



HAM RADIO FOX HUNTING

ALSO KNOWN AS ARDF (AMATEUR RADIO DIRECTION
FINDING)

AD4CJ

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WHY DO WE WANT TO USE DIRECTION FINDING?

- Stuck transmitter
- Interference (intentional or unintentional)
- Locate noise sources
- Search and rescue (downed aircraft and ELT)
- Introduce non-hams to our hobby
- Have fun in the out of doors



WHAT TYPE OF EQUIPMENT IS NEEDED

- Transmitter that can be hidden (the fox)
- Receiver for the hunters to hear the “fox”
- A means of determining direction to the fox



HOW DO WE FIND THE DIRECTION TO THE FOX?

- Look for signal peaks
- Look for signal nulls



TYPES OF ANTENNAS TO USE

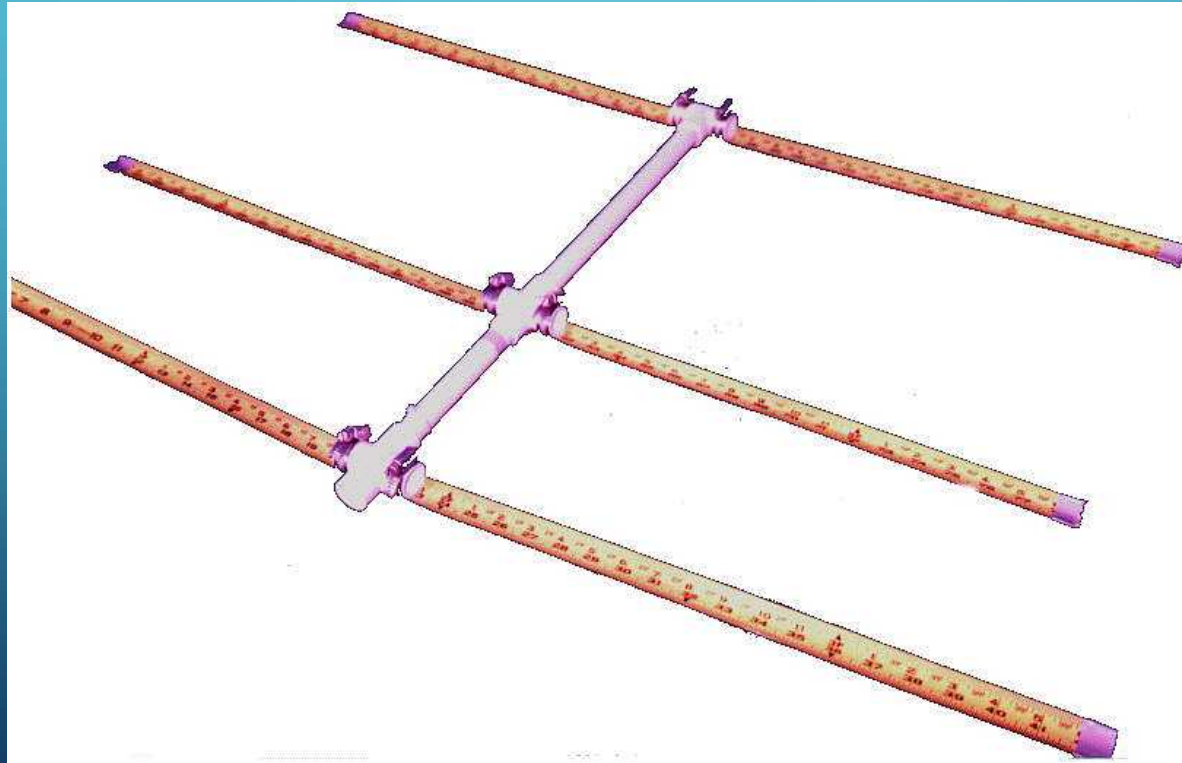
- The rubber duck on your HT (not really a great DF antenna)
- Directional peaking antennas (Yagi)
- Directional nulling antennas (loop antenna)
- Antenna array (Doppler system)

USING YOUR RUBBER DUCK ON THE HT

- You can use your HT with its “rubber duck” antenna, and use “body blocking”
- It is better to have a receiver with a good signal strength meter
- Pringles™ can or paper towel roll with foil over the antenna
- Try tuning off the transmitter frequency by a small amount. I.E. if the “fox” frequency is 146.565, try tuning to 146.570 or 146.560.
- If you have a dual band HT, try listening to the 3rd harmonic of the “fox” frequency. If the “fox” is on 146.565, listen on 439.695

ANTENNAS FOR PEAK SEARCHING

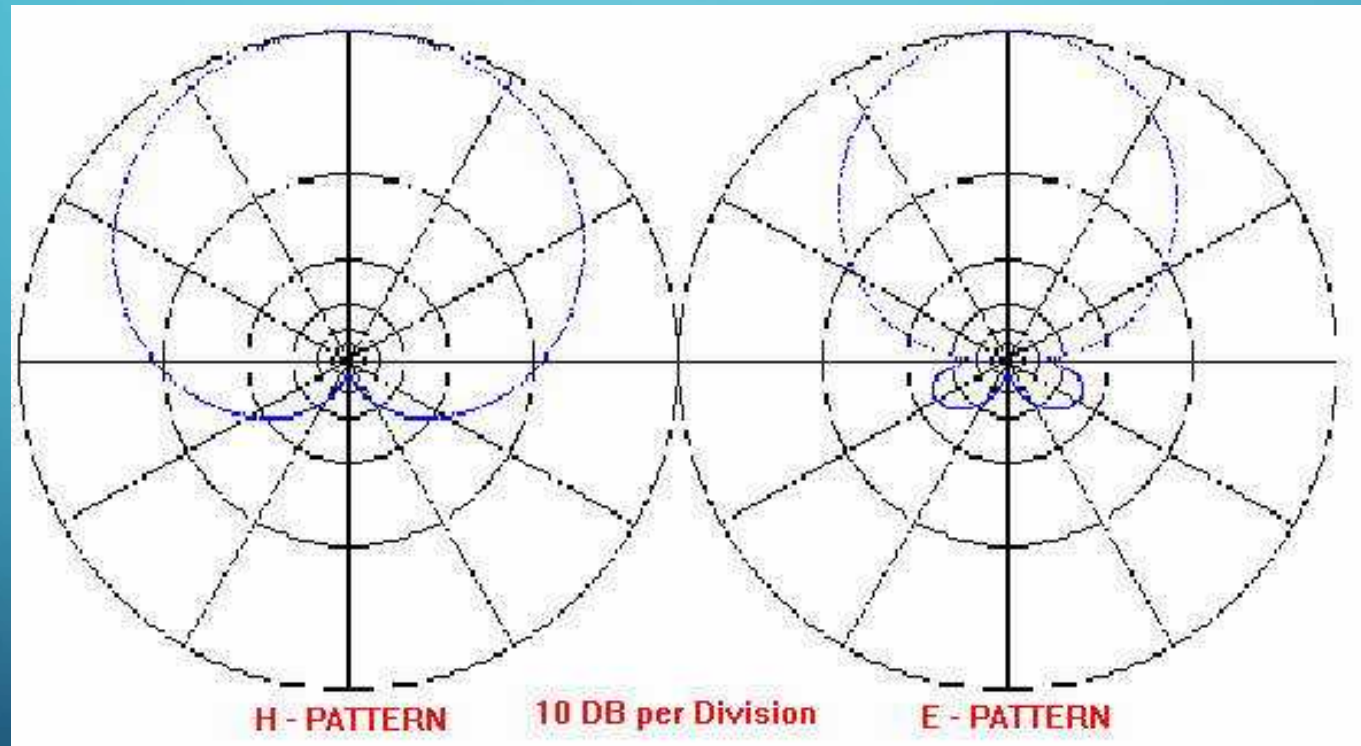
- Tape measure Yagi by WB2HOL



TAPE MEASURE YAGI PROPERTIES

Performance Predicted by YAGI-CAD	
GAIN	7.3 dBd
Front-to-Back Ratio	>50 db
3 db Beamwidth	E = 67.5 degrees
3 db Beamwidth	H = 110 degrees

TAPE MEASURE YAGI PROPERTIES

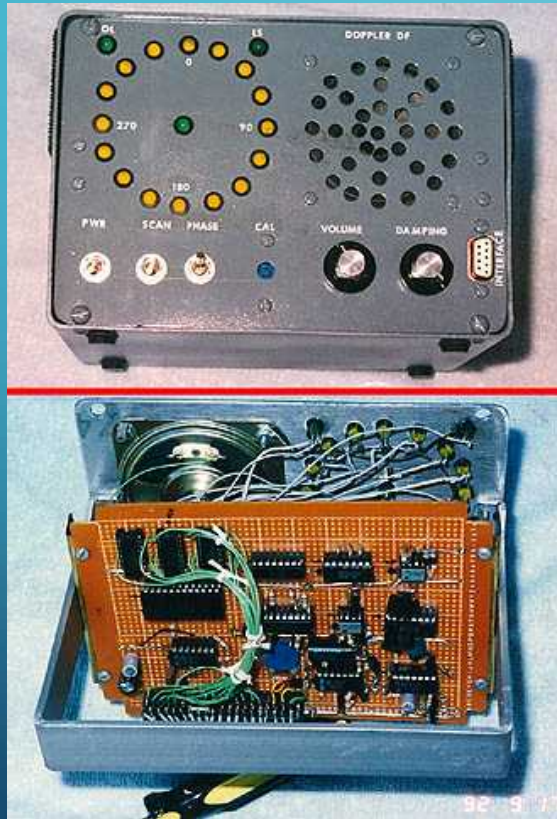




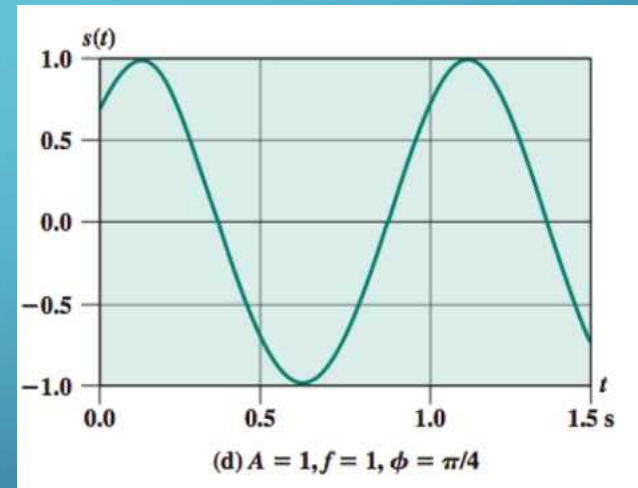
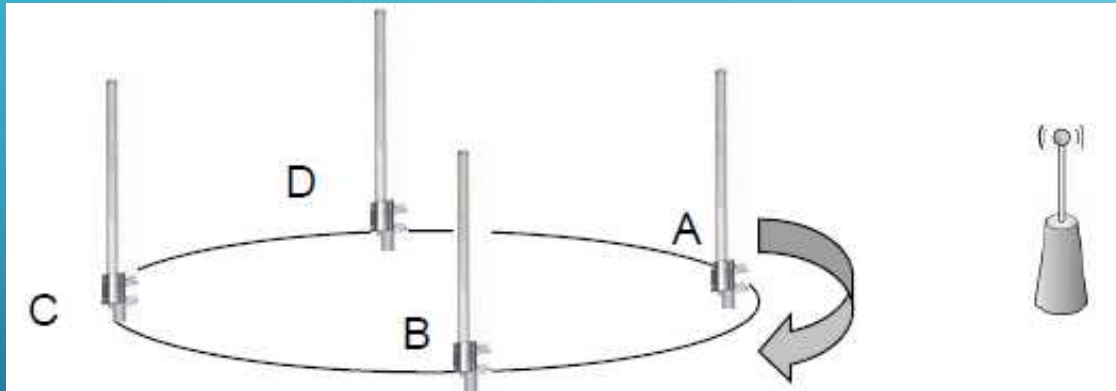
TAPE MEASURE YAGI ANTENNA

- Think of it as a “shotgun”, and not a rifle
- Remember the 3 dB (half power) beamwidth is 67.5 degrees
- Try to keep the antenna slowly moving back and forth as you watch your receiver’s S-meter

DOPPLER ARRAY FOR ARDF



DOPPLER ARRAY (REALLY PSEUDO-DOPPLER)





DOPPLER ARRAY SYSTEMS

- Advantages – very quickly can tell direction of signal source.
Good for a “kerchunker” who is on the move
- Disadvantages
 - Expensive
 - Large antenna array needed
 - Multipath confusion
 - Not really good “close in”

ANTENNAS FOR “NULL” SEARCHING

- Small loop antennas

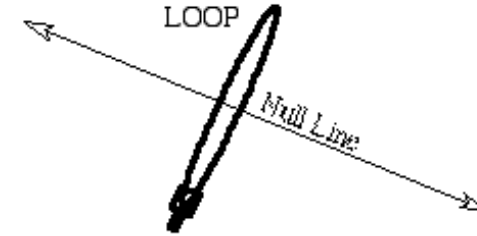


FOX HUNTING LOOP PROPERTIES

- Have fairly sharp nulls (5 degrees or so)
- Ambiguity of signal 180 degrees
- Must move off direction to fox in order to triangulate

Instructions

Unlike some other directional antennas, like a Yagi, the loop antenna is used in the null mode (minimum signal). Because the null mode can provide a very sharp bearing, readable to plus or minus 5 degrees.



The Loop Antenna has the advantage of being less affected by reflection signals due to its Faraday shield.

By itself, the loop can provide the entire antenna requirement provided the signal is strong enough to be received by the untuned loop.

If the signal is too weak, a Yagi is recommended for its directional gain.

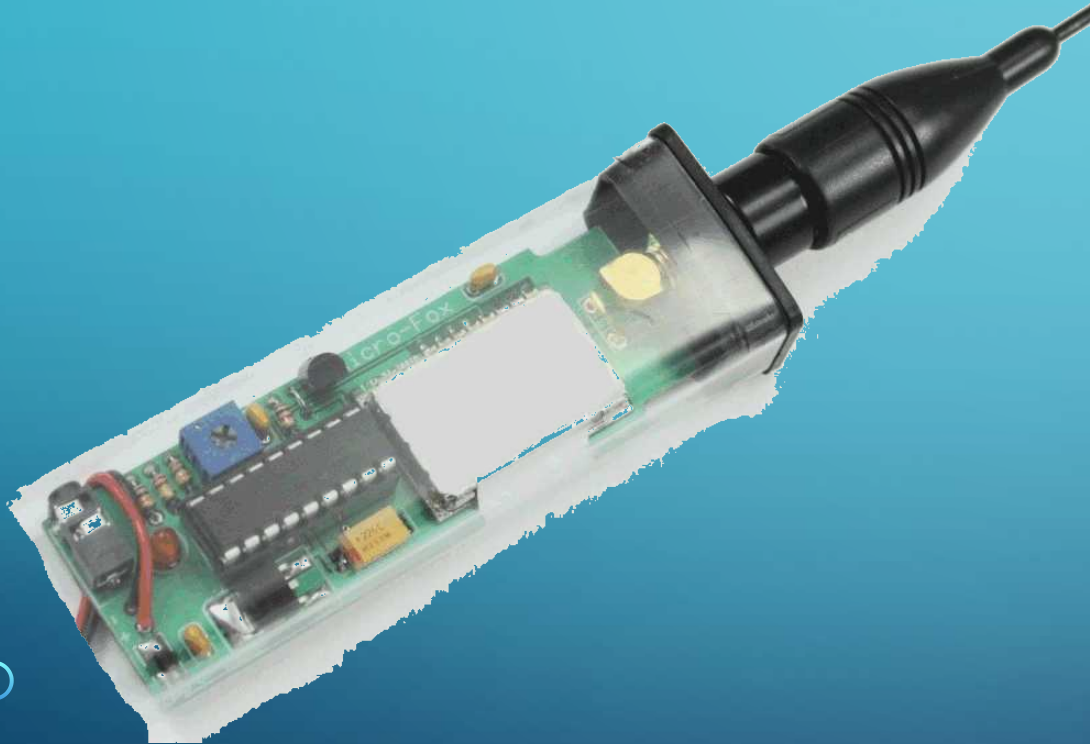
If the signal is too strong, the use of an attenuator may be required. (Fox Hunt Attenuator)

ARDF is an art, not a science. It requires skill. You need practice to acquire that skill.

Happy Hunting

WARNING
This Antenna is for Receiving ONLY
Transmitting with this Antenna can Damage your Radio.

WHAT DOES A FOX TRANSMITTER LOOK LIKE?





ADDITIONAL USEFUL EQUIPMENT

- Attenuators
 - Manual – passive inline resistors
 - Manual – offset attenuators
 - Automatic - VK3YNG Sniffer

MANUAL ATTENUATORS - PASSIVE



MANUAL ATTENUATORS OFFSET

Uses a small frequency generator to mix with the “fox” frequency, and you listen to the mixing product



AUTOMATIC ATTENUATORS VK3YNG MK4 SNIFFER

- Automatically adds attenuation as the signal starts to saturate the receiver
- Adds attenuation in 15 dB increments
- Maximum attenuation is 135 dB
 - That is $1/31,622,776,601,634^{\text{th}}$ of the signal at maximum attenuation



RESOURCES FOR FOX HUNTING

- Transmitter Hunting by Joe Moell, K00V (\$33 on Amazon)
- Websites
 - www.arrowantennas.com - Fox hunting loop antennas and Offset Attenuator
 - http://theleggios.net/wb2hol/projects/rdf/tape_bm.htm - Tape Measure Yagi
 - www.rdfantennas.com - Commercial source for Fox Hunting Yagi antennas
 - www.byonics.com - Source for Fox Hunt Transmitters
 - www.homingin.com - Joe Moell's website with TONS of Fox Hunting info