

Direction Finding  
for  
Hidden Transmitter Hunts

FRRL March 2008 Program

# Why Become a DF Expert?

- Help find repeater interference
- Potential public service
- Learn the streets in your community
- Fun competition

# Direction Finding Challenges

- Multipath reflections
  - False directions
  - Confusion to Doppler Antennas
- Strong signals > maximum S meter
  - The closer you get, the worse it gets
- Quick antenna deployment
  - Short and possibly random transmissions

# Inexpensive Direction Finding Solutions

- Simple and robust antenna
  - Yagi or quad external to vehicle
    - Hard to mount
    - High wind speed
    - Need signal attenuator
  - Tape Measure yagi
    - Survives quick door or window deployment
    - Still needs signal attenuator
- Offset Attenuator
  - KOOV partial kit = \$15-18+
  - Arrow Antenna factory built = \$55
  - Can provide 100+ dB attenuation
  - Can be bypassed for full sensitivity
- Doppler Array
  - 2 element handheld array Ramsey DF1-C \$75
  - Can be confused by multipath reflection or modulated signals
  - Somewhat fragile antenna
  - Not very sensitive for weak signals

# K00V Offset Attenuator Kit

Qty	P/N
1	PCB w/ SMT components soldered in place
1	5K Potentiometer
1	Oscillator (2 MHz or 4 MHz)
1	8-Pin DIP Socket
1	1N9148 Diode
1	9V Battery Lead
1	4" Tie Wrap

Assembled/Tested	\$22.00 ea
Assembled/Tested – 12+	\$18.00 ea
Kit	\$18.00 ea
Kit - 12 or more	\$15.00 ea

<http://www.west.net/~marvin/k0ov.htm>

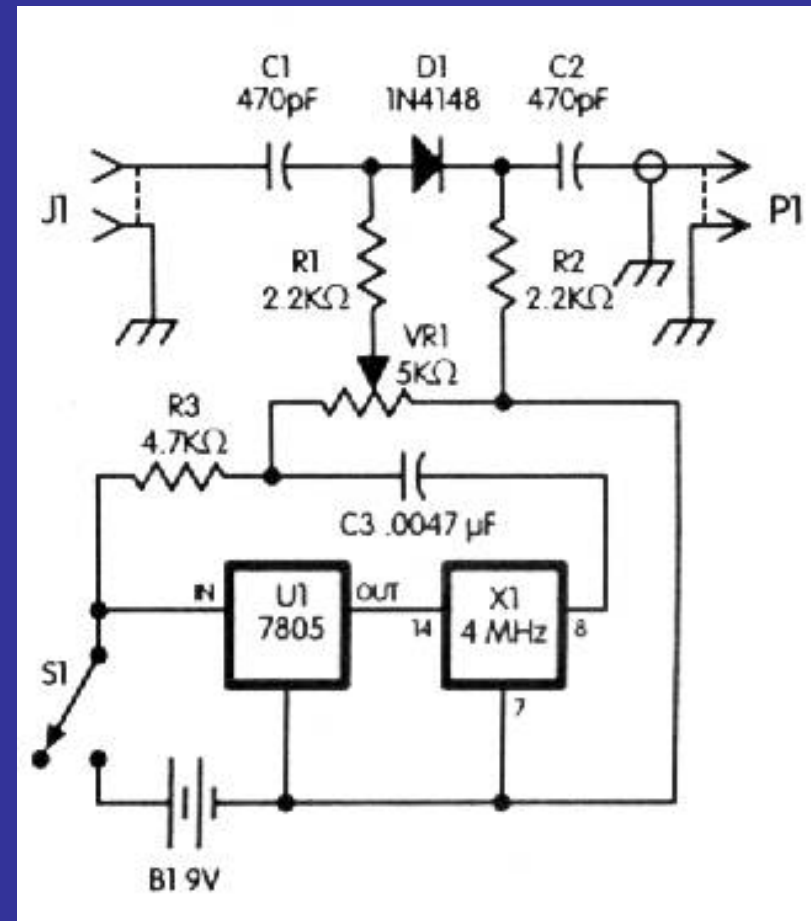
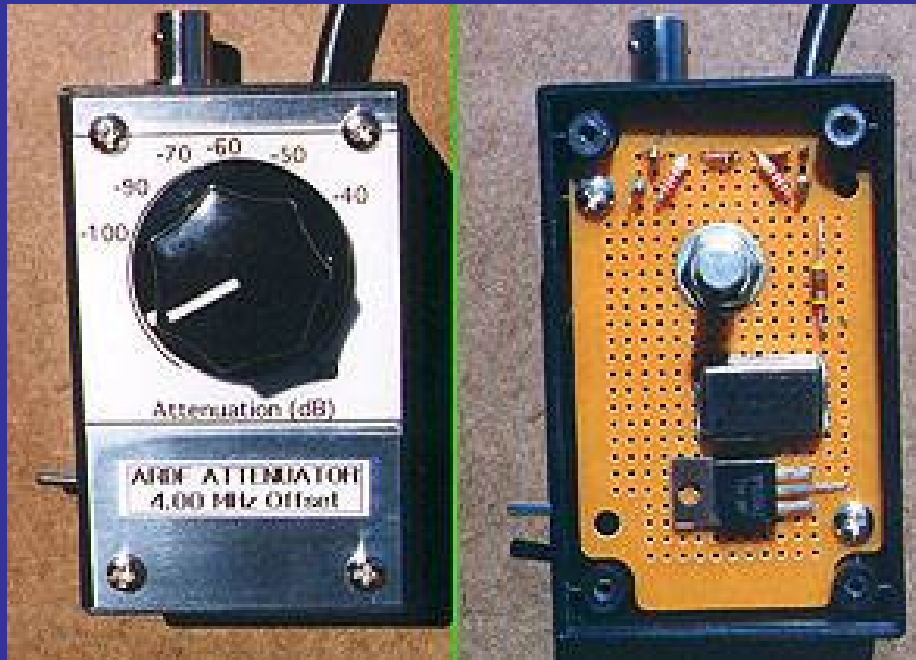
To order, payment can be made by check, money order, or PayPal (my email address is my PayPal ID.) The total due will be the kit(s) prices plus \$4.60 USPS (USPS raised their rates.) Priority mail including Delivery Confirmation. International Orders, please email for shipping. Please email me first to confirm what kits you are purchasing. My email address is: [marvin@west.net](mailto:marvin@west.net)



# Offset Attenuator Performance

S Meter Dynamic Range		35.5dB	Arrow Offset	28dB	Arrow Offset	3/4 scale	Unshielded K0OV
RX Freq	Offset Attenuator	Kenwood D7A	Effective Attenuation	Standard C508	Effective Attenuation	Standard C508	Effective Attenuation
146.565	Direct RF	-121	0dB	-128	0dB	-128	0dB
150.565	Off	No reception	NA	No Reception	NA	No Reception	NA
150.565	On	-79.5	-41.5dB	-88	-40dB	-111	-17dB
150.565	1/2 scale	-49	-72dB	-71.5	-56.5dB	-97	-31dB
150.565	Almost (or 3/4)	-17	-104dB	-27.5	-100.5dB	-66	-62dB
150.565	Maximum	-7	-114dB(estimate)	-19	-109dB	-27	-101dB

# Schematic and Example Housing



# More Housing Examples

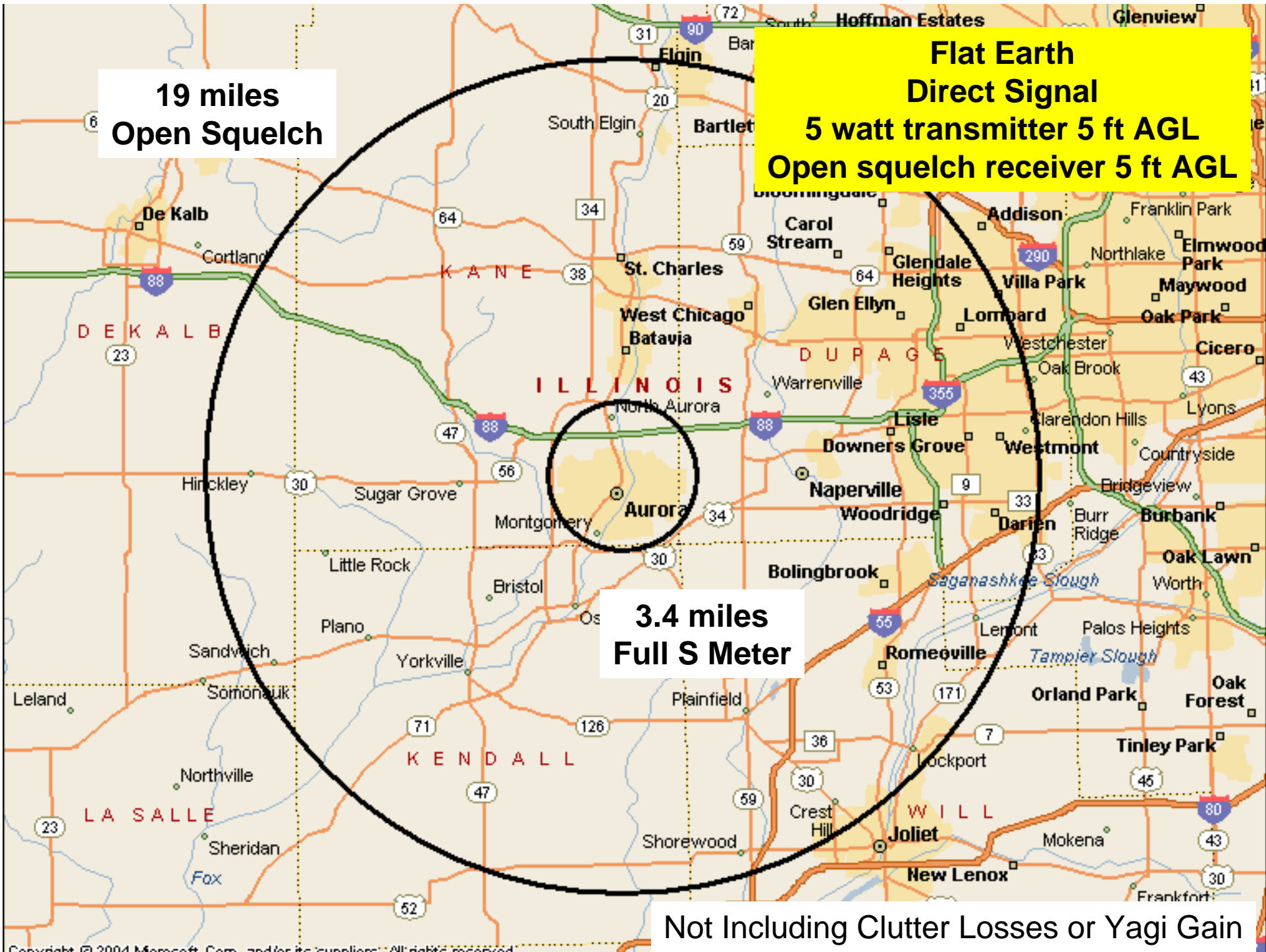


**19 miles  
Open Squelch**

**Flat Earth  
Direct Signal  
5 watt transmitter 5 ft AGL  
Open squelch receiver 5 ft AGL**

**3.4 miles  
Full S Meter**

**Not Including Clutter Losses or Yagi Gain**

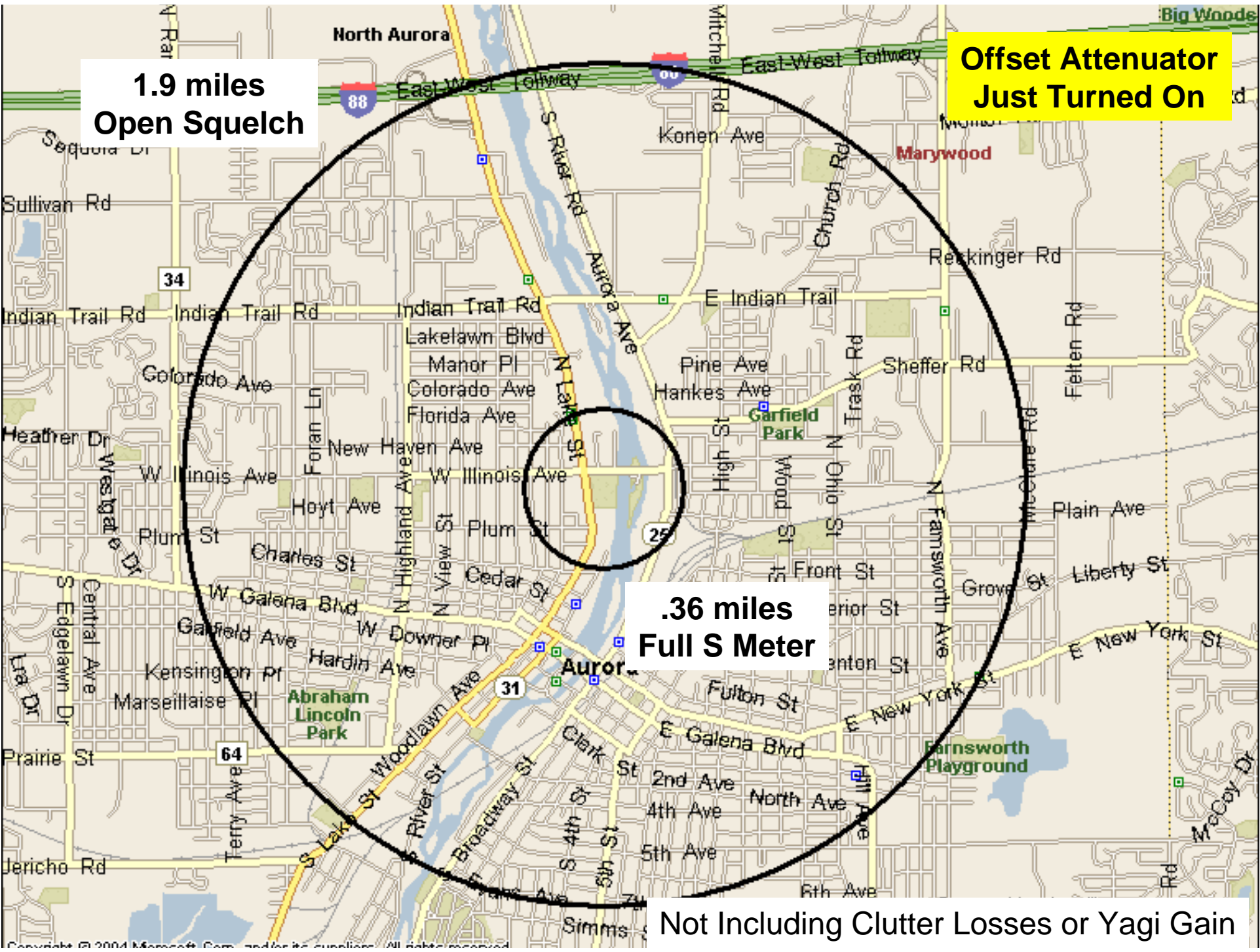


**1.9 miles  
Open Squelch**

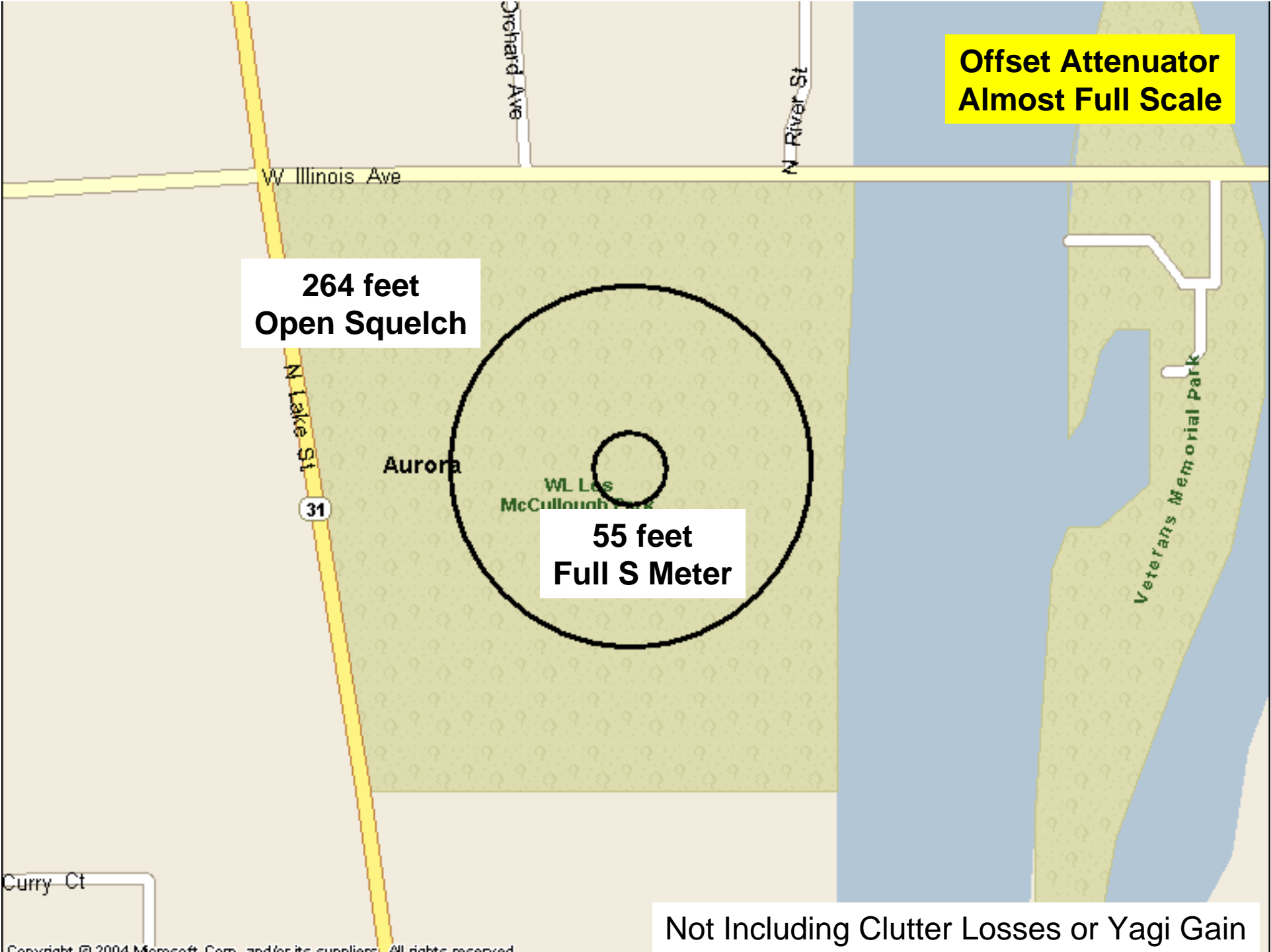
**Offset Attenuator  
Just Turned On**

**.36 miles  
Full S Meter**

Not Including Clutter Losses or Yagi Gain







**Offset Attenuator  
Almost Full Scale**

**264 feet  
Open Squelch**

**55 feet  
Full S Meter**

**Not Including Clutter Losses or Yagi Gain**

**Offset Attenuator  
Full Scale**

**158 feet  
Open Squelch**

Aurora

WL Les  
McCullough Park

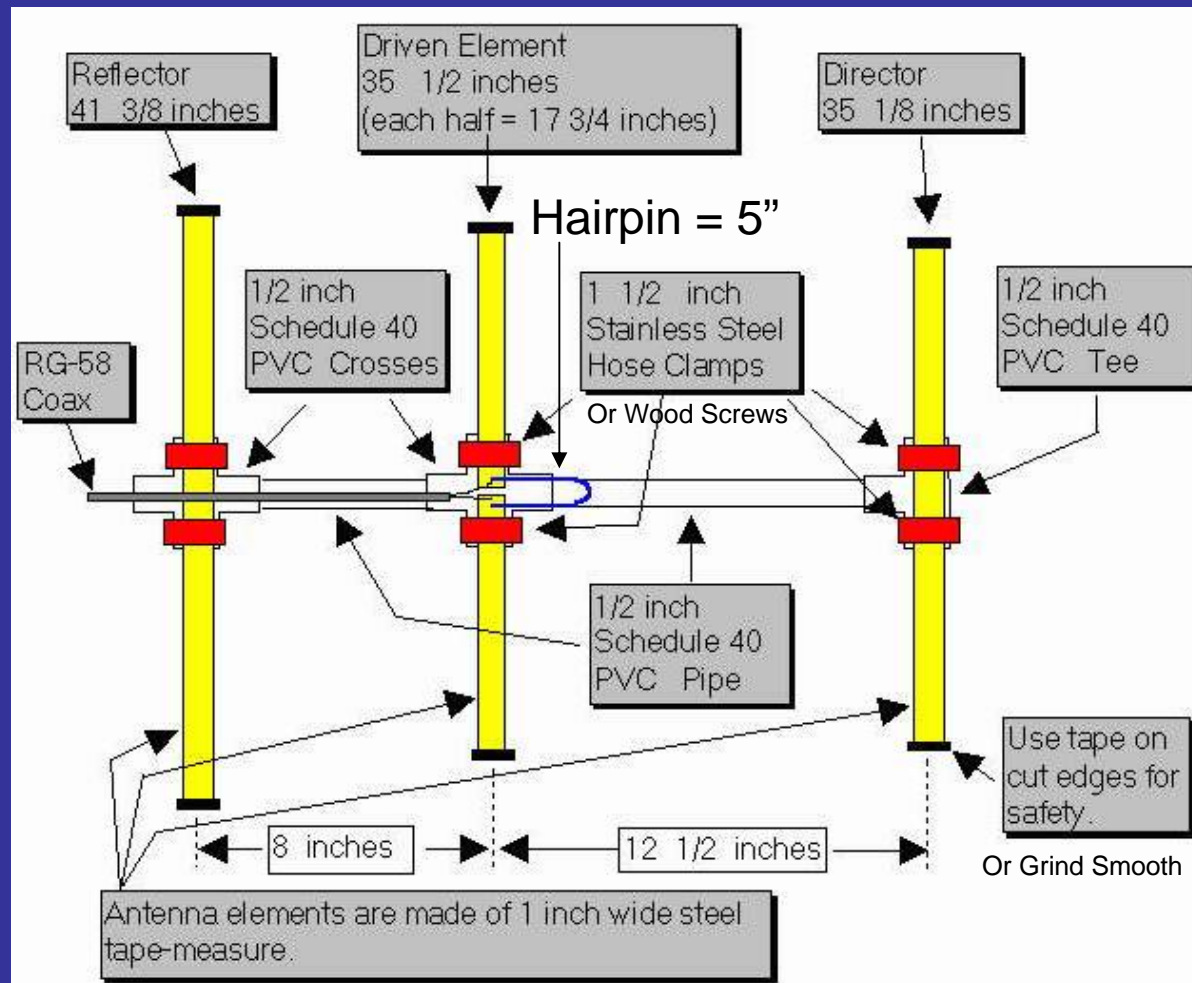
**22 feet  
Full S Meter**

Veterans Memorial Park

Not Including Clutter Losses or Yagi Gain

Curry Ct

# Tape Measure Yagi



## 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