Radio Direction Finding:
Analog and Digital Applications
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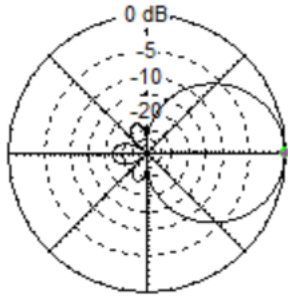
Analog

Overview – Direction Finding is the physical tracking of radio transmissions. Hams rely on an antenna's gain pattern to find a signal; they must rotate the antenna to find either the peaks or nulls of their transmission.
Direction Finding also involves **attenuation,** where a signal's received power is diminished through antenna modification.
Analog DF'ing provides a faster, simpler response over digital DF but only gives a signal bearing.
Equipment – Yagi/Beam/Directional antennas, attenuators. Low cost or homebrew.
Results – Very responsive but only gives bearings to signals

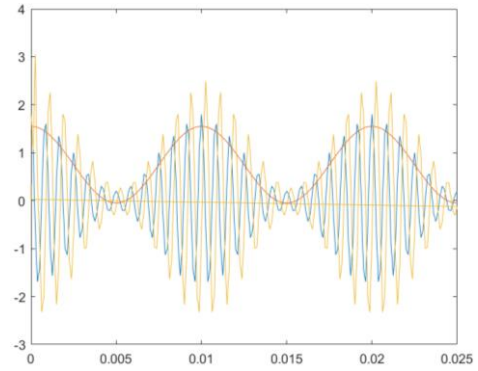
Cadets using directional antennas for foxhunt



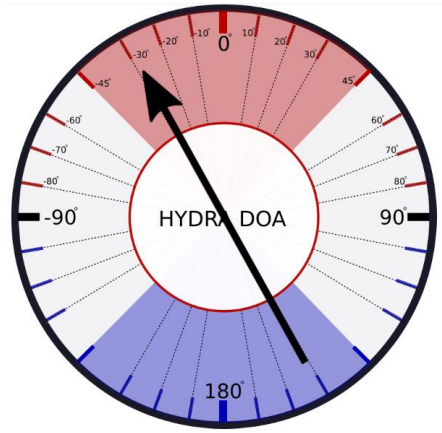
Antenna gain plot on EZNEC

Digital

Overview – Software Defined Radios can do most of the work of directional antenna arrays. In addition to locating a signal, SDRs can decode signals. Algorithms on signal processing software can digitally filter, attenuate, and demodulate received signals.
Digital DF'ing requires intense software knowledge but provides much more signal information and ability over analog DF.
Equipment – High-Cost SDRs (KerberosSDR, HackRF One) and DSP Software (MATLAB, GNURadio).
Results - Gives bearing, GPS location, ability to decode and manipulate signals within SDR Software.



AM Signal Demodulation In MATLAB



KerberosSDR DOA

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