

An Introduction to RF Direction Finding aka Fox Hunting

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Outline of talk

- Terminology
- History of Radio Direction Finding
- The FOX
- HF RDF
- VHF/UHF RDF
- Using the Handi-Finder
- Review and Q&A

Terminology

- DFing is the art of locating the source of a signal
 - Using a Portable Receiver
 - And Directional Antennas
- Fox Hunting is the game of DFing
 - AKA T-hunting, radio-orienteering
 - Ham Radio's Hide-n-seek
- RadioSport is a formal DFing contest with international rules and teams from many countries.

History of RDF



- From the 2010 ARRL Handbook, the British Navy used it to track German U-boats in WWI.
- Fast forward to the early 50s, ARDF used 3.5MHz and 28MHz.
- Today mostly on 144MHz
- Most International ARDF contests also use 3.5MHz
- See also <http://homingin.com/> for more history and techniques

First you need the Fox

- Fox should be physically small, low power and depending on event long duration.
- Some misc. examples are: <http://homingin.com/boxes.html>
- Commercial:
 - <http://www.byonics.com/products>
 - <http://www.silcom.com/~pelican2/PicoDopp/MICROHUNT.htm>
 - <http://www.bigredbee.com/BeeLine.htm>

HF RDF

- Primarily use RDF Loops
 - Single turn in shape of loop $\sim 0.08 \lambda$ in circumference ($C=\pi d$ or $2\pi r$)
 - At 28MHz, loop is $\sim 34''$ in circumference or $\sim 10''$ diameter
 - At 3.5MHz, loop is $251''$ in circumference or $80''$ diameter
- Measure RF signal in loop
- Null in signal indicates direction to Fox is perpendicular to loop
- To reduce ambiguity in direction, use body to shield loop

VHF/UHF RDF

- Smaller and more portable (than HF) directional antennas
- Switched Pattern Antennas
 - Depends on antennas that have non-uniform patterns (cardioid)
 - Similar to VOR system as it shows which way to turn
- Time-of-Arrival
 - Switch between two 'identical' antennas
 - Delayed Time-of-Arrival creates audible phase shift when not pointed directly at source
 - The Handi-Finder
- Doppler
 - Uses multiple antennas that are electronically rotated and a way to calculate direction to source.
 - Best in mobile environment

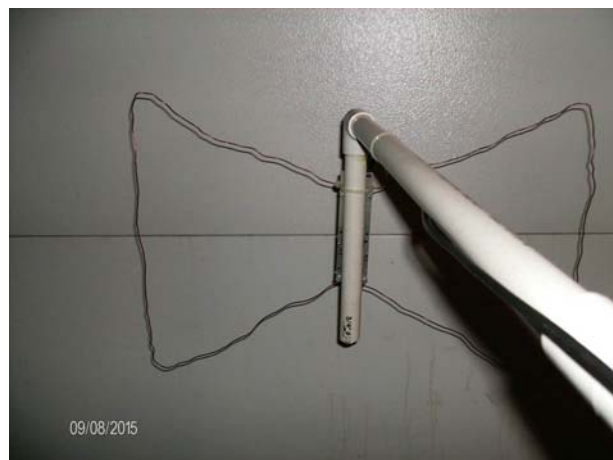
Using the Handi-Finder (1)



Using the Handi-Finder (2)



Handi-Finder (3) – searching left-right



Handi-Finder (4) – searching up or down



Review and Q&A

Post question to chat or raise hand