of experience to find the fox.
- I'll get ridiculed if I don't find the fox.

The Fancy Stuff





The Facts

- The most basic fox hunting can be done with a handie talkie and “rubber duck” antenna.
- Body fade, shielding, and Faraday cages can be used to determine signal direction.
- For attenuation, try substituting lower gain antennas, antennas cut for higher frequencies, small paperclips, or even no antenna at all.
- If you don’t participate, you’ll never be successful at finding the fox.

The Stuff That Works

Things to Remember

- Take notes!!! Pencil and paper are priceless.
- Use a compass or landmark to confirm headings and take heading readings often.
- Don’t move too far in one direction without taking subsequent readings or you may pass the fox completely.
- If you lose the signal or get confused, return to the last known good location and start over.

Things to Remember, cont'd

- Don't limit yourself to the frequency of the fox. Tuning several kHz either side of the fox frequency can provide valuable information. Also consider tuning the third harmonic of the fox frequency. The idea is to keep the signal near midscale (not full scale) on your S meter.
- NEVER transmit on the fox frequency.
- If you find the fox, do not let your excitement give away the location and spoil the hunt for others.
- Don't trespass on private property.

Practical Applications of Radio Direction Finding

- Search & Rescue – Lost campers and hikers; downed aircraft; boats in distress, etc.
- Recovery of Stolen Property – The common stolen car recovery system LoJack® uses RF signals on 173.075 MHz to locate the LoJack® transmitter in cars. Police utilize a Doppler array on patrol cars to track the LoJack® signal from the stolen car.
- Locate repeater jammers or other malicious interference.
- Locate sources of RFI or EMI

Fox Hunting for ARES

- ARES Fox Hunts are useful training exercises. They test not only the operator, but the equipment too.
- ARES members and ham radio operators in general can use RDF techniques to locate sources of electrical noise or Part 15 devices causing interference to radio communications.
- RDF techniques can be useful to track down sources of malicious interference (repeater jammers, squirrels, etc.).

Fox Hunting for ARES, cont'd

- With the prevalence of Personal Locator Beacons operating on 121.5 MHz and 406 MHz, and our proximity to the Sam Houston National Forest, there is a real possibility of a need for trained searchers in the event of a lost camper/hiker.
- Aircraft Emergency Locator Transmitters (ELT's) operate on 121.5 MHz and are activated automatically in the event of a crash or hard landing.

Fox Hunting for ARES, cont'd

- Many amateur/commercial HT's feature some sort of automatic transmission mode that will send a distress signal if the user becomes incapacitated or needs to summon help.

1. Yaesu: "Emergency Automatic ID"
2. Kenwood: "Emergency Call"
3. Icom: "One Touch Reply"
4. Motorola: "Man Down"

No matter what you call it, the feature is only as good as those who know how to track the signal.

Resources

- www.homingin.com
- *Transmitter Hunting, Radio Direction Finding Simplified*, by Joseph Moell, KoOV and Thomas Curlee, WB6UZZ
- www.texasardf.org
- http://www.arrl.org/direction-finding