



Antennas Live!!!

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About . . .



- **This Talk . . .**

- Takes advantage of the Visualisation & Solver Capability
- Uses Field Solver Software to Display the Fields and Currents on Basic Antennas

So Far . . .



Nimrod MRA4

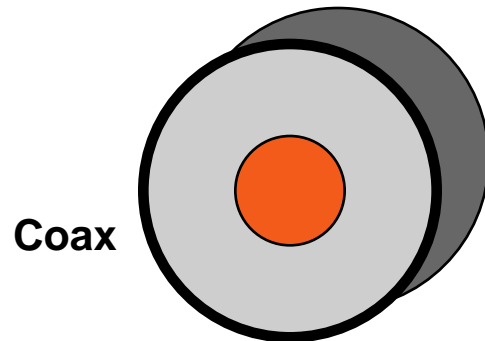
- **Amateurs & Professionals have a similar Problem**
- **Too Many Antennas in Too Little Space!**
- **Need to Understand What the Fields and Currents Do**



A Ham Stack

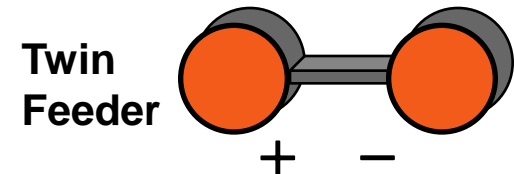
Feeders

- **Two basic feeder types: Coax, Twin Wire**



Inner Conductor is shrouded by dielectric, with outer (braided) screen.

For Radio 50Ω Coax is used (TV is 75Ω)

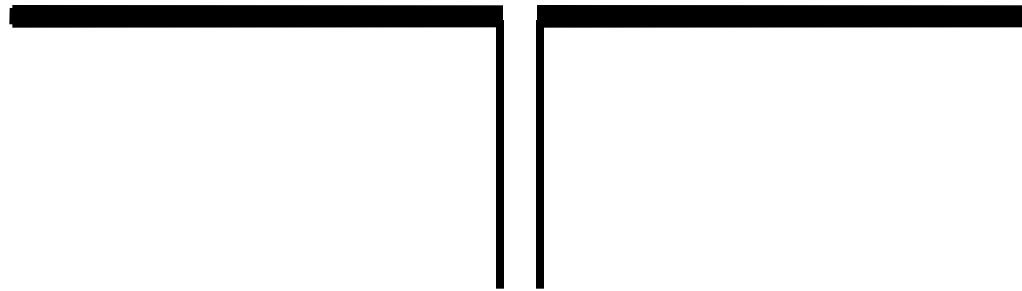


Two conductors kept at constant separation by insulation - no screen

Balanced Feeder

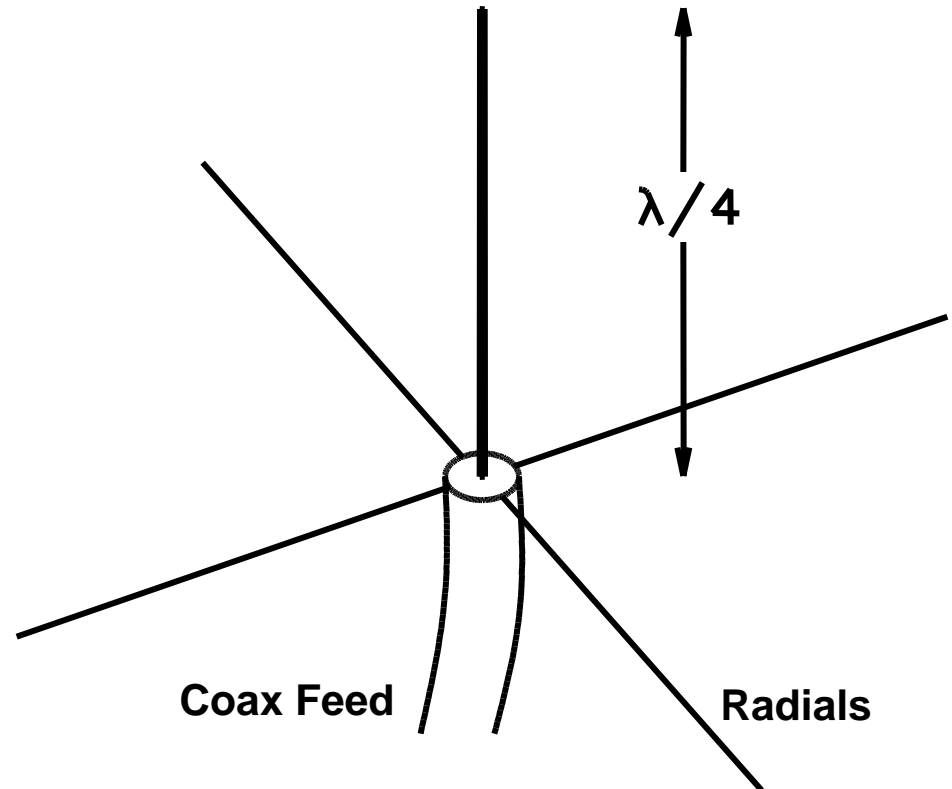
Dipole

- **Simple - but requires a balanced feed via a balun.**
- **Each leg is $\lambda/4$ long - $\lambda/2$ across in total.**



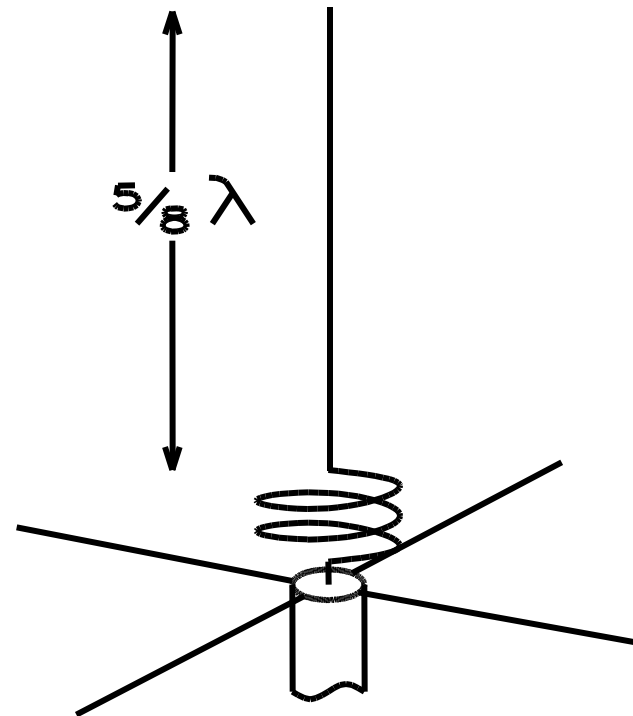
Quarter Wave: $\lambda/4$

- Radials simulate a groundplane and are also $\lambda/4$ long



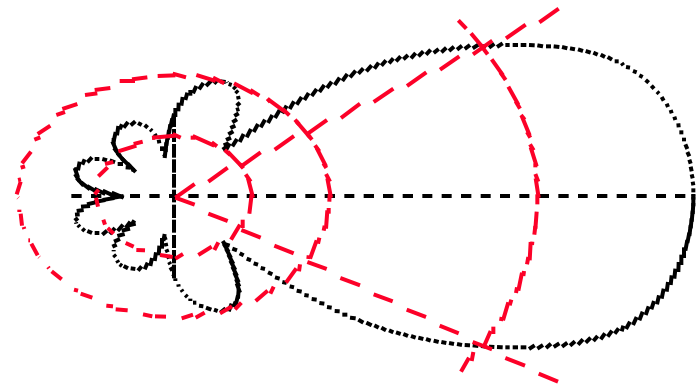
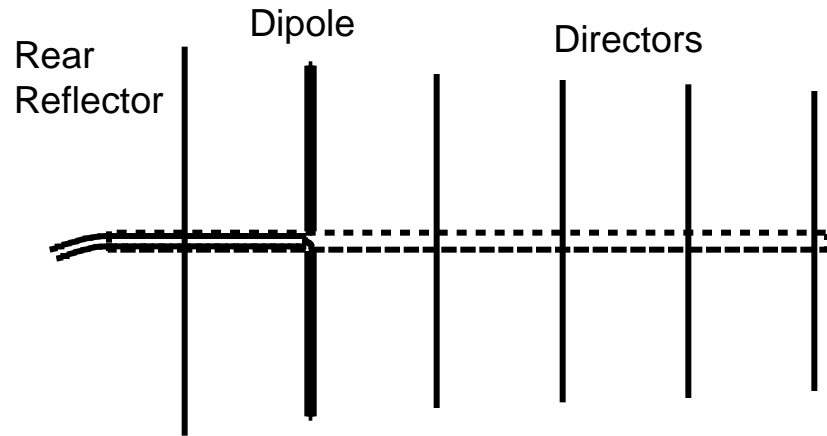
Five-Eighths: $5\lambda/8$

- $5\lambda/8$ - Common antenna for mobile use
- Better impedance match and gain than basic quarterwave
- Radials emulate groundplane like the quarterwave



Yagi

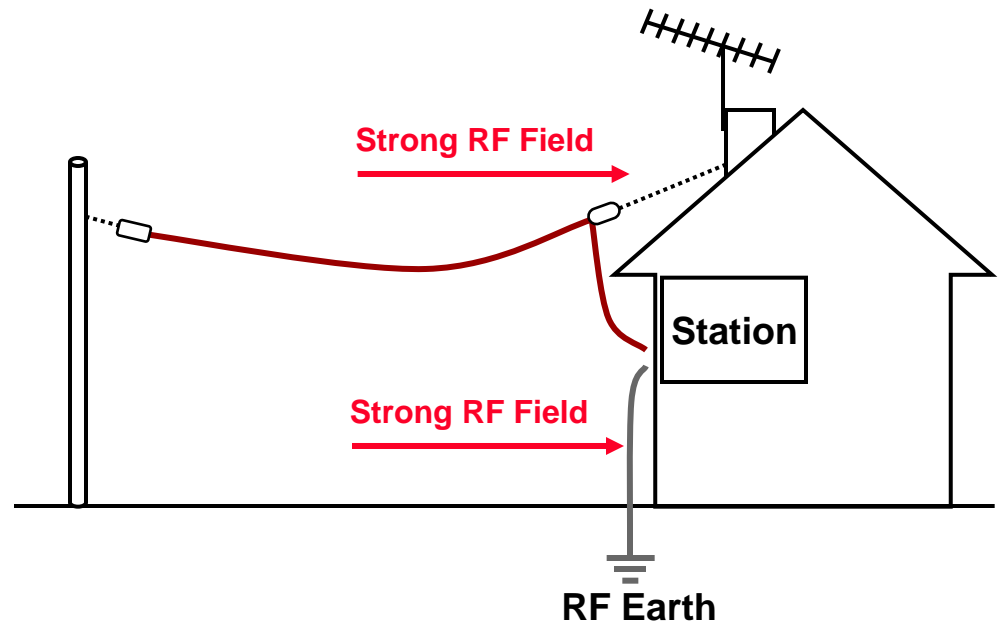
- Dipole acts as pick up
- Front Directors 'focus' to give Gain
- Rear Reflector gives back/front isolation
- Yagis may be horizontal or vertical



Gain - Circles are at -3dB, 10dB & 20dB

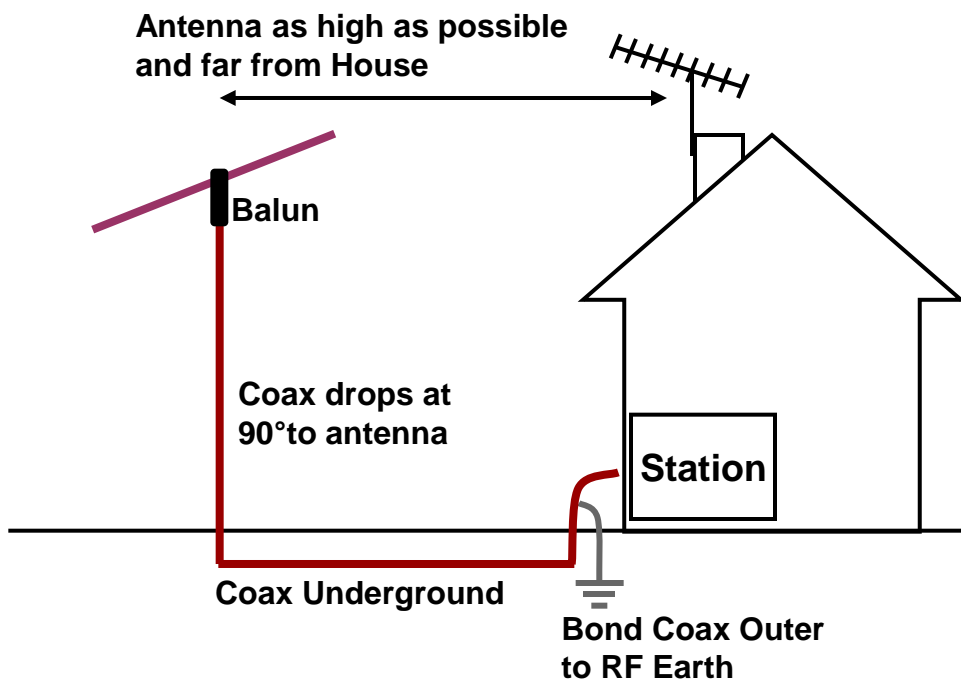
Long / End Fed Wires

- **Poor EMC Antenna System**
- **Common at HF where wavelengths are long**
- **Needs an ATU to match it for HF multiple bands**
- **Unbalanced Antenna System.**
- **End-Fed Wire**
- **Strong RF fields near the house.**
- **Poor earth system.**
- **Near TV antenna.**
- **Most likely to cause interference**



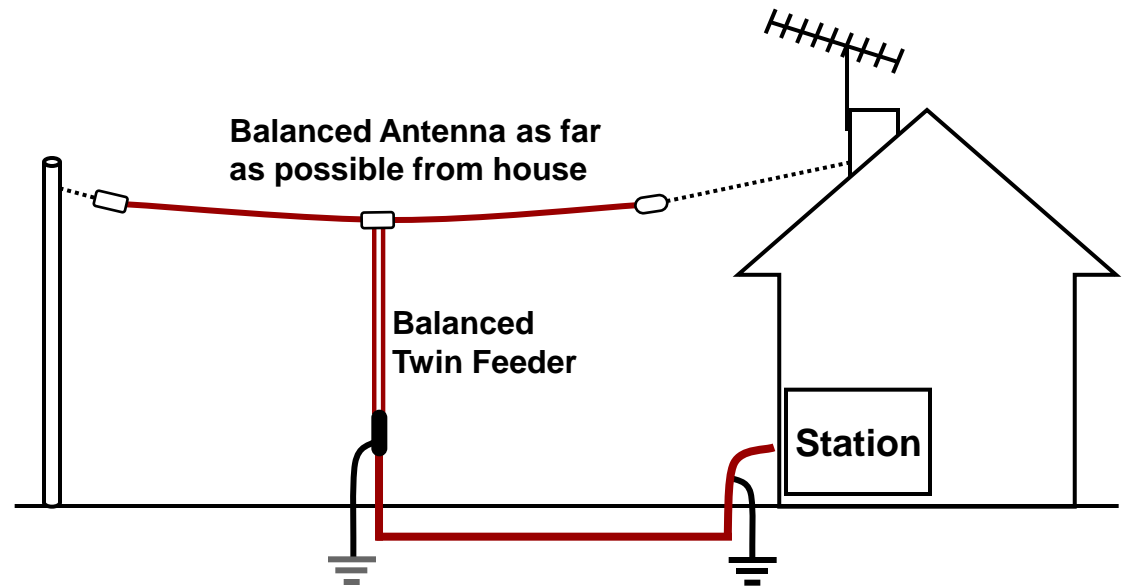
Dipole Systems

- **EMC Correct Antenna System**
- **Antenna sited as far away and as high as possible from TV antenna.**
- **Good Quality coax run underground where possible.**
- **Coax earthed at point of entry to house.**
- **Balun used.**
- **Balanced Antenna System.**



Balanced Antennas

- **Excellent EMC Antenna System**
- **Antenna balanced system.**
- **Well located.**
- **Well Earthed.**
- **Antenna Position - Space away from TV Antennas, Phone Lines**
- **Least likely to cause interference**



Software & References

Free:-

- **Mininec:** <http://www.emsci.com/>
- **MMANA:** <http://mmhamsoft.ham-radio.ch/>
(home of MMSTV as well)
- **SonnetLite - Planar/Patch Antennas etc**
- a free version of Sonnet from <http://www.sonnetusa.com>

Not Free:-

- **HFSS - High Frequency Structure Simulator**
- **FEKO - <http://www.feko.info/>**