

Antenna Modeling  
How and Why  
for Existing or Future Antennas

FRRL Program

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AH6EZ/W9

# *Why* Model Your Antennas

- Existing Antennas
  - Maximize the performance of your station
  - Know where your signals are radiating (and not)
  - Build confidence in your station
- Future Antennas
  - Easily dream and scheme about antennas, at no cost
  - Get an idea of performance before you erect them
  - Perhaps precut element lengths

# *How* to Model Your Antennas

- Download free demo version of W7EL EZ-NEC
  - Demo is fully functional but limited to simple antennas
  - <http://www.eznec.com/demoinfo.htm>
  - Runs on Windows 95 – 7
  - Full EZ-NEC V5 is \$89
- Download extensive 188 page manual
- Leverage and modify existing antenna models
- I am going to show you how simple it can be

# What EZ-NEC Can Do

- Show your antenna gain in all directions
- Show effects of antenna height and configuration
- Show you the SWR curve
- Version 5.0 adds the following
  - Array phasing networks, tuners, impedance matching networks, along with realistic effects from transmission line loss
  - Insertion of objects in a wire
  - Transformers, parallel loads
- Version 5+ and Pro add Smith Chart and VOACAP file outputs

# What EZ-NEC won't do very well

- Indoor antennas
  - How to consider capacitance and absorption
- EZ-NEC estimates ground conductivity
  - Can you measure your ground? Probably not
- Demo EZ-NEC limited to simple antennas
  - 20 segments, full version does 500 segments

# ARRL Antenna Modeling Course

- All ARRL Continuing Education Courses being reformulated for release in 2011
- 2002 Course book was \$40, 384 pages
- 14 Chapters
  - Modeling, language used, setting up a model, outputs, sources, grounds, freq selection, loads, transmission lines, adequacy testing, limitations, equations, practical modeling, advanced modeling
- 31 Lessons
- 320 Review Questions

# Let's Try out the software

- Simplest to start with existing antenna
  - Change length, height
  - Look at effects
- Modify existing antenna to what you have
  - Look at the performance, gain, take off angle, azimuth effects
- Later on, create your own antennas using practical theory