



H0A's and Operating HF

Or How to have HF Antennas that are HEARD but not "SEEN"

HF Options in an HOA

- Higher bands only
- Operate HF Remotely (RCFORB or RemoteHamRadio / premium subscription service)
- Antennas like teeth (come out at night)
- HF Mobile an option
- **Stealth and Hidden Antennas**

HOA Experiences – HF Stealth Antennas

- All HOA's are different
- Neighbors can be an ally
- What we learned and what works for us
 - Group dynamics helps the learning curve
 - Good measuring equipment a key
 - Do not be afraid to fail but try again
 - Location variations are important for choosing options
 - Do not mess with something that works

Stealth and Effective H0A Antennas

- Verticals – hard to hide and need radials
 - Vertical dipoles an option
 - Flagpole antennas commercially available
- Wire Antennas – can work in attics, on roofs, in trees
- Rain Gutters require a tuner – DX Possible when propagation works – 40M thru 10M best
- Mobile Antennas – can perform as well as compromised HF antennas and offer the Mobile Privilege when heard
- **Magnetic Loops**

Magnetic Loop Antennas

- Offer Best Performance vs Size - height not a big factor
- Commercially available options exist- budget vs performance considerations apply
- High Power - > 200 watts a challenge
- Build it Instructions Readily Available – tools needed
- Remote Tuning and/or Ease of Access Important
- **Magnetic Loops in our HOA**

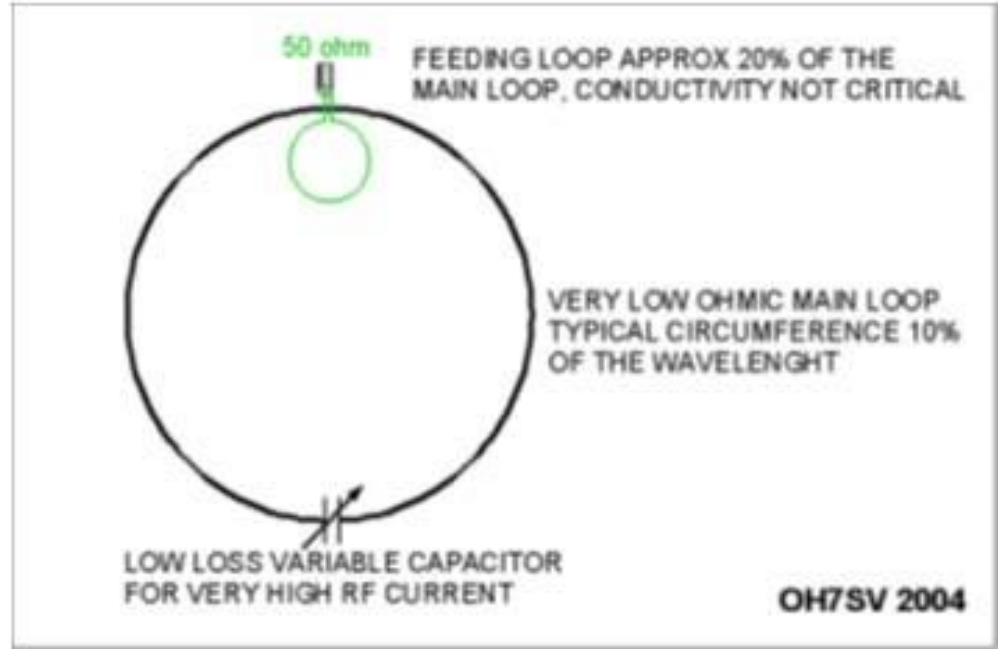
Magnetic Loop 1st Experience

- WA9UOD made experimental loop (worked best on 17M)

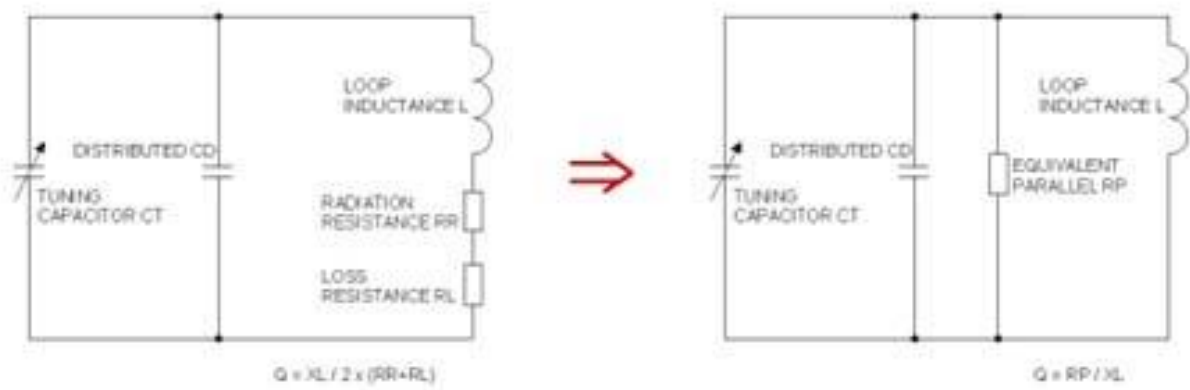


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Enter here		Results	
Frequency (MHz)	14.3	Inductance (uH)	2.344
Loop conductor length (m)	3.048	Capacitance (pF)	52.9
Conductor diameter (mm)	22	XL = XC (ohms)	210.5
RF power (w)	100	Distributed C (pF)	8.2
		Tuning capacitance (pF)	44.7
		Main loop diameter (m)	0.970
		Feeding loop diameter (m)	0.194
		Radiation resistance (ohms)	0.089
		Loss resistance (ohms)	0.043
		Parallel resistance (kohms)	167
		Efficiency (%)	67.2
		Compared to ideal loop (dB)	-1.72
		Loaded Q	793
		Bandwidth -3dB (kHz)	18.0
		Capcitor rms voltage (V)	4087



$$L = 62.3e^{-9l} \left(7.353 \log \frac{8l}{\pi d} - 6.386 \right)$$



LOOP ENHANCEMENTS by KM6T

- Experiments with John's loop (design mods)
 - Tested wider range of frequencies (20 thru 15M)
 - Mods for lower resistance (increased efficiency)
 - oval shape to fit balcony

Antenna aka “bathtub” – returned to WA9UOD

- Lessons learned applied to improved loop for 20 – 15M

The “Bathtub”



BEFORE



AFTER

KM6T LOOP ENHANCEMENTS –CONT'D

- Redesigned a new 20M loop that works the world – handles legal power
 - Oval shape to fit balcony with Gamma Match Feed
 - Low Resistance with 1 inch Copper pipe, Vacuum Variable cap and tuning motor



Enhanced Mag Loop for 40 M



- Assembled at WA9UOD's Qth
- Full size loop (32 ft circumference)
- $\frac{3}{4}$ inch copper pipe- octagonal
- Moved to NA5V location – summer 2018
 - Modified – in place

Octagon – In Place Modifications

- Gamma Match to replace loop primary
- Weather Resistant Enclosure
- Vacuum Variable Cap
- Low resistance Connections
- Low loss Coax
- Stepper Motor – Arduino Interface
- Outperforms – 6BTV (40M) at same QTH



NA5V's 40M LOOP – Finished Design

- Recorded 11/15/2018 in California by W6LVP



Ciro Mazzone Baby Loop

- COMMERCIAL - High End Option
- 10 thru 40M
- Remote Tuning
- 400 watts to 1 KW
- Works DX
- Excellent Ears
- Rotator - optional*

* User supplied



RESOURCES FOR MAG LOOPS

- <https://amrron.com/2015/07/24/home-made-high-power-magnetic-loop-antennas/>
- Small Transmitting Loop Antenna Calculator
 - <http://www.66pacific.com/calculators/small-transmitting-loop-antenna-calculator.aspx>
- Major Resource Site (LOOPS and other antennas)
 - https://www.nonstopsystems.com/radio/frank_radio_antenna_mag_loop.htm#top-of-page

HOA REFERENCES for HF Antennas

- Verticals
 - Commercial – HF multiband - NA5V (6BTV)
 - Vertical dipoles - NA5V (experiments)
 - Flagpole antennas -
 - Wire Antennas - KM6T , NA5V and WA9UOD
- Rain Gutters - NA5V and KM6T
- Mobile - NA5V (ham sticks)
- **Magnetic Loops**
 - Homebrew - KM6T , NA5V and WA9UOD
 - Commercial - Ciro Baby - info on request