

The Villages Amateur Radio Club

2015 Antenna Guide for The Villages

February 19, 2015

Antennas for The Villages

Tonight's review of the antenna members have used

Tonight's list of antennas will cover

- Multiband Antennas HF, 6M and some 2M/70cm
- Presenting the implementation for most used
- Description of layout with key PROs and CONs
- **This is a shopping list, not DIY which will be in future presentations**

Factors to be considered

This is not the end all list, but the important issues

- RF Radiation Efficiency
- Installation
- Stealthy-ness
- Impedance Matching
- Cost

Small Antennas are a **Compromise** Stealth Antennas are a **Compromise** Multiband Antennas are a **Compromise**

Antenna Design Rules

Pick one from the list below;

- You can make an HF antenna physically **small**
- You can make an HF antenna radiate **efficiently** at low angles
- You can make a **broadband** HF antenna with a wide VSWR Bandwidth



THIS PRESENTATION IS
STEP ONE OF YOUR PLAN;
FINDING A SOLUTION FOR
YOUR OPERATING
BANDS/MODES

Terrafugia was approved by the FAA in June 2010, price \$200,000.



A Flying car is a compromise

With the **right compromises** and some extra effort all three are possible

Modes & Bands

Compromise



Slicing a cake
in such a way
that everyone
thinks they
received the
biggest piece!

The right planning requires each operator to think about which modes they want;

- SSB will require the best RF Efficiency available
- CW can operate on marginal RF Efficiency
- Digital can operate on marginal & poor RF Efficiency

The right planning requires each operator to think about which bands they want;

- 160M & 80M
- 40M, 30M & 20M
- 17M, 15M, 12M, 10M & 6M

The right planning requires each operator to think about how each antenna presented can fit within your landscape

- Palms or Shade Trees?
- Villa Fences?
- Screen Enclosures?

How Much “Punch” Can You Get from Different Modes

QST Dec 2013, P30-32

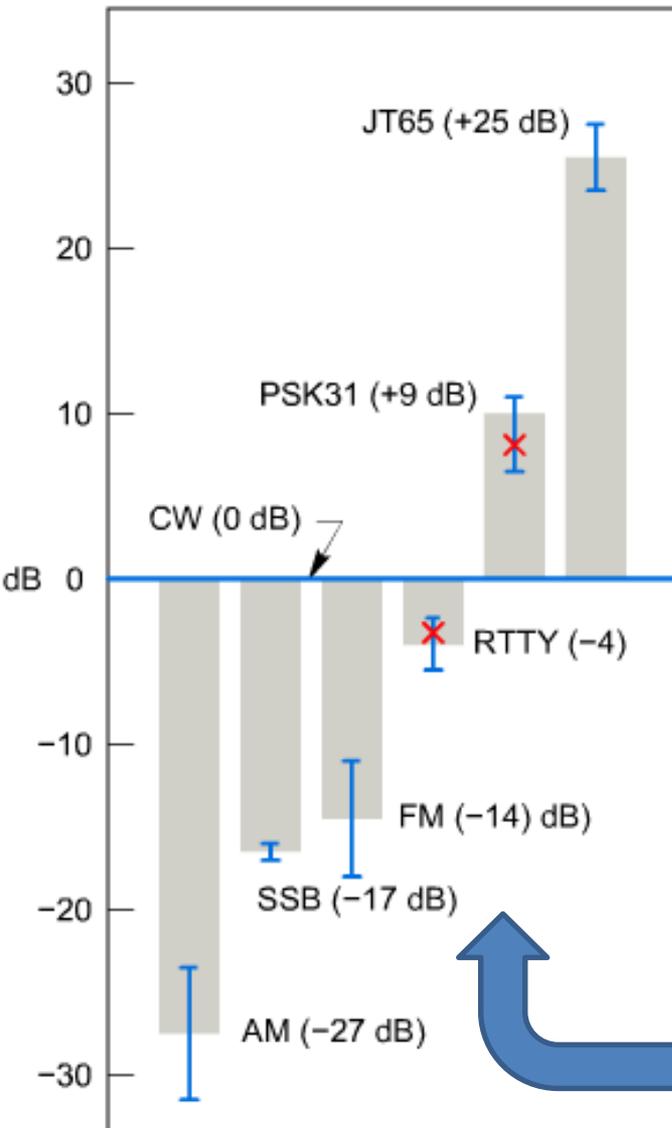
“You can target the DX station's operating mode more confidently when you know CW can out perform unprocessed SSB by 17 dB and RTTY can out perform SSB by 11 dB. If you can't get them on phone, try RTTY or better still, try CW.”

Table 1
Average Power for 100 W PEP Transmitter

Mode	Average Power (W)	Compared to CW (dB)
AM	25	-2.5
SSB	25	-2.5
FM	100	+3.6
RTTY	95	+3.3
CW	44	ref: 0
PSK31	75	+2.3
JT65	100	+3.5

Table 2
Average Receiver Sensitivities

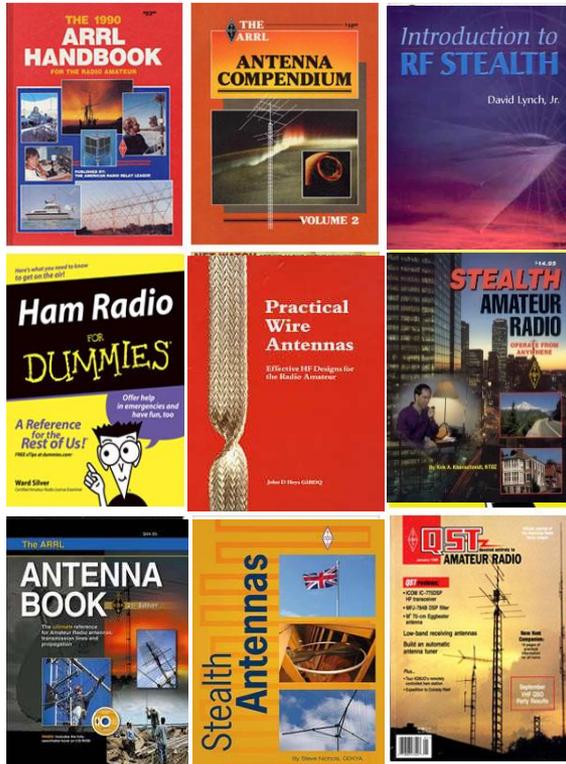
Mode	Receiver Sensitivity (microvolts)	Receiver Sensitivity (dBm)	Compared to CW (dB)
AM	0.72	-109.9	-25.1
SSB	0.22	-120.3	-14.7
FM	0.29	-117.7	-17.3
RTTY	0.096	-127.3	-7.7
CW	0.040	-135.0	ref: 0
PSK31	0.023	-139.8	+7.1
JT65	0.0035	-156.2	+21.2



Modes & Bands

Remember your mode is the dominant factor, then review the band performance to select your antenna. The important message is what is the “best” antenna for you is not the “best” for someone else!

Read every book on antennas or use Villages Antenna Guide to narrow the list



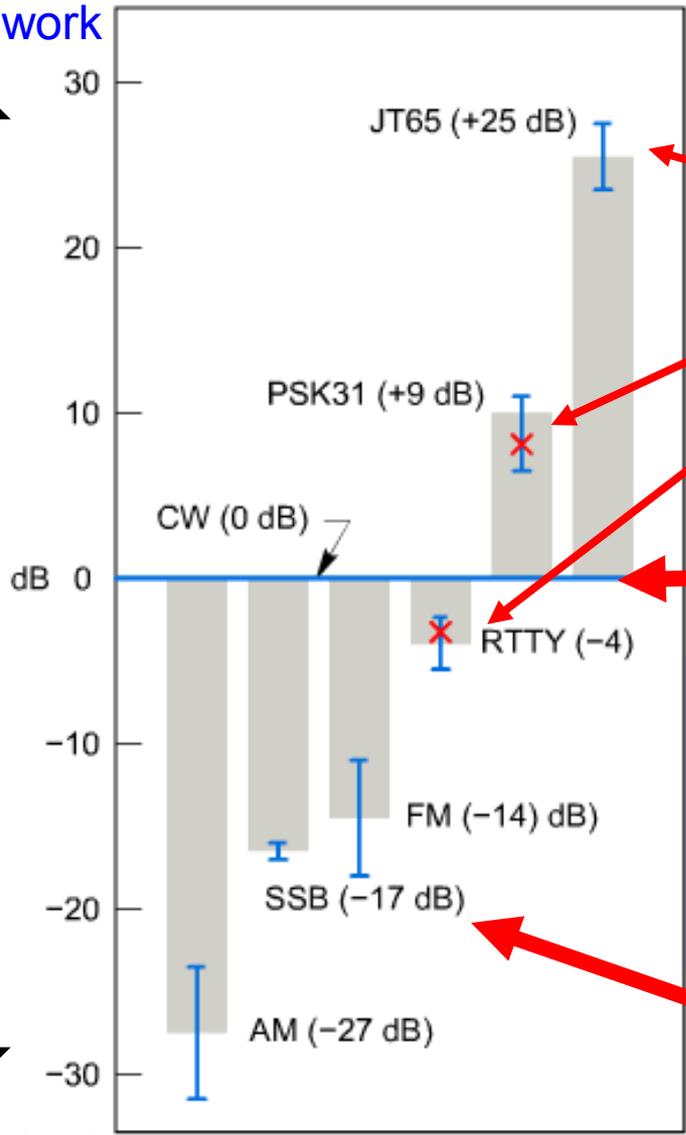
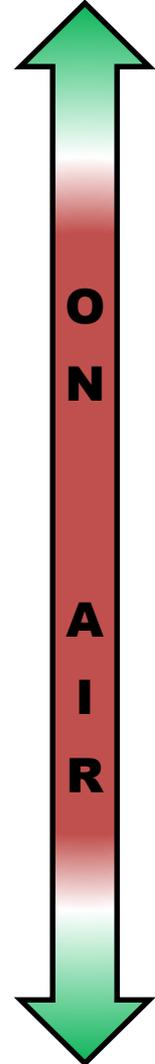
VS.

Villages Antenna Guide													The Villages FLORIDA Amateur RADIO Club		K4VRC	
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M	
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D	
Screwdriver	B	B	None	C	D	B	B	B	B	B	B	B	D	D	D	
Fishing Pole	B	C	Remote	D	C	C	B	B	B	B	A	A	C	D	D	
Trapped Vertical	C	C	Shack	D	D	C	C	C	C	C	C	C	C	D	D	
Palm Tree Cage	B	A	Remote	F	F	C	B	B	B	B	A	A	A	A	B	
Rain Downspout	D	A	Remote	C	C	D	C	C	D	D	D	D	D	F	F	
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M	
Dipole	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F	
Inverted Vee	C	D	Shack	C	B	C	B	B	B	B	C	C	C	D	F	
G5RV Jr	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F	
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F	
Slinky Dipole	D	C	Shack	B	B	C	C	C	C	D	D	F	F	F	F	
Helical-Coil Dipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F	
Wound Vert Dipole	C	D	Shack	B	C	B	B	C	C	D	D	F	F	C	B	
Fence Dipole	D	A	Remote	C	C	F	F	D	D	D	D	C	C	C	F	
TAK-tenna	D	B	Shack	B	C	C	C	C	C	C	C	D	D	F	F	
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M	
Off Center Fed	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F	
Windom	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F	
Inverted L	A	B	Remote	C	C	B	B	A	A	A	A	A	A	A	A	
End Fed	B	B	Remote	B	C	B	B	B	B	B	B	C	C	F	F	
Random Wire	C	B	Shack	B	B	C	C	C	C	C	C	D	D	F	F	
Flagpole L	A	B	Remote	C	F	B	B	A	A	A	A	A	A	A	A	
Rain Gutter Dipole	D	A	Shack	C	C	F	F	D	D	C	C	C	D	D	D	
Spiral Dipole	D	B	Shack	B	C	C	C	C	C	C	C	D	D	F	F	
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M	
WL Horz Loop	D	C	Remote	D	D	F	F	D	D	C	C	C	D	D	D	
Rain Gutter Loop	D	A	Shack	D	C	F	F	D	D	C	C	D	D	D	F	
WL Vert Loop	B	B	Shack	B	B	B	A	B	A	B	A	B	A	C	F	
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D	

“Villages Antenna Guide” is your shopping list

How does my Mode matter to my antenna?

“F” will work



Digital depends on the specific mode
 • JT-65 works on almost anything
 • PSK-31 works well with a C or D grade
 • RTTY requires a B grade for solid copy

CW will be successful with a C or D grade

Ever wonder why antenna ads rarely state modes?

I have your XYZ up for about month and I am busting pile ups everywhere and receiving 59's every time : -)

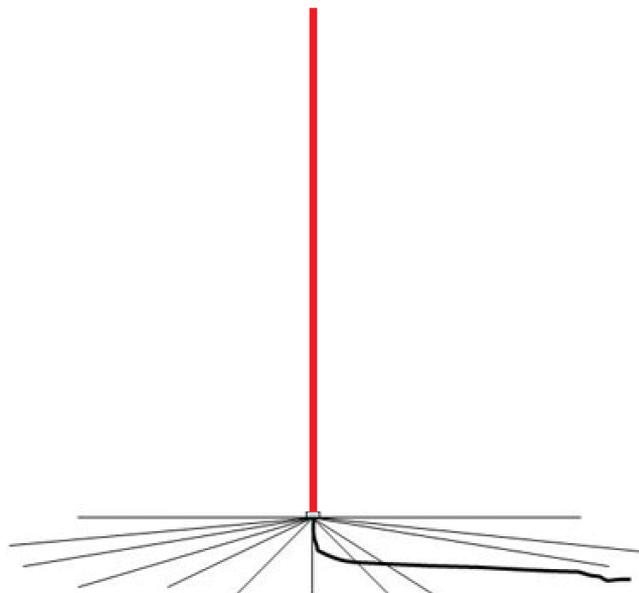
SSB will require an A or B grade in most cases

“A” required

Flagpole

“Shorten” or “Loaded” Monopoles

Flagpoles can easily be used as a 21 Foot Vertical
 Planning is important factor in disguising your remote tuner
 A minimum of 32 radials for an efficient RF



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

QST, March 2010, P 30-33

Flagpole

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Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

Before we start what does the summary antenna chart mean?

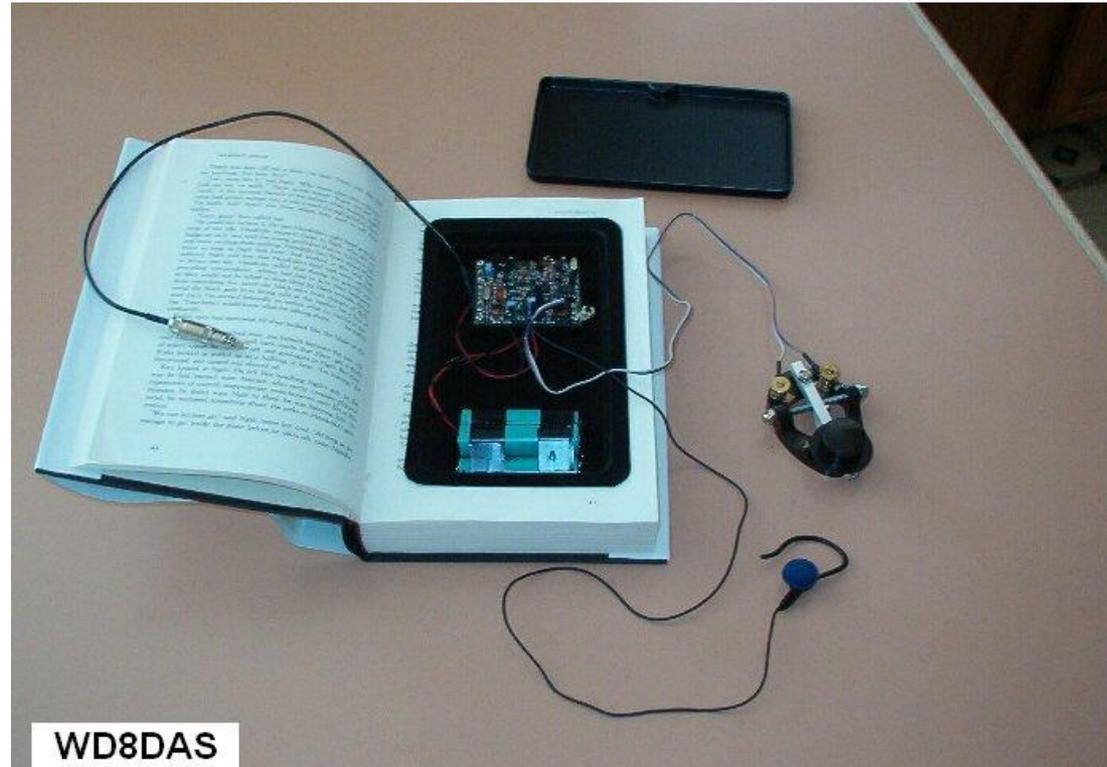
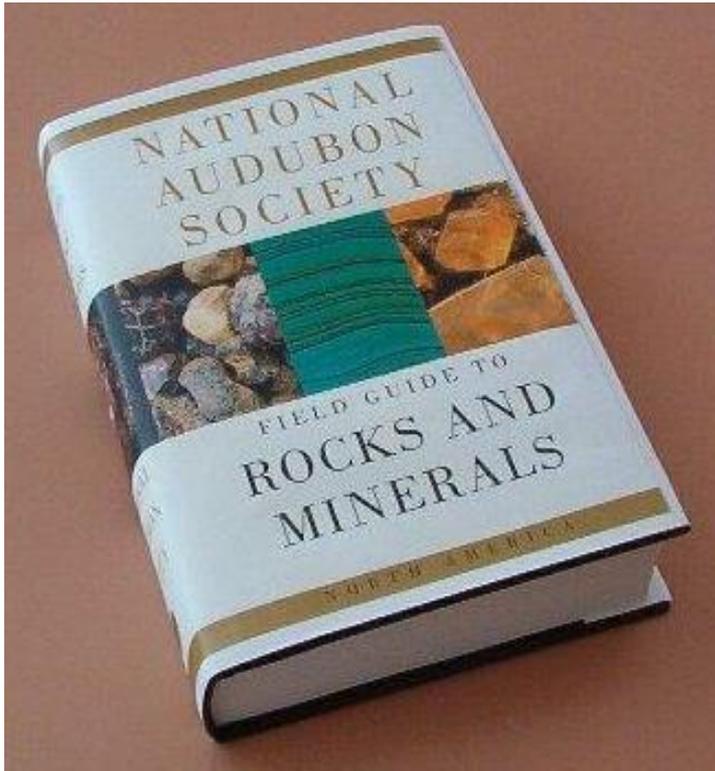
Factors are graded A best to F least, just like school

- **On Air** is the average RF Radiation Efficiency for 40M – 10M (most people)
- **Each band** is graded based on the radiating element size, height vs WL
Each person can decide which bands are important to them
- **Stealth** is graded on how invisible or non-antenna like the appearance
- **Tuner** is the tuner location that drives the cost, site plan and landscaping
- **Install** is the how much work is needed; like radials and landscaping
- **Cost** is graded A for least to F most expense;
Example the flagpole gets an “F” for high cost as it requires many costly items
 - Radials \$200 - \$300
 - Pole & Flag Kit \$100 - \$200
 - Remote Tuner \$300 - \$400
 - Underground feed line & protective conduit \$?
 - Underground Power for Tuner \$?
 - Landscaping \$?
- This is a shopping list, not the DIY which will come in later presentations

Stealth

Stealth comes in two forms;

- Hiding in plain sight by looking like a common object (Flagpole)
- Hiding in by being almost invisible (#28 AWG wire)



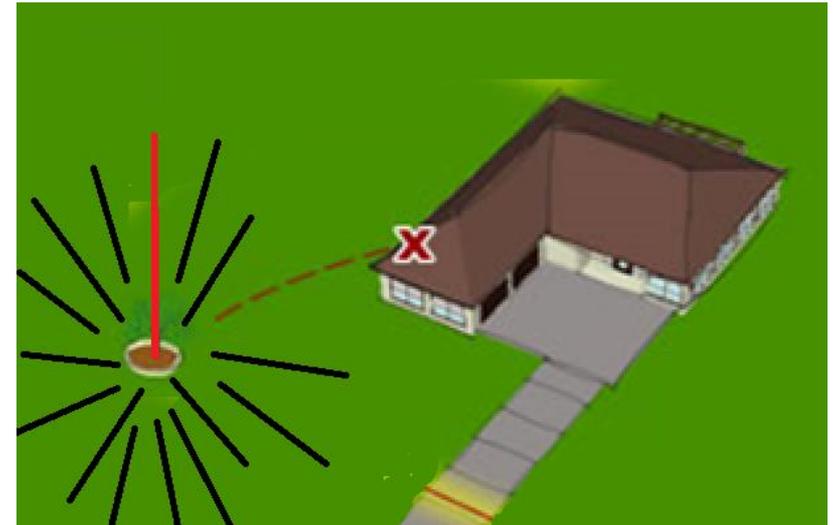
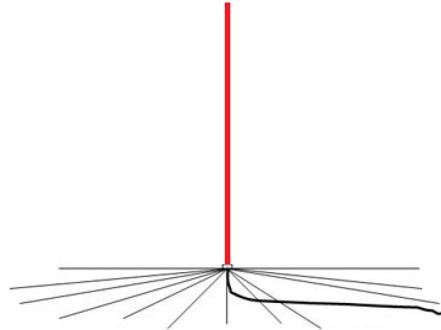
WD8DAS

Flagpole

“Shorten” or “Loaded” Monopoles

Be sure to do a site plan

- Radial Placement
- Feed line runs
- Concealing your tuner
- Access for maintenance
- Power for remote tuner
- Power for landscape lighting



PRO

- Stealth
- On Air

CON

- Cost
- Install

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

PRO

- Stealth
- On Air

Flagpole

“Shorten” or “Loaded” Monopoles

The installation needs to look like a Flagpole

Today’s neighbors don’t care next year brings a different answer

The best rule is not to look like an antenna

CON

- Cost
- Install



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

PRO

- Stealth
- On Air

Flagpole

“Shorten” or “Loaded” Monopoles

CON

- Cost
- Install

A minimum of 32 radials for an efficient RF is step one



Invisible Dog Fence installers charge \$200 - \$300

Using an edger and hand installation costs only the wire



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

QST, March 2010, P 30-33

PRO

- Stealth
- On Air

Flagpole

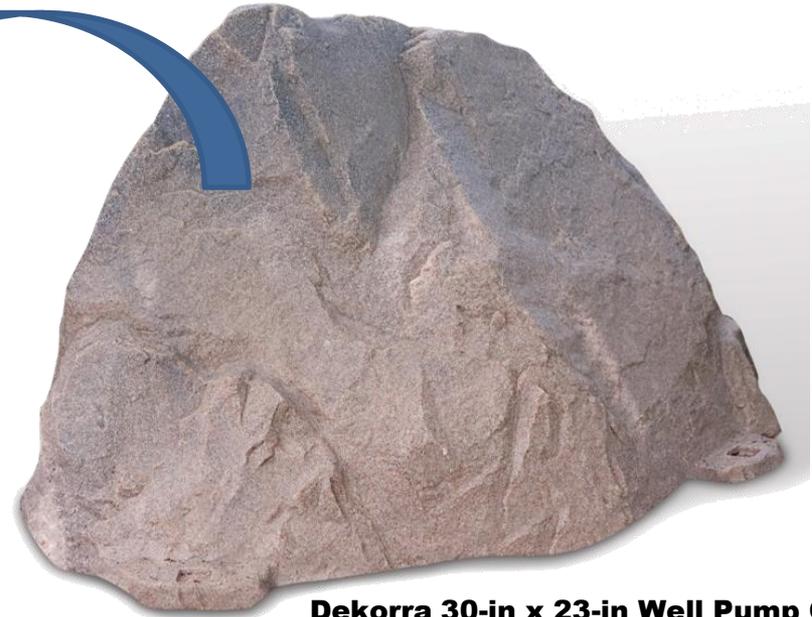
“Shorten” or “Loaded” Monopoles

CON

- Cost
- Install

One of the best ideas for disguising your remote tuner is a fiberglass water well pump cover

Keeps electronics hidden, dry and accessible later



Dekorra 30-in x 23-in Well Pump Cover
Lowes Item #: 307793 \$54.98

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

PRO

- Stealth
- On Air

Flagpole

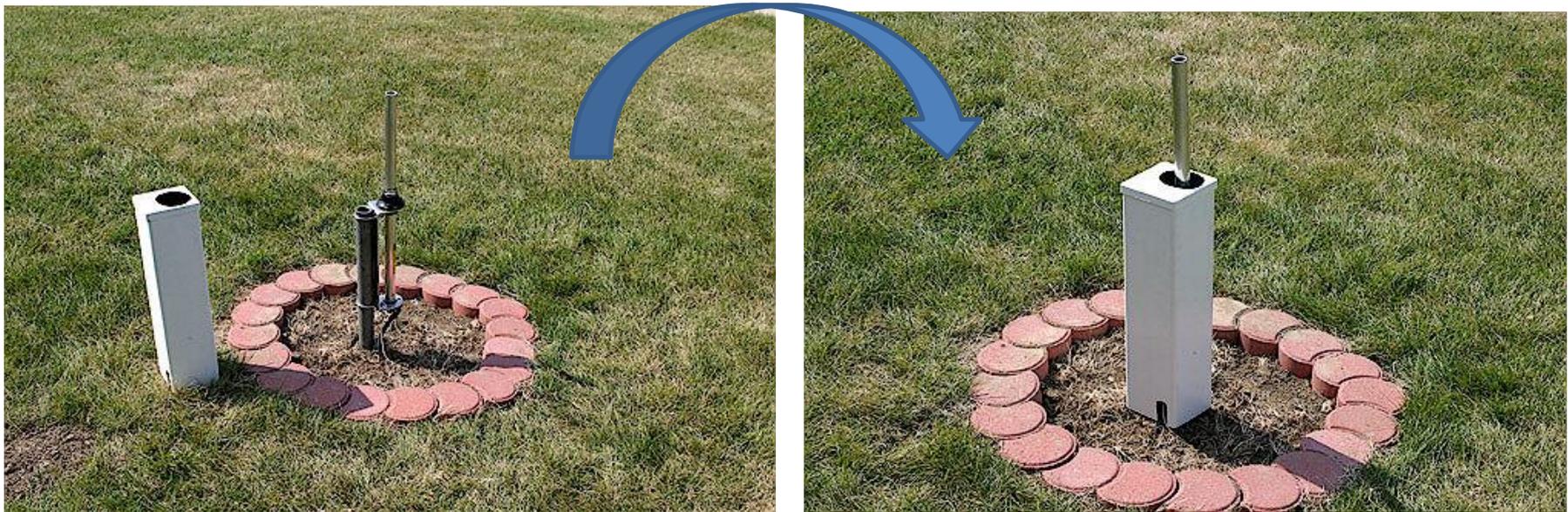
“Shorten” or “Loaded” Monopoles

CON

- Cost
- Install

Depending on the size and shape of your base equipment the disguise your can be made from plastic privacy fencing components

Keeps electronics hidden, dry and accessible later



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

PRO

- Stealth
- On Air

Flagpole

“Shorten” or “Loaded” Monopoles

Testing before digging is a great planning tool

A tripod with a fishing pole will give you on air performance

Experimenting with radials before digging has advantages

CON

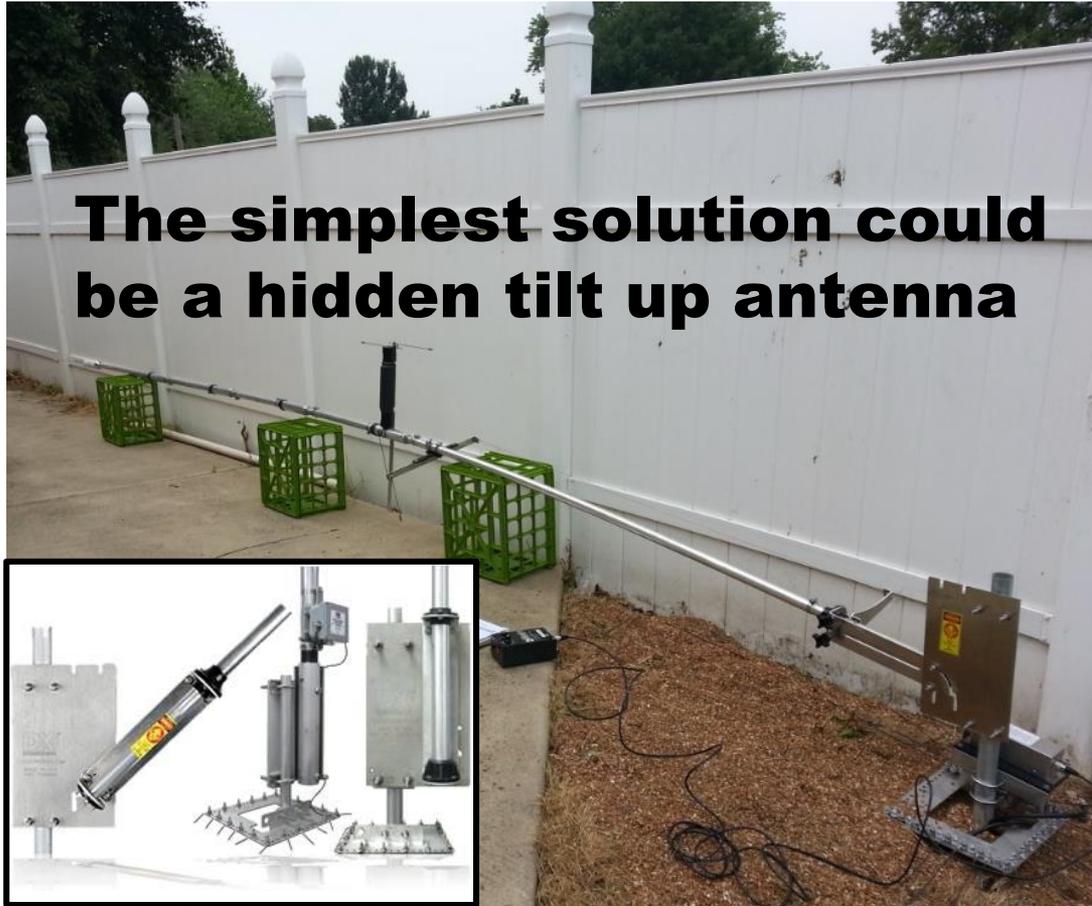
- Cost
- Install



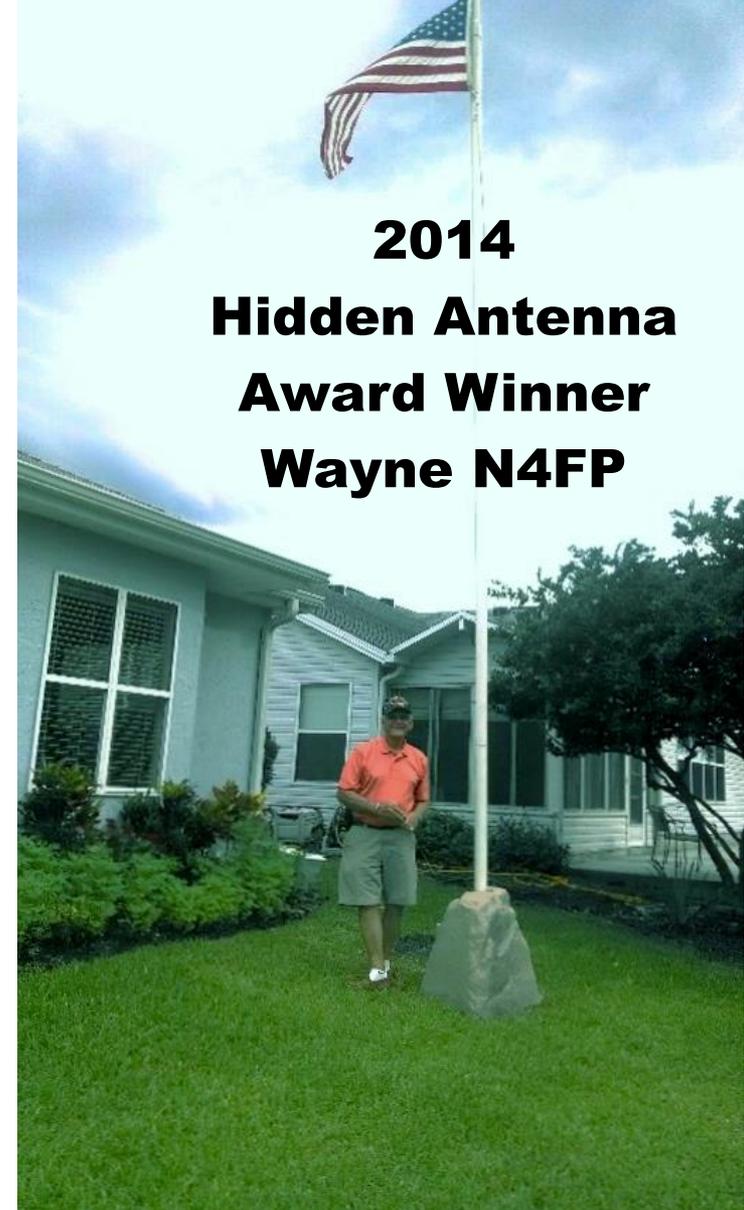
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

Flagpole

“Shorten” or “Loaded” Monopoles



The simplest solution could be a hidden tilt up antenna



**2014
Hidden Antenna
Award Winner
Wayne N4FP**

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D

Before the next antenna

Now that the summary chart and planning considerations for any antenna has been explained the rest of the presentation will be antenna descriptions with any special considerations.

Villages Antenna Guide



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole	B	A	Remote	D	F	C	B	B	B	B	A	A	C	D	D
Screwdriver	B	B	None	C	D	B	B	B	B	B	B	B	D	D	D
Fishing Pole	B	C	Remote	D	C	C	B	B	B	B	A	A	C	D	D
Trapped Vertical	C	C	Shack	D	D	C	C	C	C	C	C	C	C	D	D
Palm Tree Cage	B	A	Remote	F	F	C	B	B	B	B	A	A	A	A	B
Rain Downspout	D	A	Remote	C	C	D	C	C	D	D	D	D	D	F	F
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Inverted Vee	C	D	Shack	C	B	C	B	B	B	B	C	C	C	D	F
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Helical-Coil Dipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F
Wound Vert Dipole	C	D	Shack	B	C	B	B	C	C	C	D	D	F	F	F
Fence Dipole	D	A	Remote	C	C	F	F	D	D	D	D	C	C	C	B
TAK-tenna	D	B	Shack	B	C	C	C	C	C	C	C	D	D	F	F
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End Fed	B	B	Remote	B	C	B	B	B	B	B	B	C	C	F	F
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Flagpole L	A	B	Remote	C	F	B	B	A	A	A	A	A	A	A	A
Rain Gutter Dipole	D	A	Shack	C	C	F	F	D	D	C	C	C	D	D	D
Spiral Dipole	D	B	Shack	B	C	C	C	C	C	C	C	D	D	F	F
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WL Horz Loop	D	C	Remote	D	D	F	F	D	D	C	C	C	D	D	D
Rain Gutter Loop	D	A	Shack	D	C	F	F	F	D	C	C	D	D	D	F
WL Vert Loop	B	B	Shack	B	B	B	A	B	A	B	A	B	A	C	F
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

PRO

- Built-In Tuning

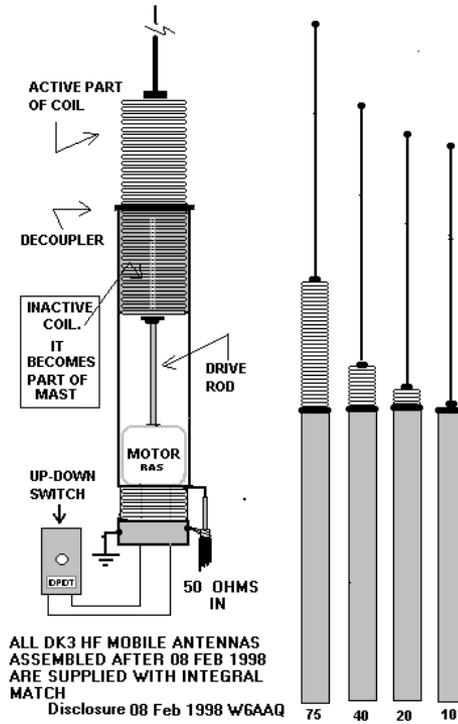
Screwdriver

CON

- 10 KHz BW

“Shorten” or “Loaded” Monopoles

Base loaded vertical normally used as mobile antennas. The small size gives stealth, you may “plant” a screwdriver in the garden without drawing attention to it. Adding band extensions to increase performance and use as many ground radials as possible.

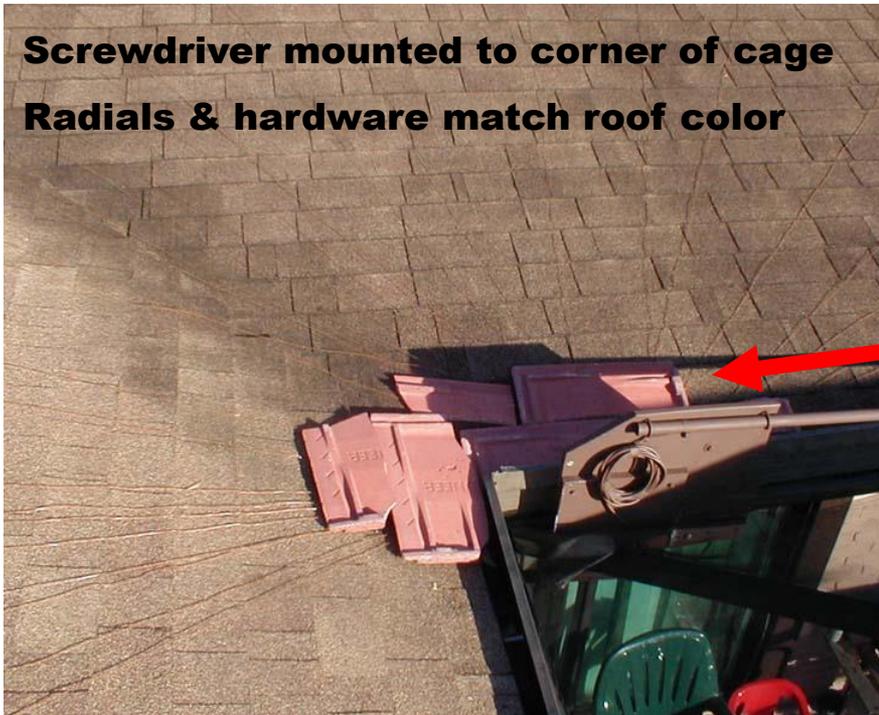


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Screwdriver	B	B	None	C	D	B	B	B	B	B	B	B	D	D	D

More Screw Driver

“Shorten” or “Loaded” Monopoles

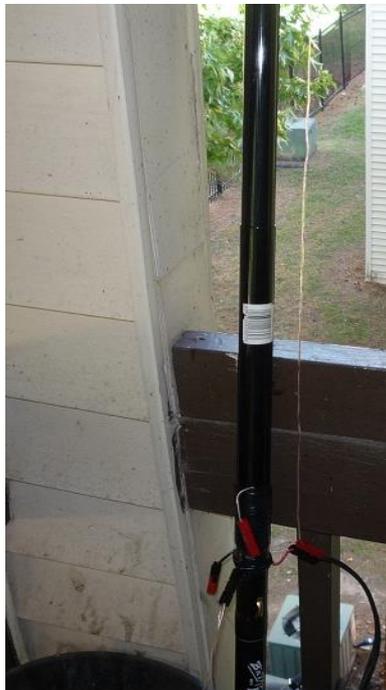
Antenna mounted at inside corner of screen cage to obscure view then painted to match cage frame and roof



Fishing Pole

“Shorten” or “Loaded” Monopoles

This is just a simple 20 foot crappie pole propped up against fence or any object disguise your antenna.

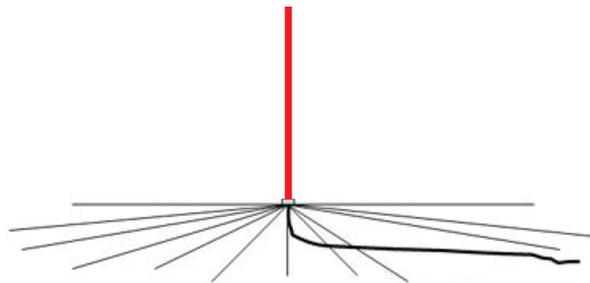


PRO

- More stealth on patio

CON

- Where to put Radials



Surround the bottom of the pole with an old fishing tackle box to provide your antenna with visual effect



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Fishing Pole	B	C	Remote	D	C	C	B	B	B	B	A	A	C	D	D

more Fishing Pole

“Shorten” or “Loaded” Monopoles

Many options for stealth

- Tilt up
- Tripod
- PVC Poles
- Clamp to railing



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Fishing Pole	B	C	Remote	D	C	C	B	B	B	B	A	A	C	D	D

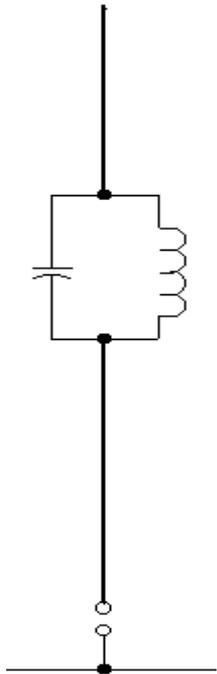
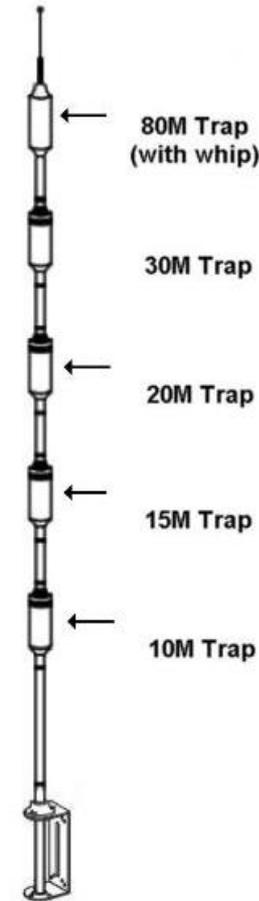
Trapped Vertical Antennas

PRO

- Wide VSWR BW “Shorten” or “Loaded” Monopoles

The HF6V antennas are easy to erect and tune antennas that will last you for many years. Butternut HF6V antennas work six bands--80, 40, 30, 20, 15, and 10 meters--with an extremely efficient vertical radiator that's only 26 ft. tall!

The traps are low pass filters that make the antenna electrically shorter as frequency increases to maintain a lower VSWR but reduces On Air performance



CON

- On Air Tapped verticals are often hidden inside PVC Flagpole for stealth

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Trapped Vertical	C	C	Shack	D	D	C	C	C	C	C	C	C	C	D	D

more Trapped Vertical Antennas

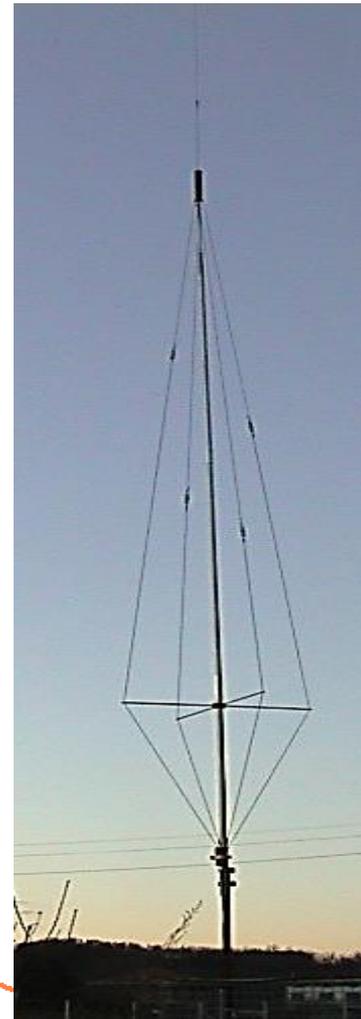
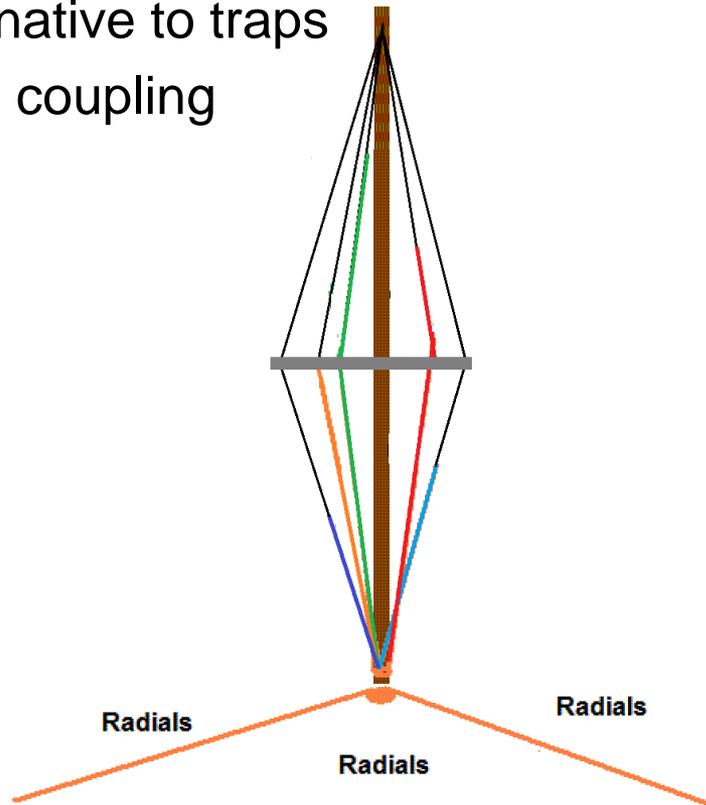
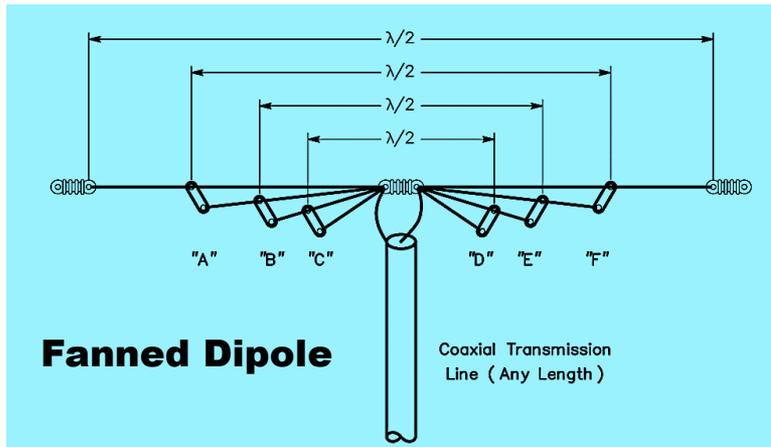
“Shorten” or “Loaded” Monopoles

Traps lower efficiency on lower frequencies

Separate elements are an alternative to traps

Elements are separated to stop coupling

Works like a “Fanned Dipole”



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Trapped Vertical	C	C	Shack	D	D	C	C	C	C	C	C	C	C	D	D

Palm Tree Caged

Monopole with Radials

- Palms can be 30 to 40 Feet and do better on 80M & 160M than Flagpoles limited to 21 Feet
- Disguising your remote tuner in plain sight as electrical equipment for your lights
- Radiating element can be Xmas lights or Gray-Brown wire to form a “Caged” radiating element
- Still need many radials for an efficient RF



PRO

- Stealth
- On Air



CON

- Cost
- Install

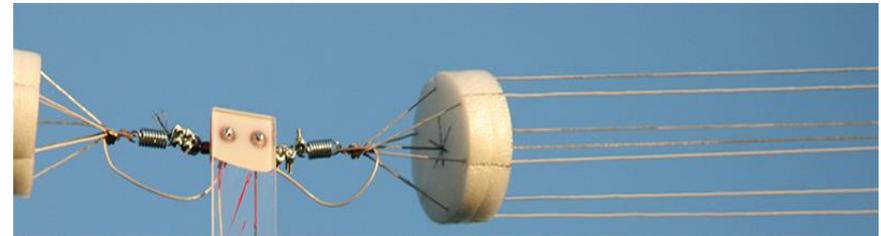
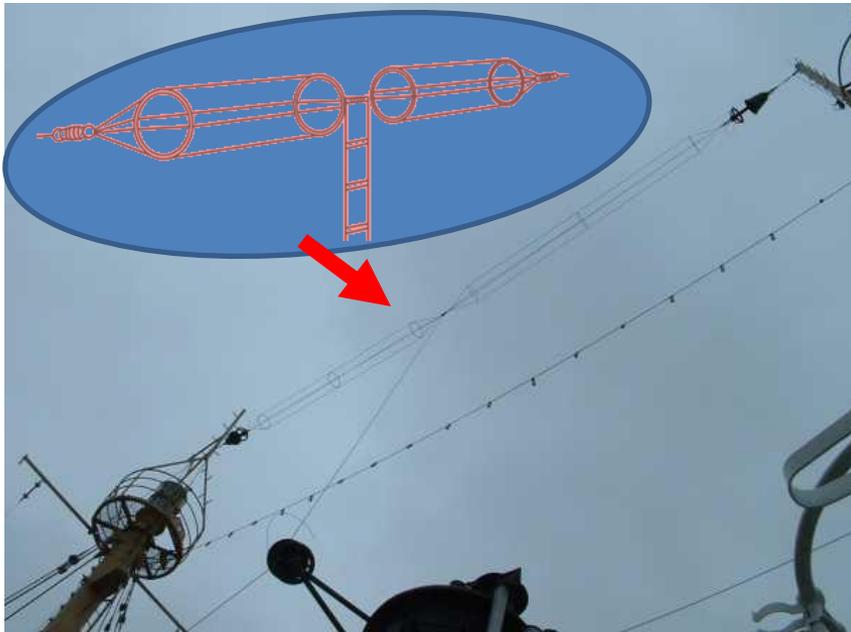
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Palm Tree Cage	B	A	Remote	F	F	C	B	B	B	B	A	A	A	A	B



what is **Caged**

Monopole with Radials

A “cage” antenna is electrically a cylindrical conductor that appears electrically as a much larger and longer single conductor providing greater bandwidth / SWR. It can be shorter physically and was often used on ships with limited distance between masts for HF into the 1960s. The use of higher frequencies and availability better tuners resulted in the cage fading away.



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Palm Tree Cage	B	A	Remote	F	F	C	B	B	B	B	A	A	A	A	B

PRO

- Stealth

Rain Downspout

“Shorten” or “Loaded” Monopoles

CON

- On Air
- Install

Rain downspout antenna is a difficult install job

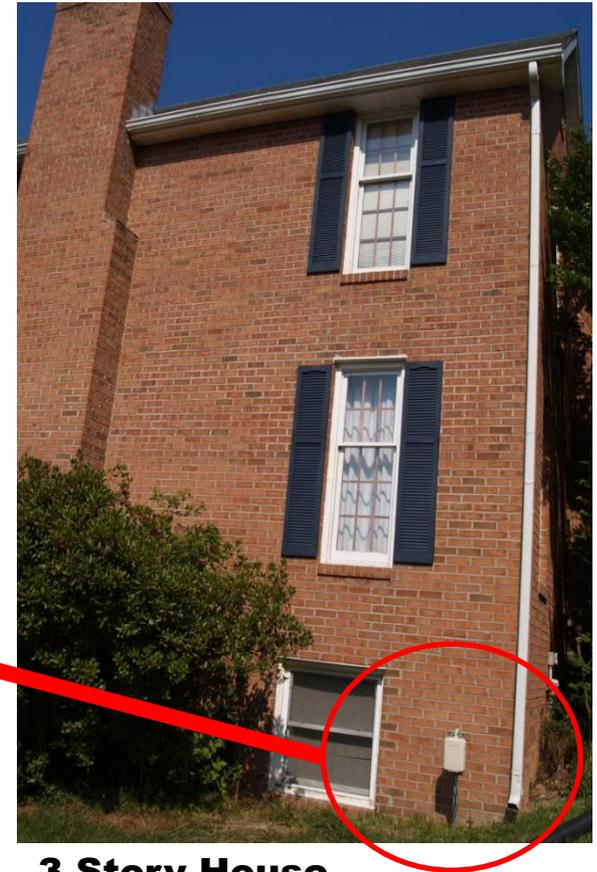
- The gutter and downspout are isolated from ground
- Electrical continuity between sections of your downspout is a maintenance problem
- Coupling to the house, aluminum window and screen cages detunes
- Success has been at 2 or 3 story homes



Poor Conductivity



Remote Tuner



3 Story House

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Rain Downspout	D	A	Remote	C	C	D	C	C	D	D	D	D	D	F	F

Before the next antenna

Newer homes are being made with **aluminum roof sheathing**. Basically plywood or OSB sheathing with a thin aluminum facing on one side as a radiant heat barrier. The **aluminum blocks RF** and precludes many of the attic antenna installations for homes south of 466.



PRO

- Cost

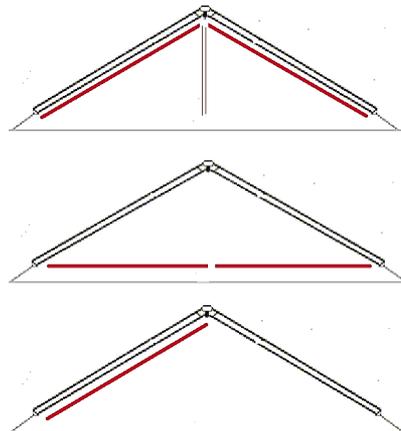
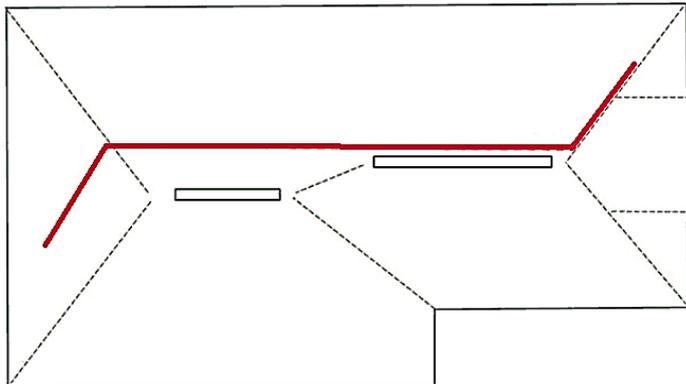
Dipole

Center-Fed-Dipoles - ½ Wavelength

CON

- NVIS
- On Air

- ½ WL dipole oriented horizontal and center fed
- Resonate 40M and 15M is ~ 65 Feet Long
- May take many shapes to fit in attic space
- 2.16 dBi perpendicular in free space
- NVIS at ten feet above ground drop to -9 dBi
- Attic is most common installation

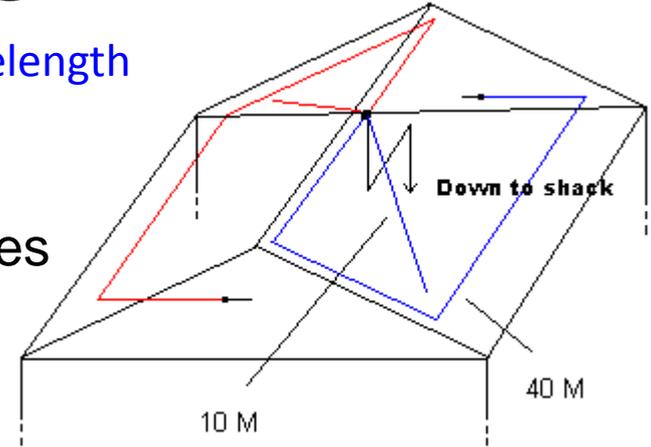


Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Dipole	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

More Dipole

Center-Fed-Dipoles - 1/2 Wavelength

- Color is key to stealth
- Location can be under soffits or over shingles
- Straight lines are not required
- Multi-antennas required for matching
- Primary & Odd Multiples are resonant



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Dipole	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

PRO

- Cost

Inverted Vee

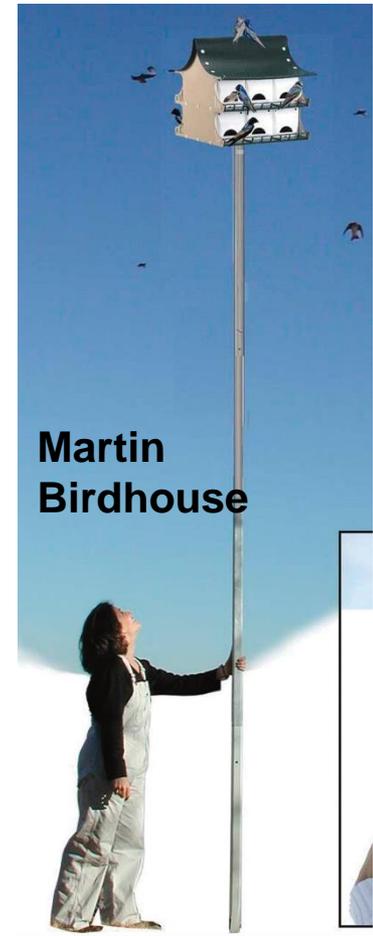
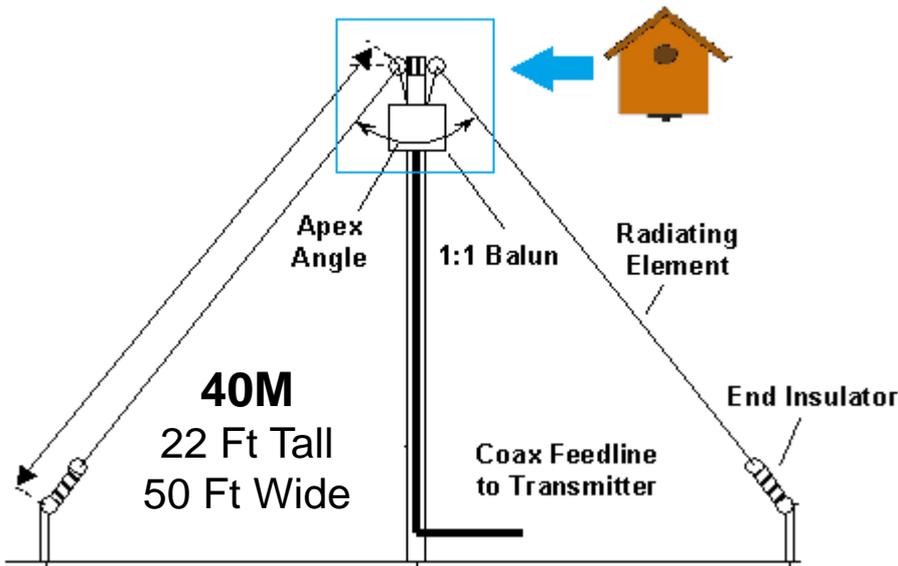
Center-Fed-Dipoles - 1/2 Wavelength

CON

- Stealth

“Birdhouse Antenna”

- Elements “support” the birdhouse pole
- Birdhouse covers feed point & coax in PVC pipe
- Tell everyone how much you love bird watching!
- Less NVIS than attic or roof Dipole



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Inverted Vee	C	D	Shack	C	B	C	B	B	B	B	C	C	C	D	F

PRO

- Cost

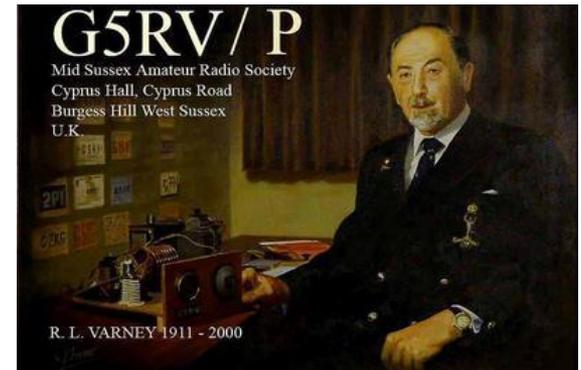
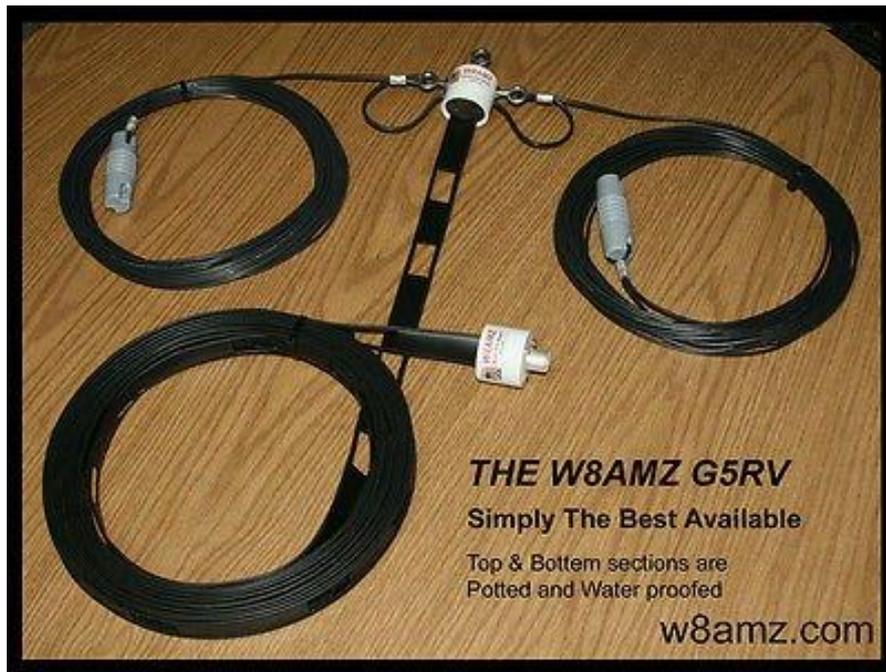
G5RV Jr

Center-Fed-Dipoles - 1/2 Wavelength

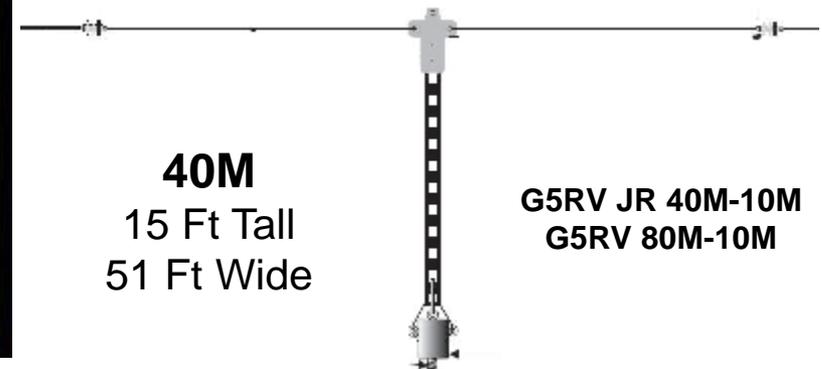
CON

- On Air
- Install

G5RV popular multi-band "compromise" antenna
 Ladder Line must be in free space and vertical
 Demands better tuner than dipole or OCF



Invented in 1946 by Louis Varney, G5RV (SK)

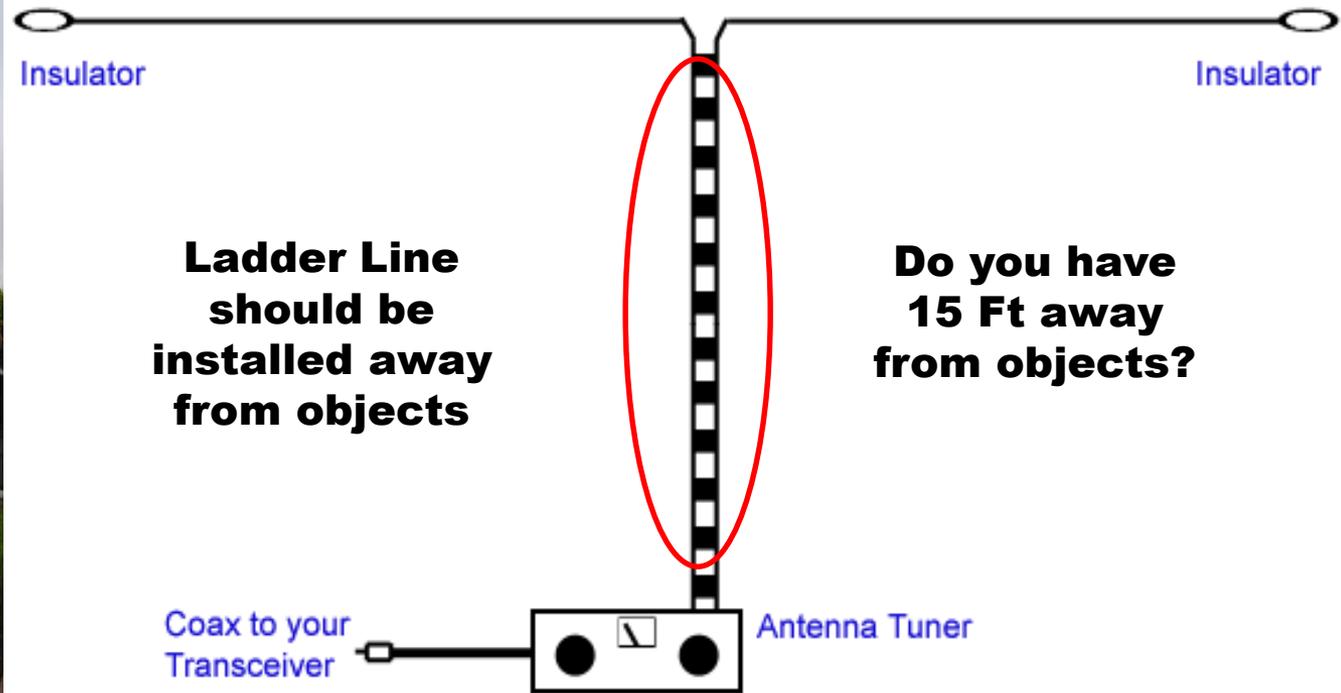


Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
G5RV Jr	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

G5RV Jr

Center-Fed-Dipoles - ½ Wavelength

Issue - Ladder Line must be in free space



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
G5RV Jr	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

G5RV Jr

Center-Fed-Dipoles - ½ Wavelength

Issue - Ladder Line must be in free space



Ladder Line should be installed away from objects

G5RV intended for Free Space

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
G5RV Jr	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

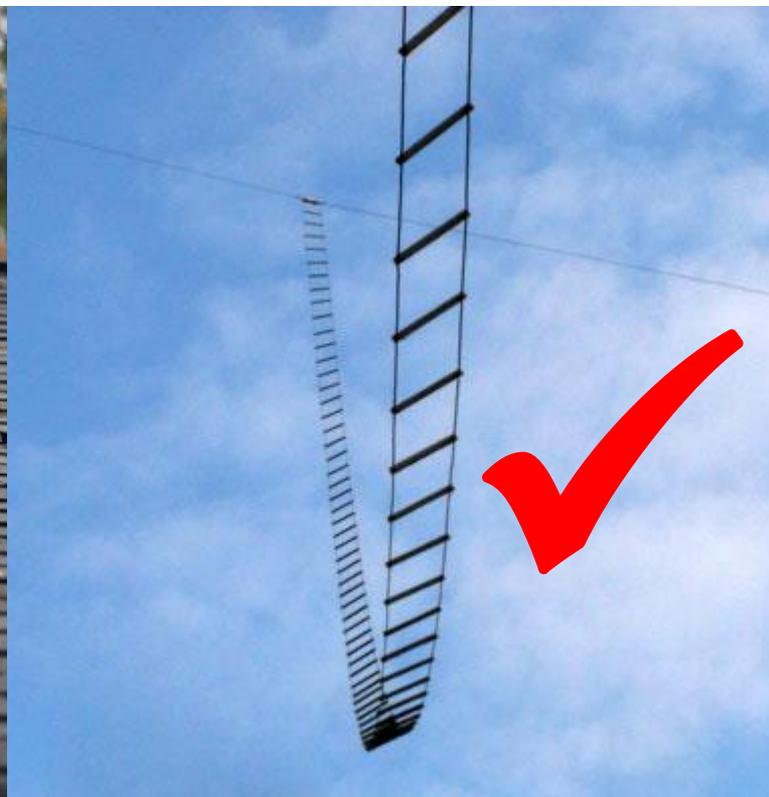
G5RV Jr

Center-Fed-Dipoles - ½ Wavelength

Issue - Ladder Line must be in free space



Ladder Line should be installed away from objects



G5RV intended for Free Space

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
G5RV Jr	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F



PRO

- Backpack
- Portable

Buddipole

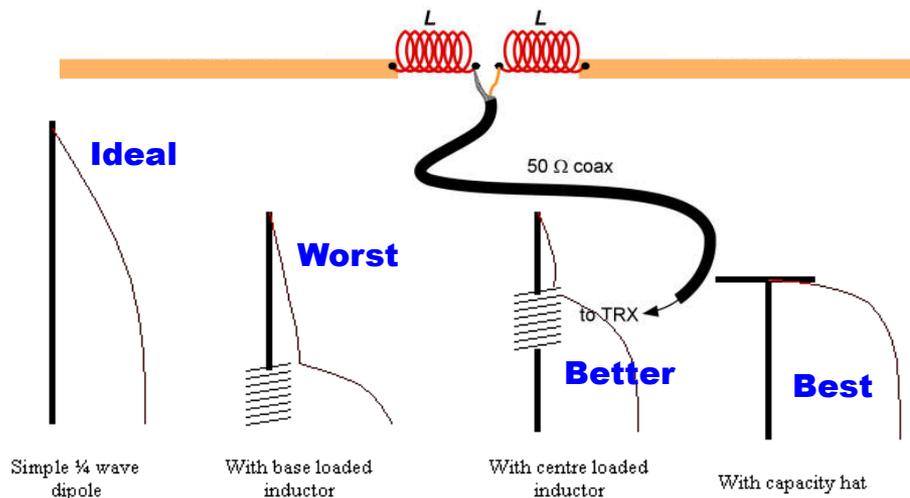
Center-Fed-Dipoles - "Loaded" Dipole

CON

- On Air
- Cost



Two short elements on a tripod
 Tuned by base loaded elements
 40M-6M & 2M by changing coils
 16 Ft Wide X 10 Ft Tall
 ~ \$500 as shown



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- Cost

Slinky Dipole

Center-Fed-Dipoles - "Loaded" Dipole

CON

- On Air

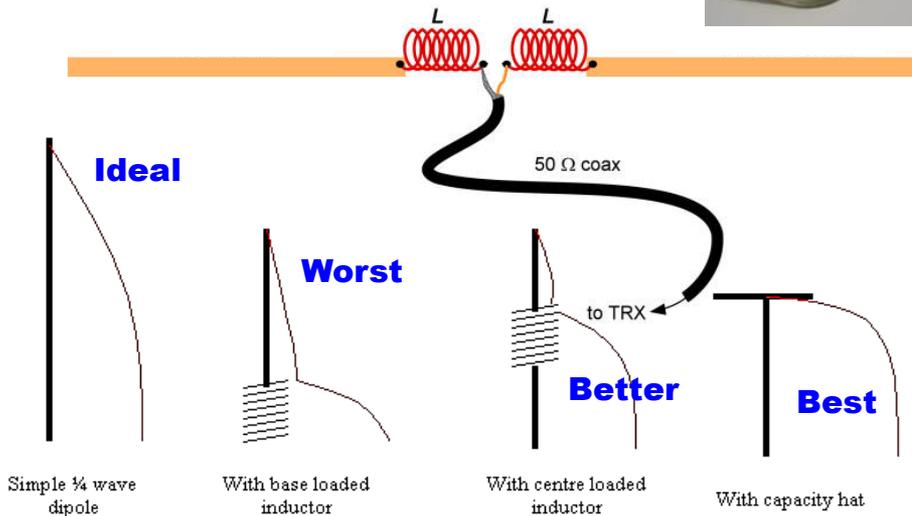
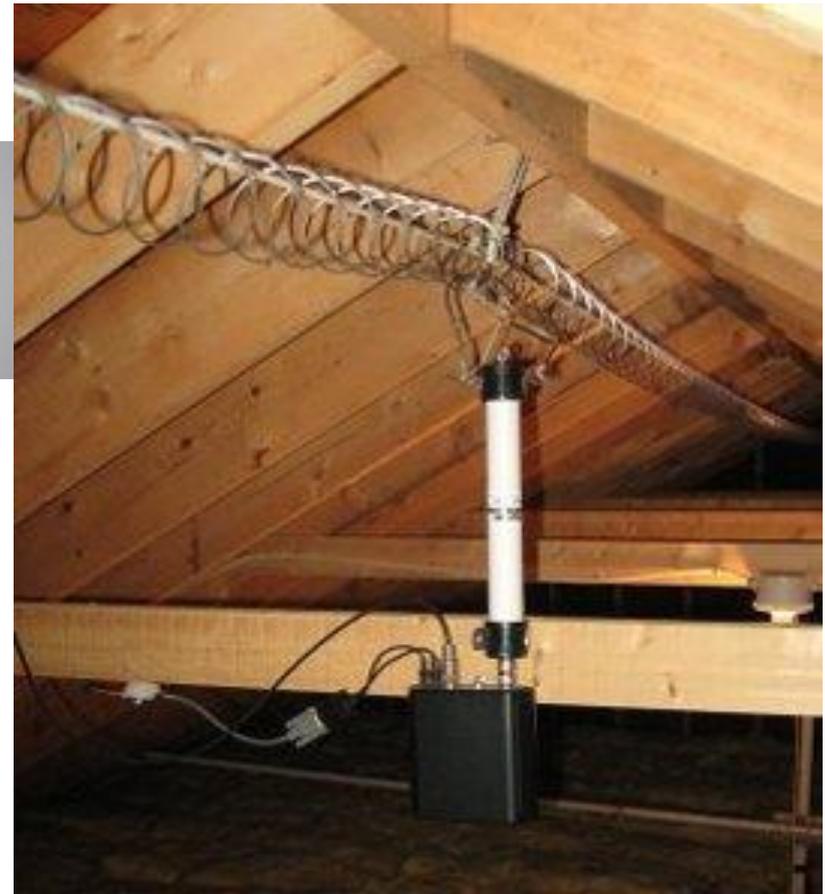
Two shorter loaded elements

Tuned by stretching (var. Inductor)

40M-10M with tuner

Size to fit space available

Acts like a base load



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- Cost

Helical-Coil Dipole

CON

- On Air

Center-Fed-Dipoles - "Loaded" Dipole

The Dowsers Corner Our COAX Stealth Helical

~ Shipping Insur. & Del. Conf. Included ~

From QRP up to 100W on Xmit

10M thru 80M in as little as 15'- 20' of space!*

It's a Real FULL SIZED Helical Dipole (approx. +/- 130') all coiled up!!!

Simple permanent or portable mounting!
Indoors ~OR~ Outdoors

It's a Slinky!



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Helical-Coil Dipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- Install

Wound Vertical Dipole

CON

- On Air

Center-Fed-Dipoles - "Loaded" Dipole

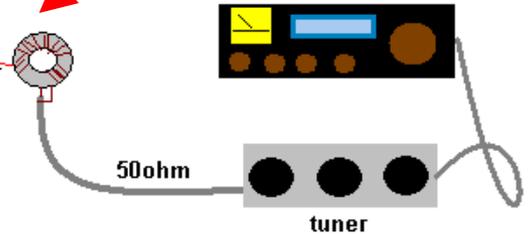
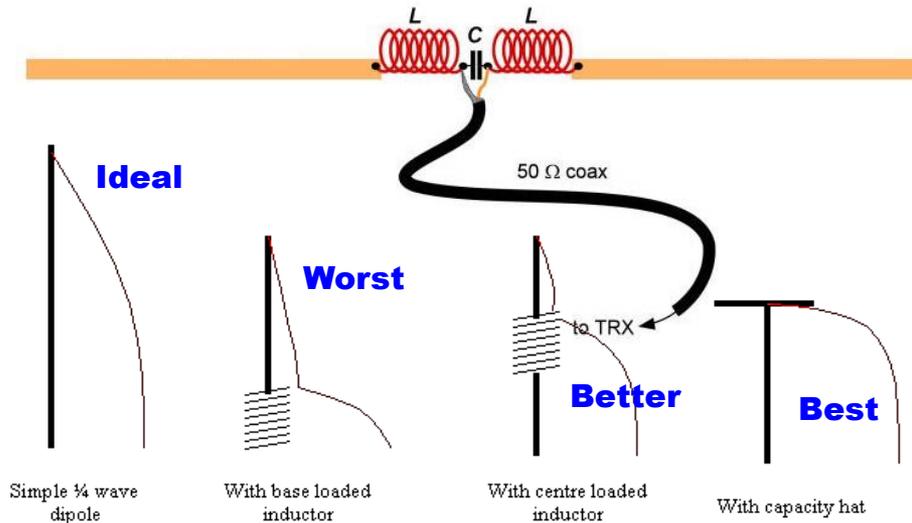
Vertical has less NVIS than Horizontal

Tuned by adjusting elements

40M-10M, 80M by adding coil

20 Ft Tall wire around a fishing pole

~ \$50 as shown



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- Backpack
- Portable

Wound Vertical Dipole

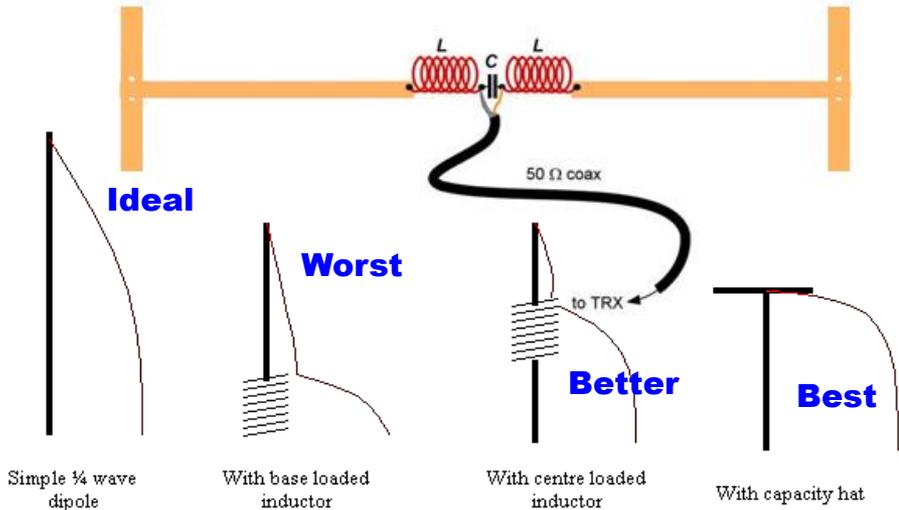
Center-Fed-Dipoles - "Loaded" Dipole

CON

- On Air
- Cost

"TransWorld Adventurer"

Tuned by matching network
 20M-10M by switching network
 5 Ft Wide X 8 Ft Tall
 ~ \$800 as shown



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- 160M

Fence Dipole

Direct Driven Ring Radiator

CON

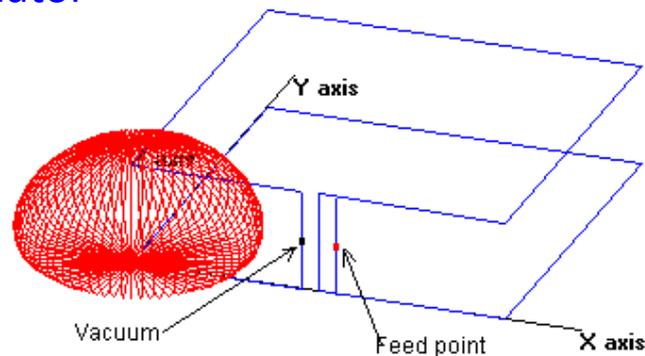
- On Air

Featured in QST as Stealth 80M – 160M

NVIS design

Not for 40M & up

5 Ft High X 62 Ft Long



DDRR and radiation pattern

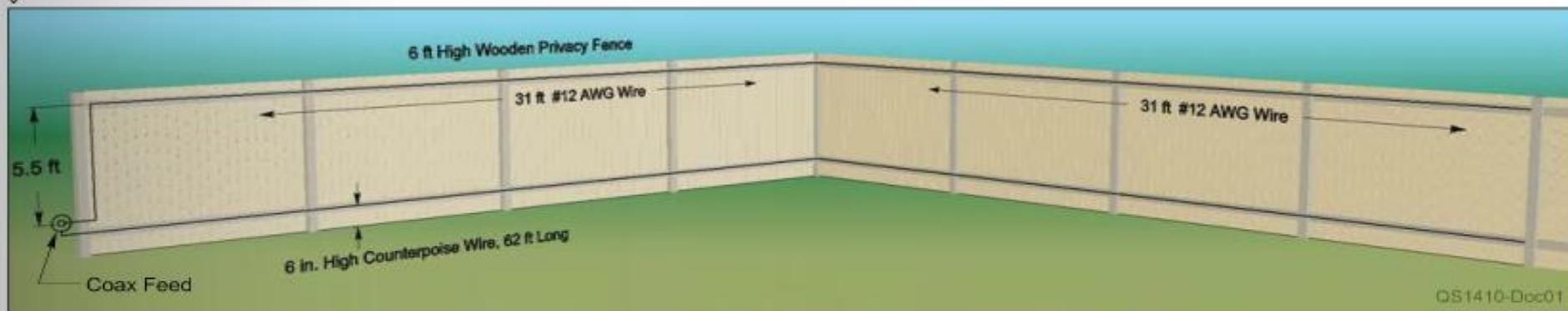


Figure 1 — Sketch of an 80-meter DDRR-like top-wire loaded vertical monopole mounted on a privacy fence. As noted, it can give a good account of itself, considering its visual impact and cost.

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Fence Dipole	D	A	Remote	C	C	F	F	D	D	D	D	C	C	C	B

PRO

- Install

TAK-tenna

Center-Fed-Dipoles - "Loaded" Dipole

CON

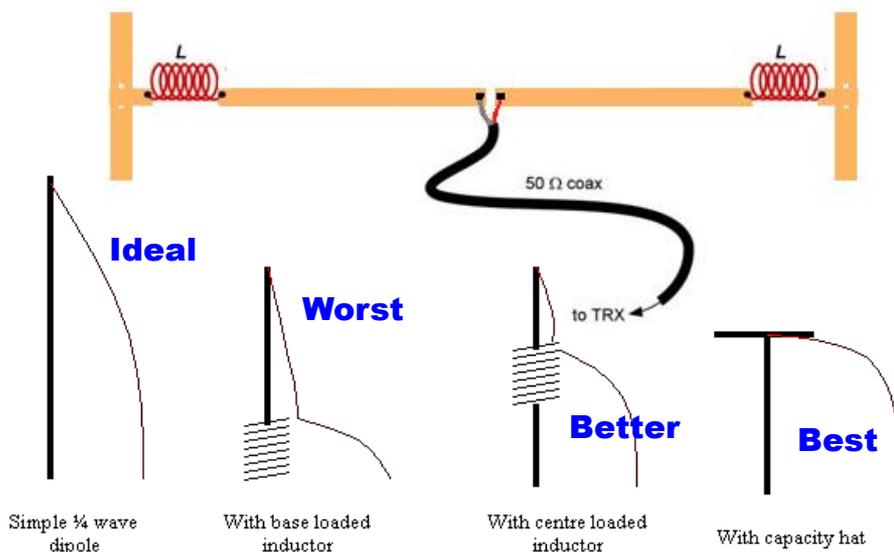
- On Air

Two short elements with end loads

40M-6M

3 Ft Wide X 3 Ft Tall

~ \$180 in Kit Form



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- Cost

Off-Center-Fed Dipole

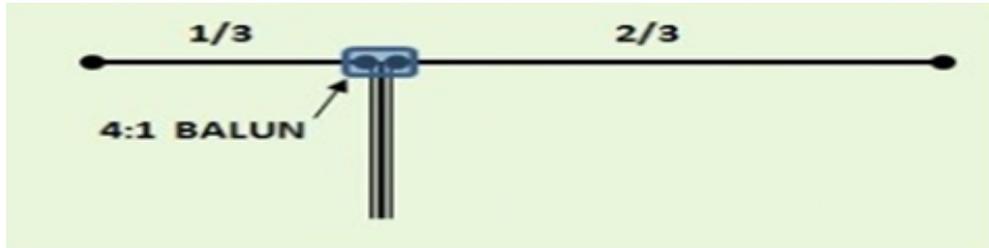
“Off-Center-Fed” Dipole

CON

- On Air

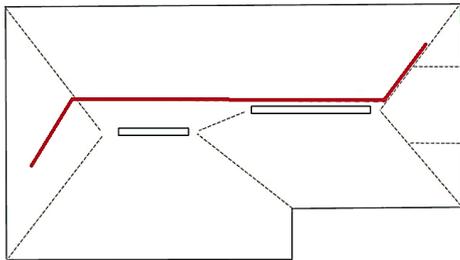
Multi-band "compromise" antenna like G5RV

- No Ladder Line, so easier to install than G5RV
- Easier to match than dipole or OCF for 30M, 17M & 12M
- Resonate 40M, 20M, 15M & 10M ~ 65 Feet Long
- May take many shapes to fit in attic space



40M
67 Ft Long (1/2 WL)

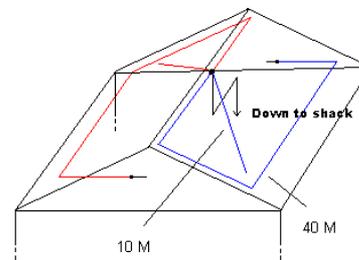
Line or Zig Zag



On top of shingles



C Shape



In attic



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Off Center Fed	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

PRO

- Cost

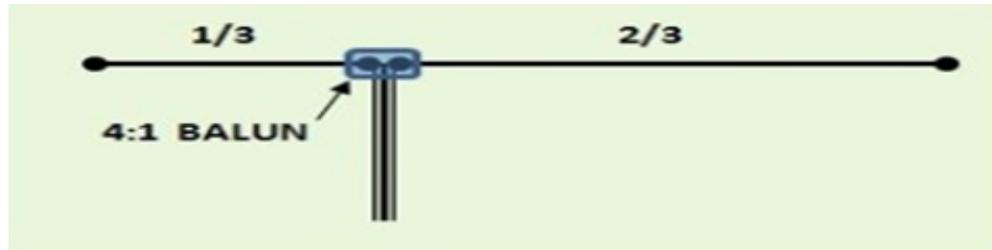
OCF DP also called a **Windom Dipole**

CON

- On Air

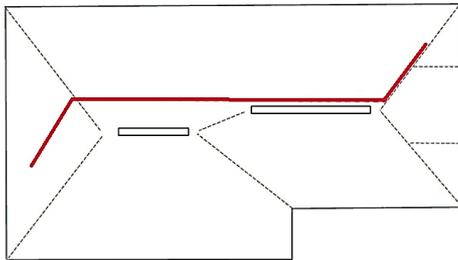
“Off-Center-Fed” Dipole

Multi-band "compromise" antenna like G5RV
 No Ladder Line, so easier to install than G5RV
 Easier to match than dipole or OCF



40M
 67 Ft Long (1/2 WL)

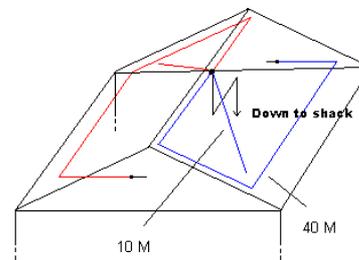
Line or Zig Zag



On top of shingles



C Shape



In attic



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Off Center Fed	C	C	Shack	B	B	C	C	C	C	C	C	D	D	F	F

PRO

- On Air

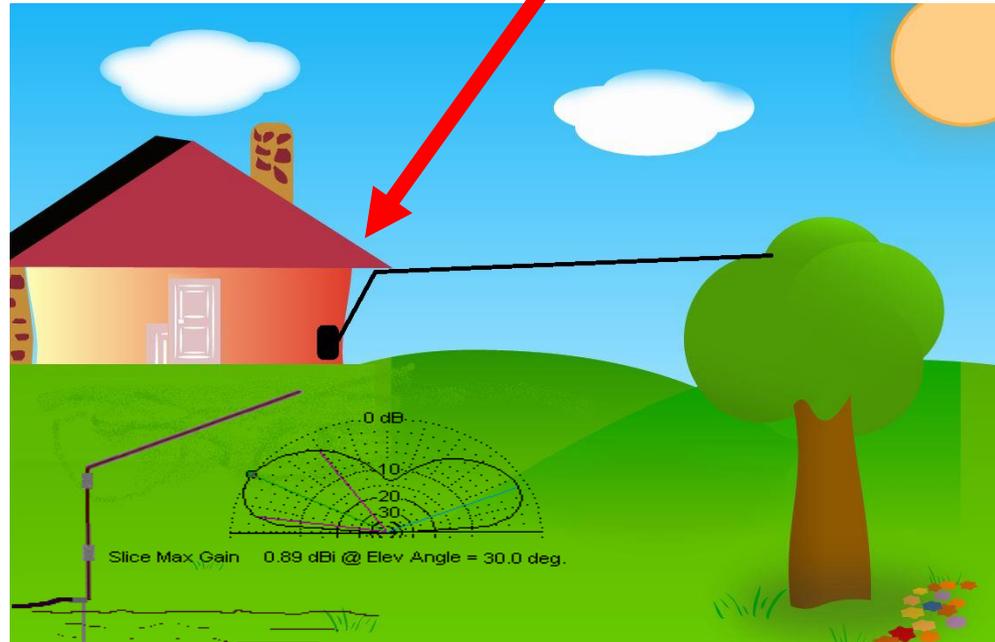
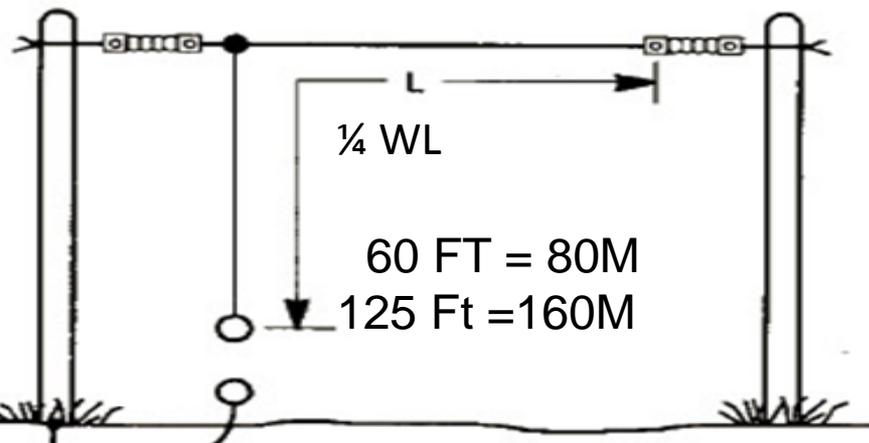
Inverted-L

“Vertical” with Radials

CON

- None?
- You decide!

Thin wire which is hard to see from a distance
 Typically 20 Ft vertical then horizontal to tree
 Length determines lowest frequency



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Inverted L	A	B	Remote	C	C	B	B	A	A	A	A	A	A	A	A

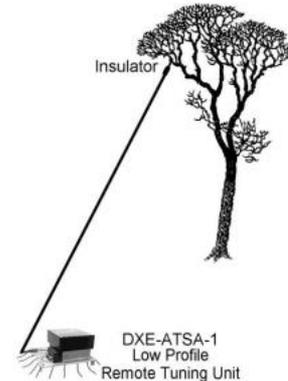
PRO

- On

End Fed "Dipole"

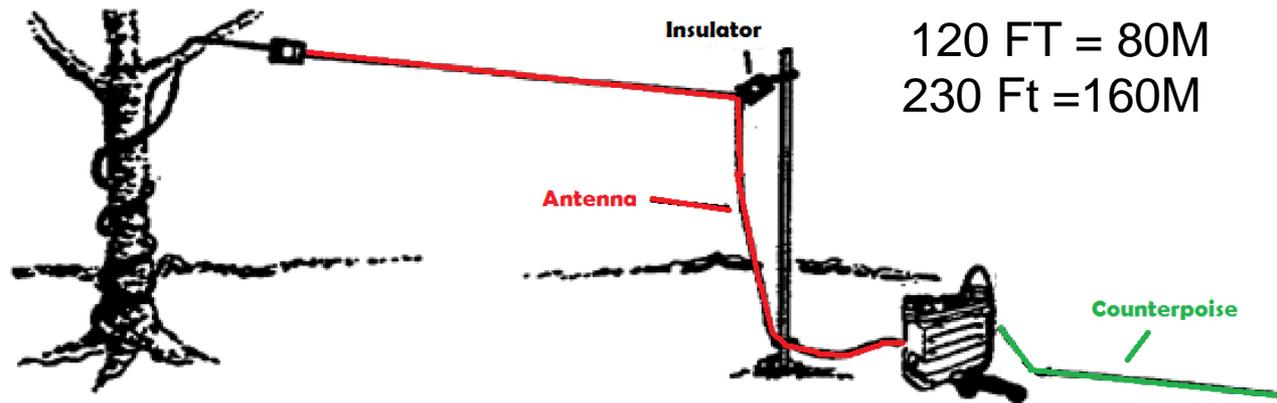
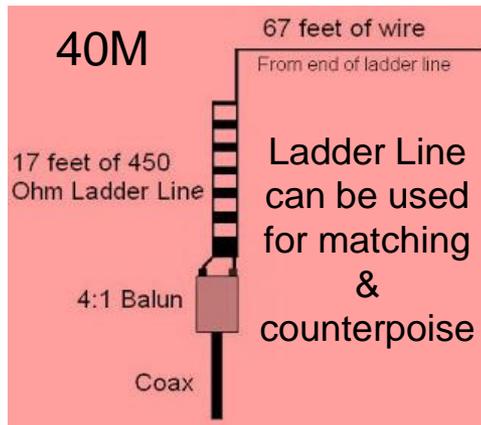
"Off-Center-Fed" Dipole

Thin wire which is hard to see from
 Typically 20 Ft vertical then horizontal
 Length determines lowest frequency
 Element ~ 92% of 1/2 WL
 Counterpoise ~ 8% of 1/2 WL



CON

- Length



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
End Fed	B	B	Remote	B	C	B	B	B	B	B	B	C	C	F	F

PRO

- On

End Fed "Dipole"

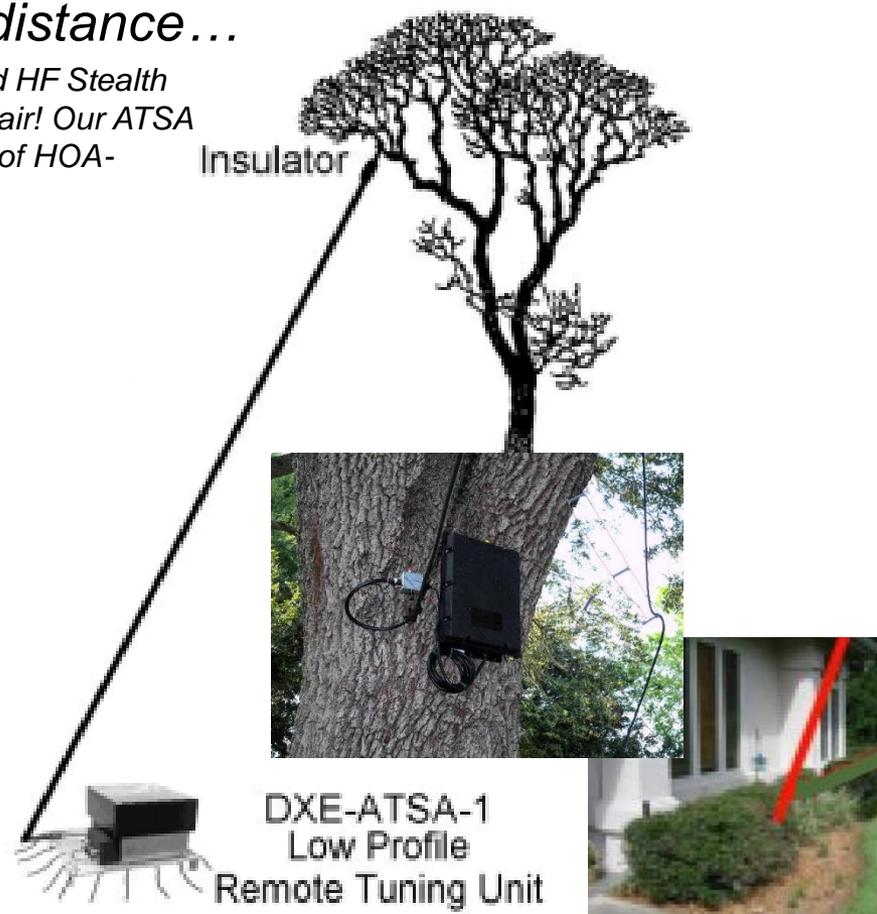
CON

- Cost

DX Engineering Auto-Tuned Multi-Band HF Stealth Antenna

"Thin wire which is hard to see from a distance..."

... No antennas allowed? DX Engineering Auto-Tuned Multi-Band HF Stealth Antenna Systems help you keep a low profile and still get on the air! Our ATSA concept allows Amateur radio operators living under the shadow of HOA-controlled areas to get on the air easily. "



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
End Fed	B	B	Remote	B	C	B	B	B	B	B	B	C	C	F	F

PRO

- Cost

Random Wire

“Off-Center-Fed” Dipole

CON

- 40-160M

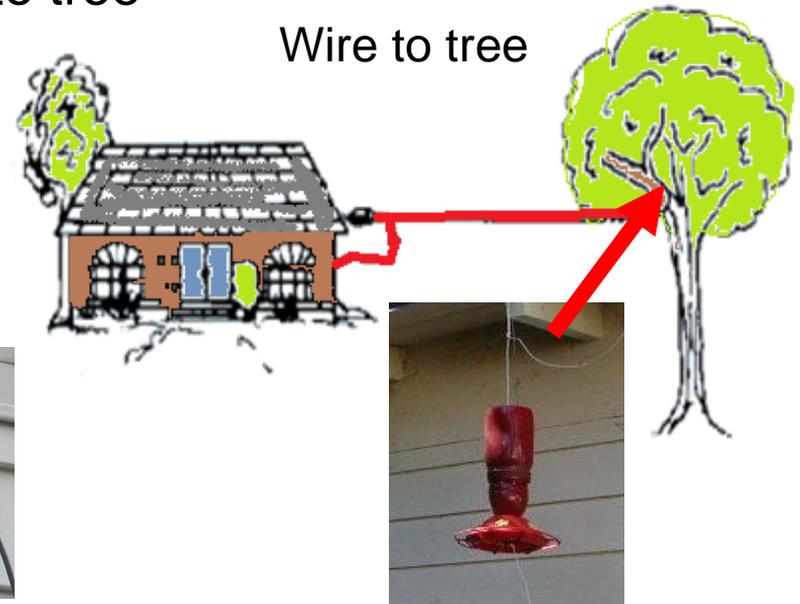
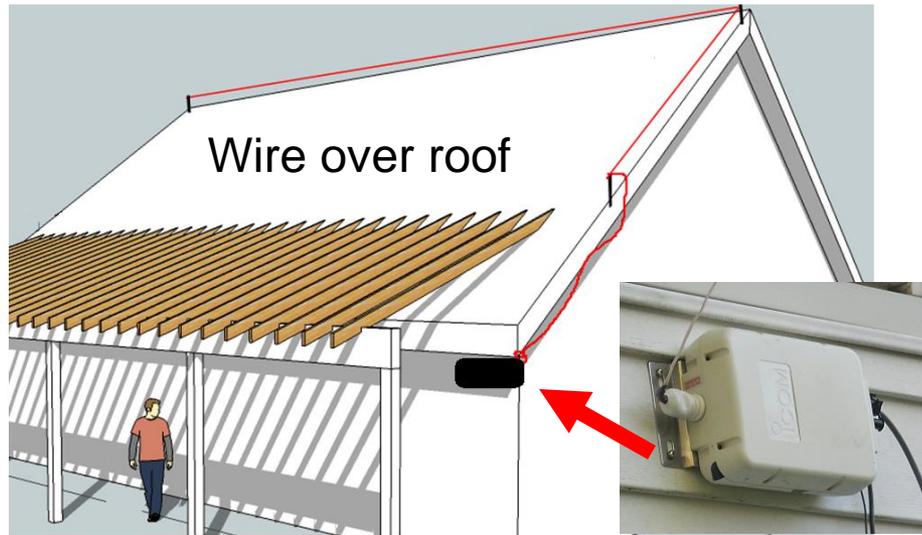
Many recommend lengths published

40M-10M Example = 84' long end fed and a 17' long counterpoise

[QST, March 1936, P 32](#)

One solution hide remote tuner & counterpoise under soffit

Random Wire can be run over roof or to tree



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Random Wire	C	B	Shack	B	B	C	C	C	C	C	C	D	D	F	F

PRO

- On Air

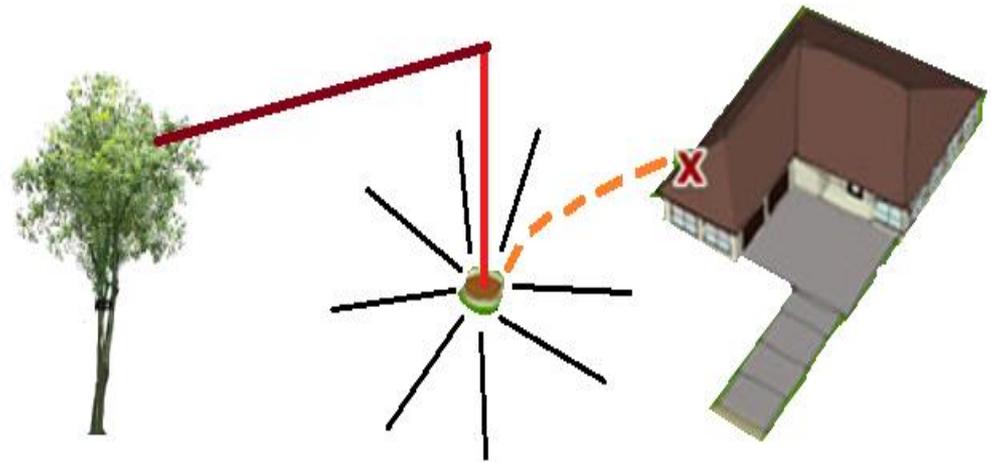
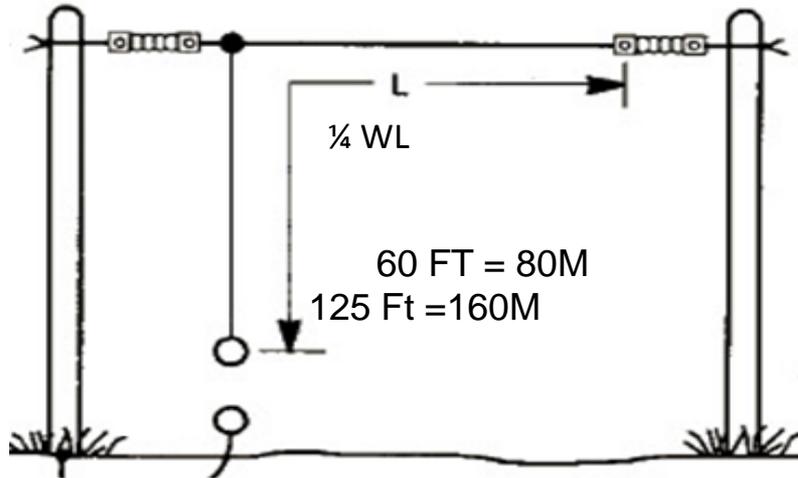
Flagpole-L

“Off-Center-Fed” Dipole

CON

- Cost

Thin wire added to Flagpole
 Small wire is hard to see from street
 Flagpole for vertical then horizontal to tree
 Length determines lowest frequency



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Flagpole L	A	B	Remote	C	F	B	B	A	A	A	A	A	A	A	A

PRO

- Stealth

Rain Gutter Dipole

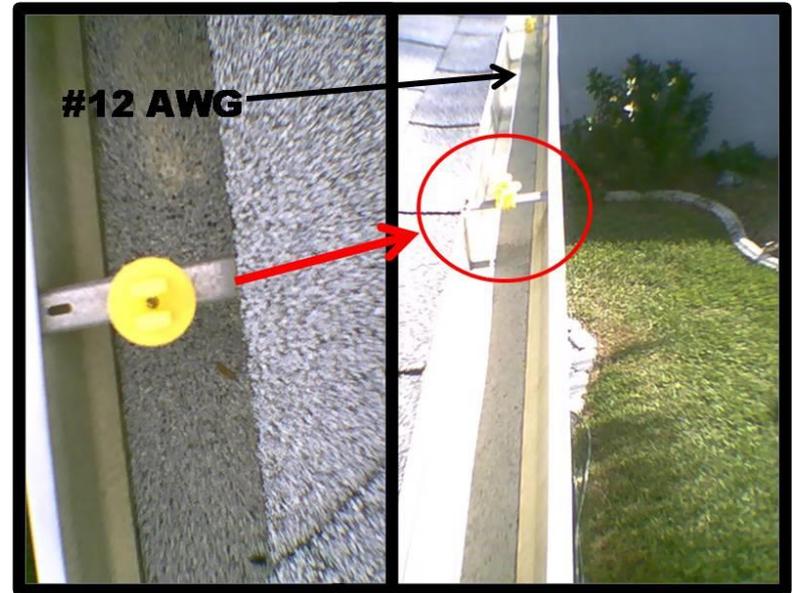
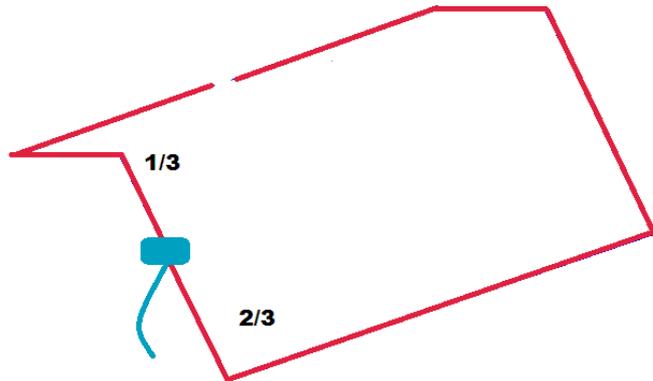
“Off-Center-Fed” Dipole

CON

- On Air

Very NVIS Antenna

- Rain Gutter antenna is a difficult install job
- Keep gutters are isolated from ground install wire on insulators
- Electrical continuity between sections is a maintenance problem
- Coupling to the house, aluminum window and screen cages detunes
- Low Res Z
 - 80M = 7 Ohms R + 0j
 - 160M = 8 Ohms R + 0j



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Rain Gutter Dipole	D	A	Shack	C	C	F	F	D	D	C	C	C	D	D	D

PRO
• Install

Off-Center-Fed Spiral Dipole

CON
• On Air

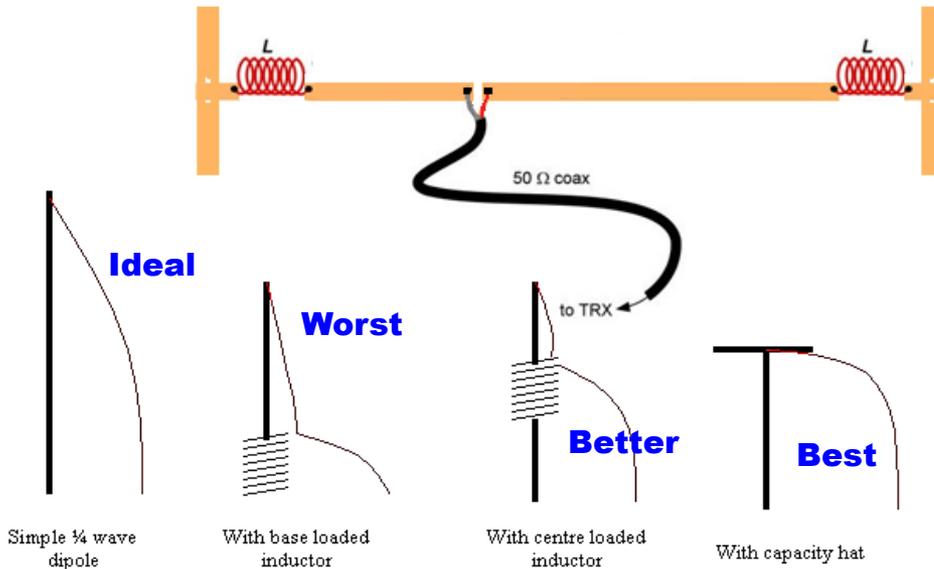
“Off-Center-Fed” Dipole - “Loaded” Dipole

Two short elements with end loads

40M-2M

3 Ft Wide X 3 Ft Tall

~ \$10 in Kit Form



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Buddipole	D	C	Shack	B	C	C	C	C	C	D	D	F	F	F	F

PRO

- None?

WL Horizontal Loop

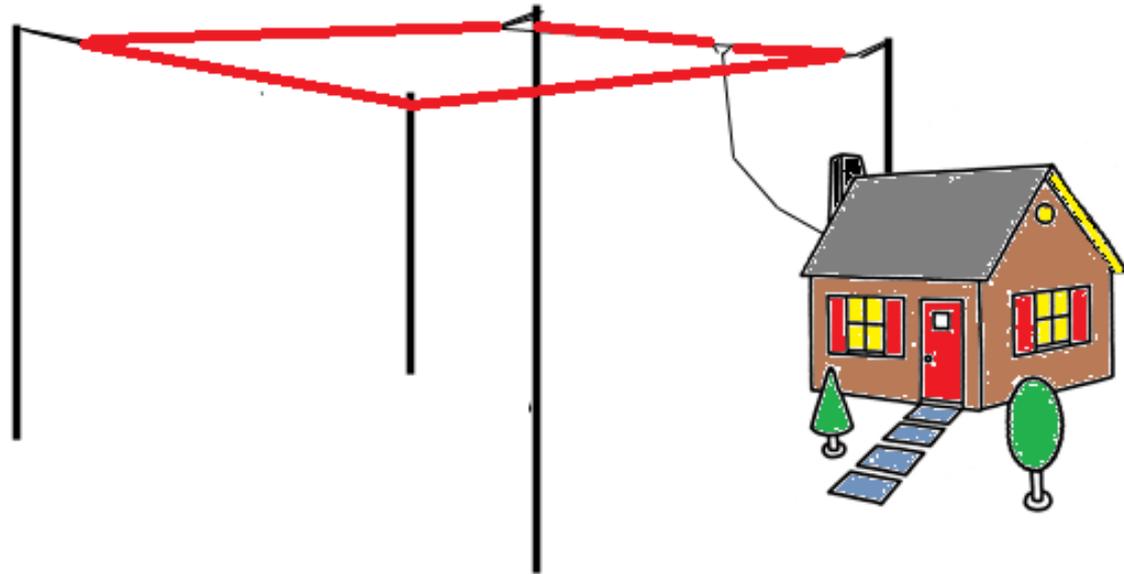
Full Wavelength Loop

CON

- Install

Very NVIS Antenna

- Depends on available trees
- Require 60 Feet above ground to work properly
- Low Res Z at 10 – 20 feet above ground



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
WL Horz Loop	D	C	Remote	D	D	F	F	D	D	C	C	C	D	D	D

PRO

- Stealth

Rain Gutter Loop

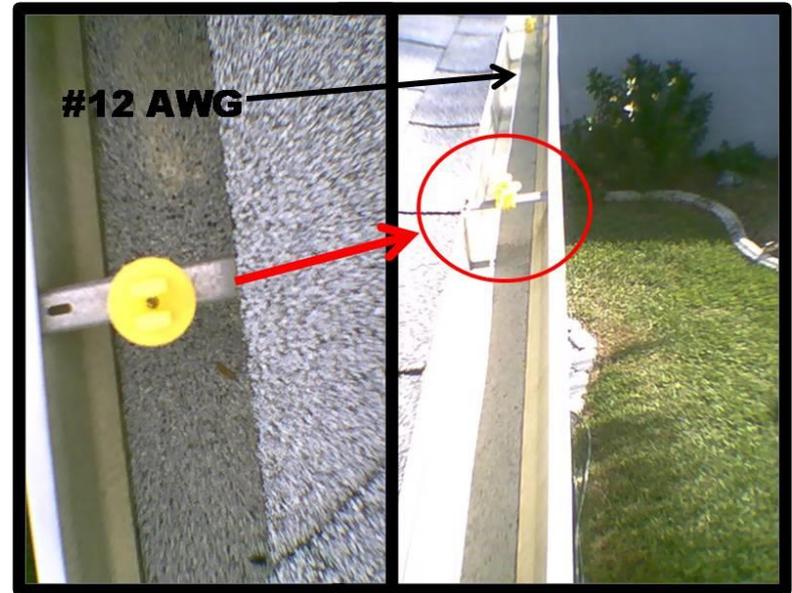
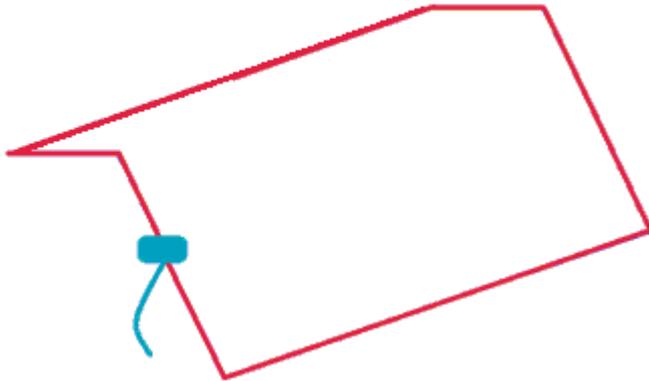
Full Wavelength Loop

CON

- On Air

Very NVIS Antenna

- Rain Gutter antenna is a difficult install job
- Keep gutters are isolated from ground install wire on insulators
- Electrical continuity between sections is a maintenance problem
- Coupling to the house, aluminum window and screen cages detunes
- Low Res Z
 - 80M = 7 Ohms R + 0j
 - 160M = 8 Ohms R + 0j



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Rain Gutter Loop	D	A	Shack	D	C	F	F	F	D	C	C	D	D	D	F

PRO

- On Air

WL Vertical Loop

Full Wavelength Loop

CON

- 80-160M

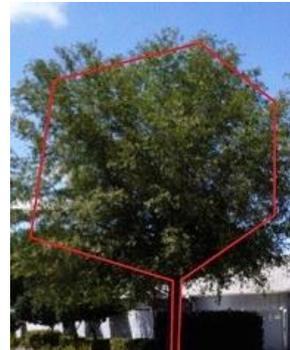
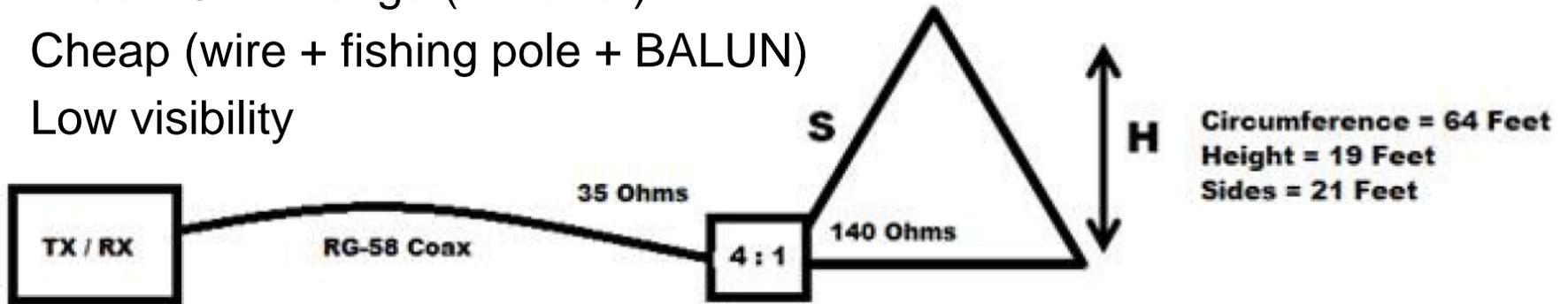
Good on the Air Performance Sitting on Ground

Almost Omni-Directional

Wide VSWR range (no tuner)

Cheap (wire + fishing pole + BALUN)

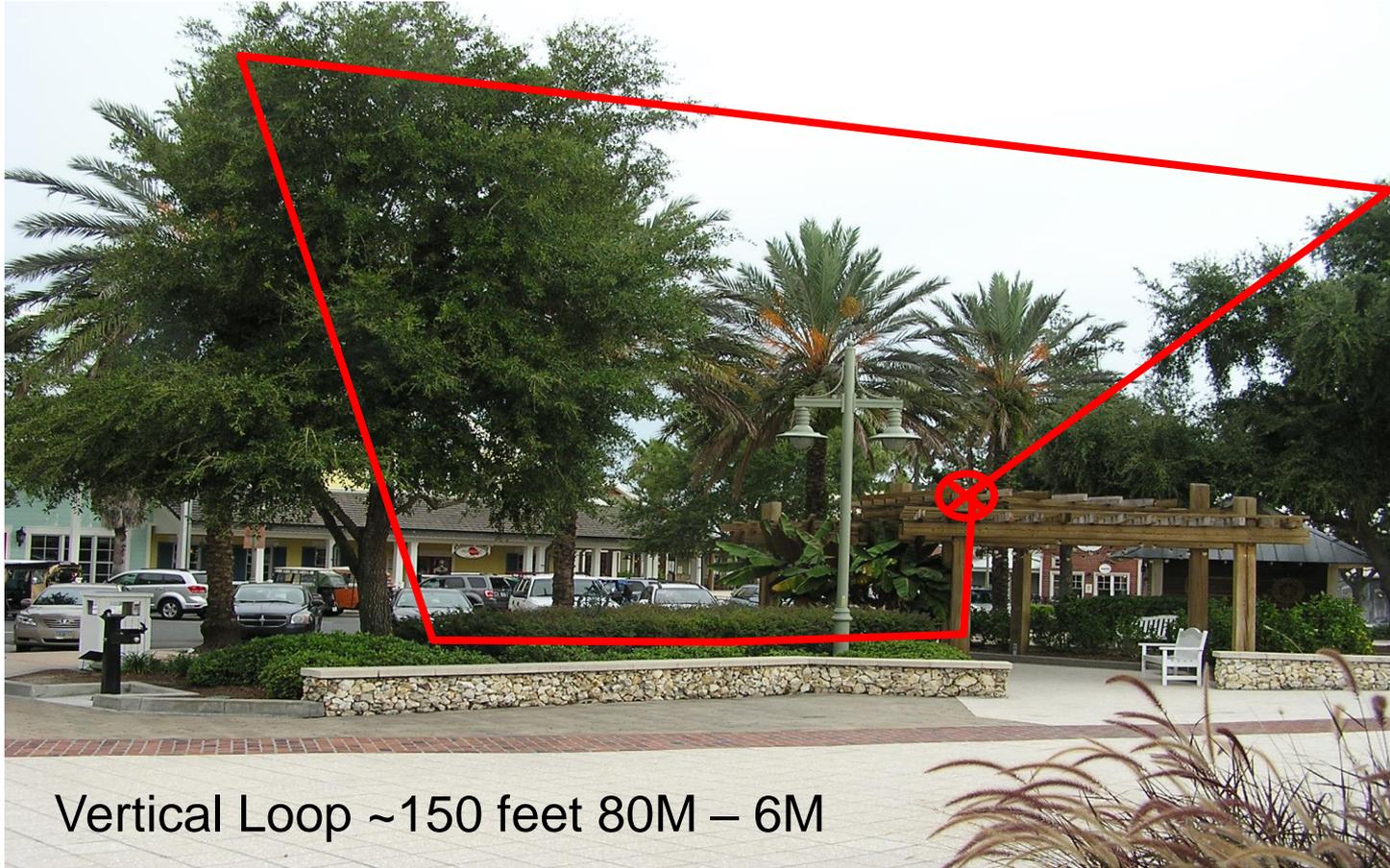
Low visibility



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
WL Vert Loop	B	B	Shack	B	B	B	A	B	A	B	A	B	A	C	F

WL Vertical Loop

Full Wavelength Loop



Vertical Loop ~150 feet 80M – 6M

Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
WL Vert Loop	B	B	Shack	B	B	B	A	B	A	B	A	B	A	C	F

Stealth for Sale

Full Loop Go Kit

Stealth in a box?

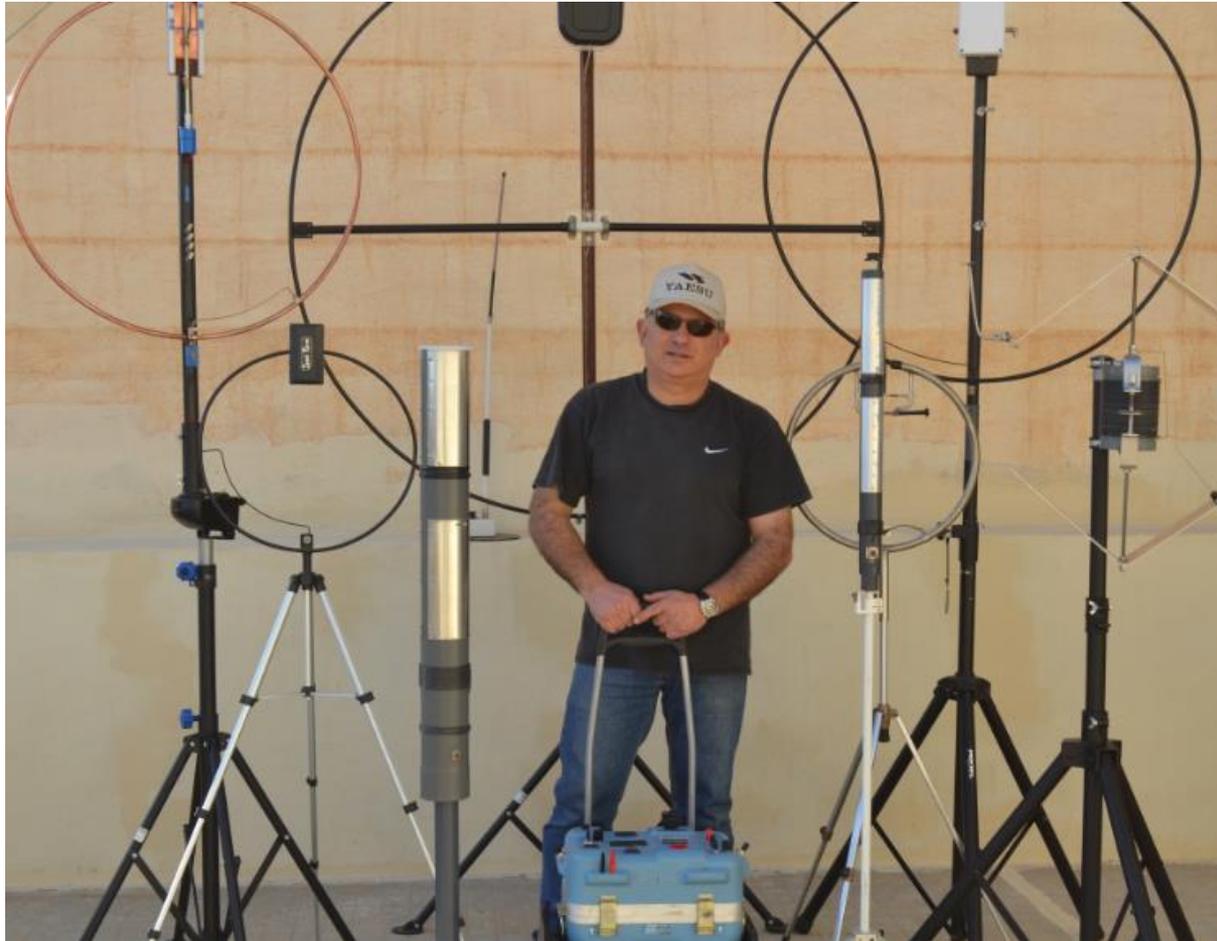
- SG-237 Smartuner
- 80 foot wire.
- Rope
- Cable ties

\$400



Magnetic Loop

Short Loop



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

PRO

- Stealth

Magnetic Loop

CON

- Cost

Short Loop

Short magnetic loops are less than 10% of a wavelength

Magnetic loop does not look like an antenna

Shape can be a circle, rectangle, square, etc. more area helps

RF Efficiency 10% & advanced DIY skill [QEX March 2013 P 3-6](#)

Thousands of RF Amps require pipe conductors

Thousands of RF Volts require vacuum capacitors for tuning

10 KHz VSWR Bandwidth



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

MFJ-1786 Loop 30M-10M sells for \$500



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

Most Magnetic Loops are DIY

Thousands of RF Amps require pipe conductors



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

Most Magnetic Loops are DIY

Thousands of RF Volts require vacuum capacitors for tuning

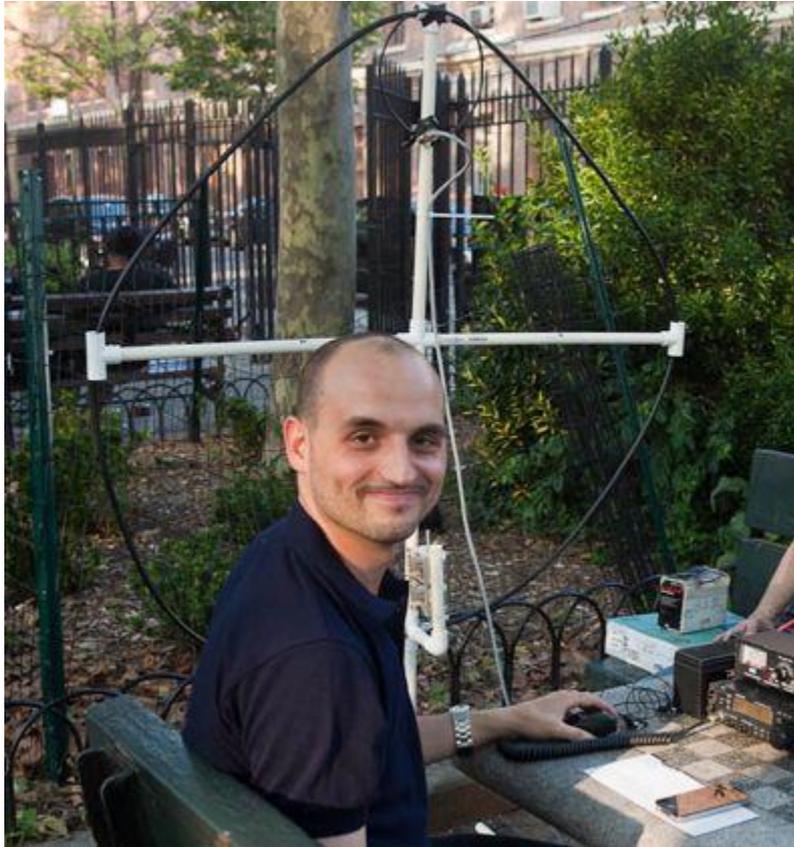


Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

QRP Magnetic Loops are often made from coaxial cable or wire



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

PRO

- Stealth

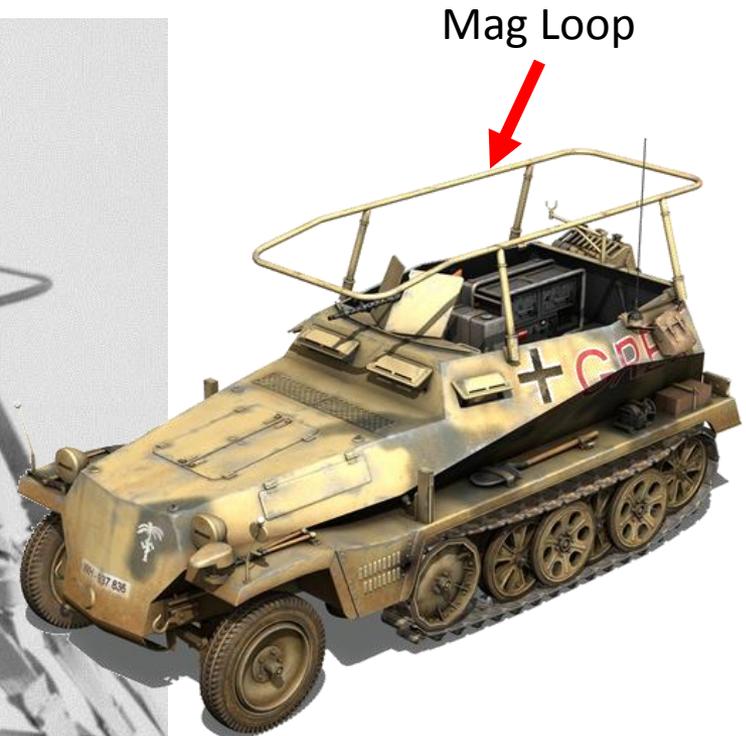
Magnetic Loop

Short Loop

CON

- Cost

Short Magnetic Loops can be used as horizontal loops for short range 200 to 400 Miles NVIS theater communications



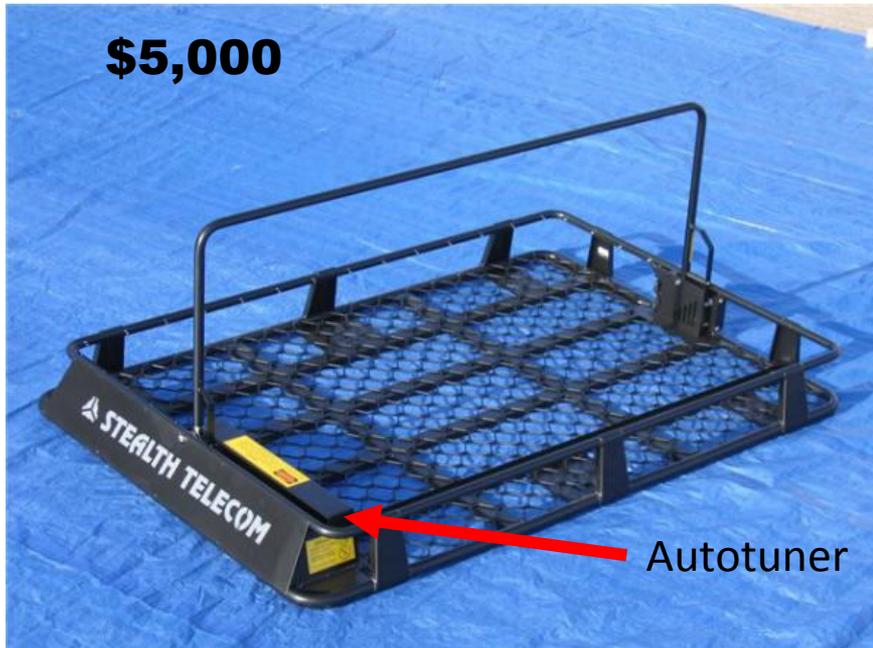
Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

Vertical or horizontal loops mobile communications

Stealth Telecom 9400 Mobile HF NVIS Magnetic Loop Antenna



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

Magnetic Loop

Short Loop

Vertical DIY loops mobile communications



Antenna	On Air	Stealth	Tuner	Install	Cost	6M	10M	12M	15M	17M	20M	30M	40M	80M	160M
Magnetic Loop	C	A	F	B	D	C	C	C	C	C	C	C	D	D	D

PRO

- Cost

2M / 70cm

CON

- None?

The Villages have good 2M & 70cm repeater coverage

Most can reach one or more repeaters from an HT

An attic antenna will reach the five Sumter repeaters

Newer homes with aluminum roof sheathing require stealth antennas



PRO

- Cost

Simply the Best

Does NOT require a ground plane.

Mount on a metal mast

Ideal for mounting in an attic,
On a roof vent pipe, (up to 1 1/2")
On a wooden or Fiberglass pole,
On Fiberglass or Plastic Vehicles,
(Motorhomes, Trucks, **Boats**)
Mount it just about anywhere.

Low SWR - Wide Bandwidth

Has Gain over a 1/4 wave .

Omni-Directional.

This is a very Heavy Duty Antenna.
The Elements are made from 3/8"
Solid Round Aluminum with a Heavy
Duty Angle Mounting Bracket.

Mounting Hardware for
mast up to 1 1/2" Included.

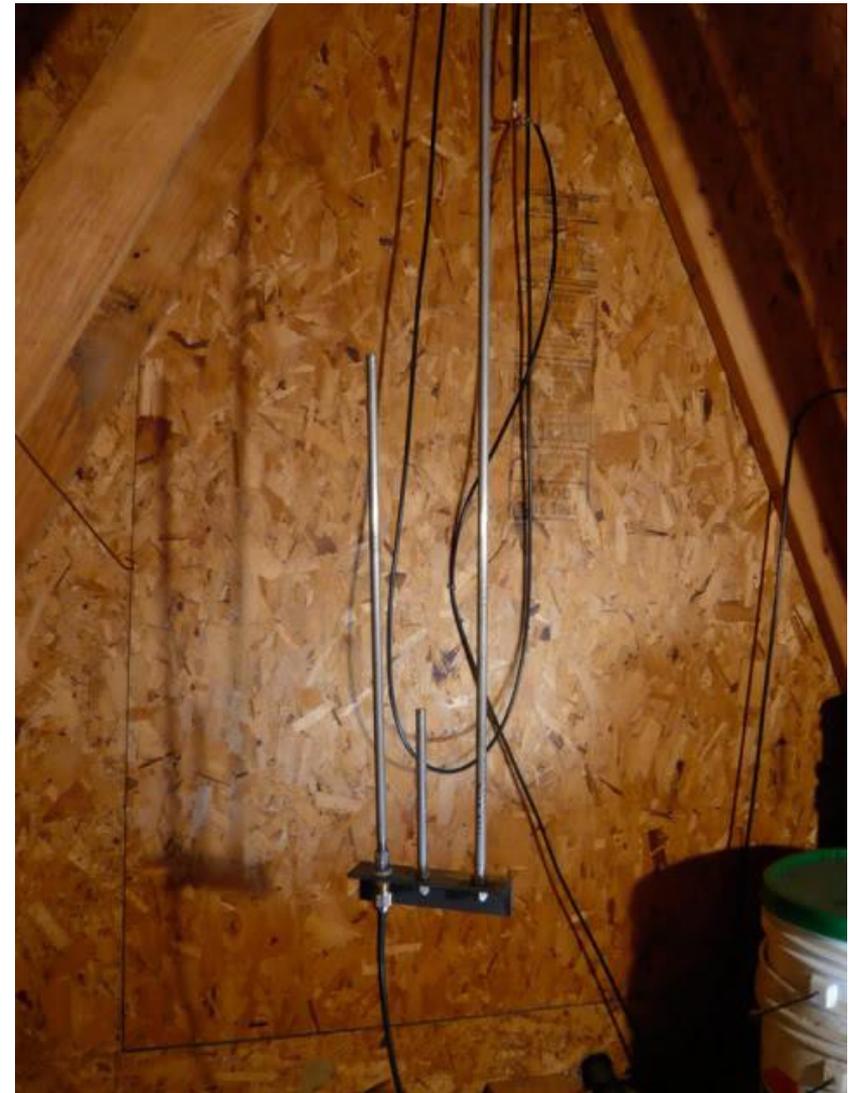
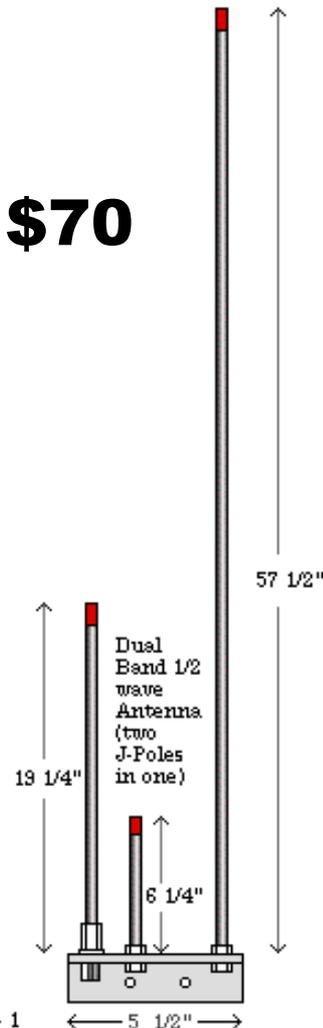
Single SO239
Feed Connector

2M / 70cm

CON

- None?

\$70



Arrow J-Pole

Covers 143-149 MHz. VHF
Covers 437-450 MHz. UHF
With an VSWR of less than 1.5 - 1

· 1

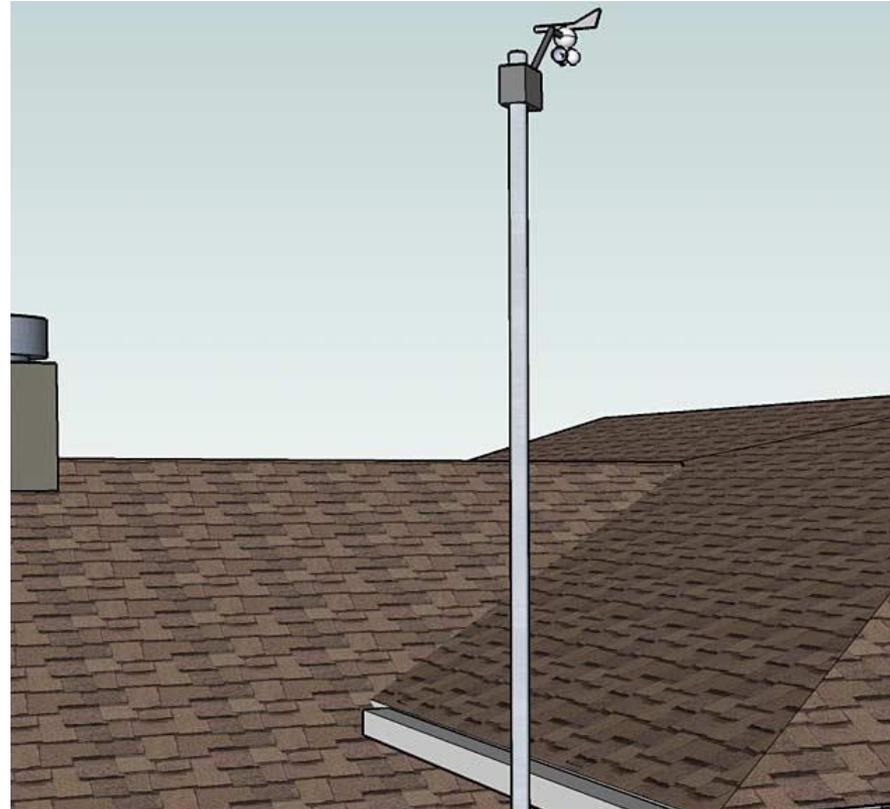
2M / 70cm

Most 2M & 70cm antennas will fit inside PVC pipe & mount as a vent pipe



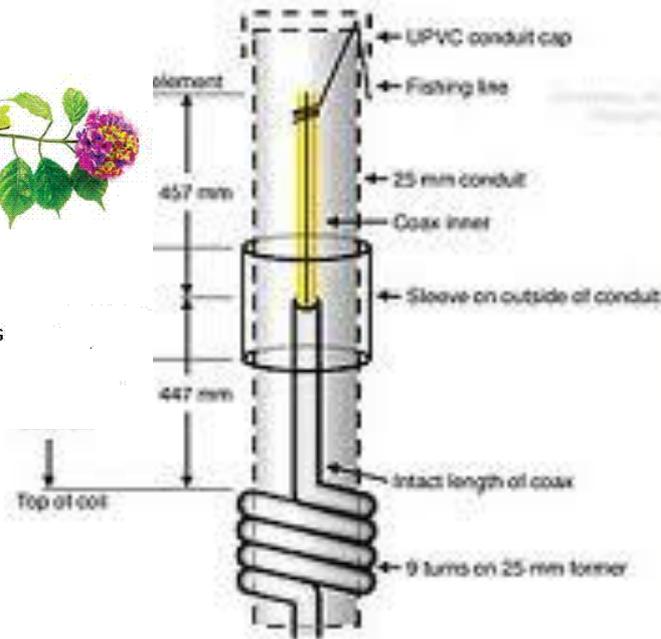
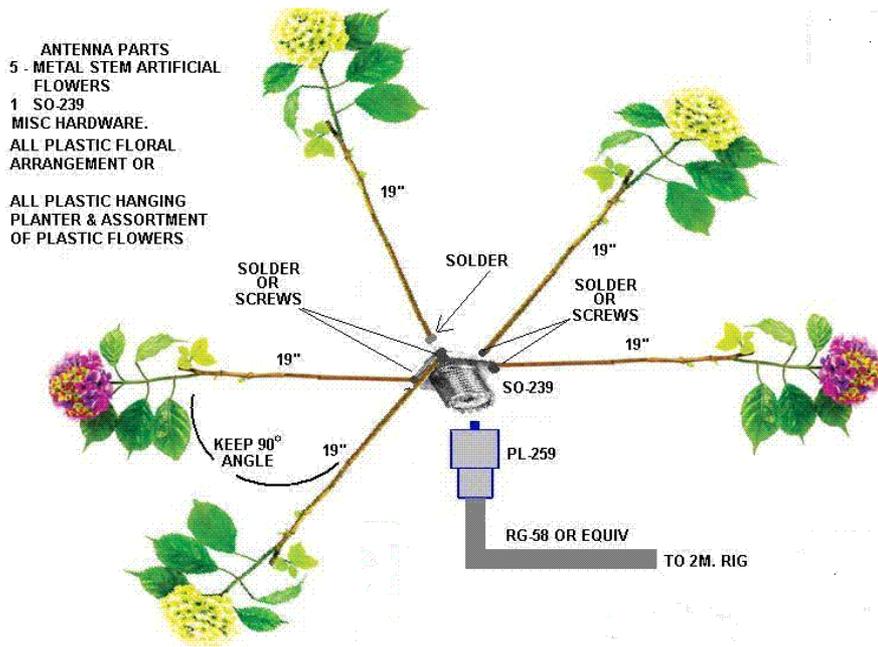
2M / 70cm

Most 2M & 70cm antennas will fit inside PVC pipe & accent with a plastic weather vane



2M / 70cm

More 2M & 70cm antennas stealth options; hiding as a potted plant or staked tree, climbing vine, etc.



Antennas for The Villages

Modulation matters more than your antenna or power output

- AM vs. SSB vs. CW vs. PSK vs. JT65
- 5 W using CW equals 250 W using SSB
- 5 W using PSK-31 equals 2,500 W using SSB
- [QST Dec 2013, P30-32](#)

Height (of Dipoles, G5RV, End Fed) matters, except Vert Loops

- Horizontal elements near ground are NVIS
- [QST Nov 2009, P 64-65 - May 2010, P 57 - Apr 2010 P 47-48](#)

Short Antennas hurt RF Efficiency

- Loads at base hurt, top loads help, top caps help
- Traps hurt lower frequencies
- [QEX Jan 2014, P34-42 – Mar 2014, P18-31](#)

1 Counterpoise above ground = 32 Radials

- Poor soil conductivity hurts radials as counterpoise
- [QST Mar 2010, P30-33 – Mar 2014, P35-37](#)

Some timeless approaches for better RF performance

- Anything Tall Helps (except Vertical WL Loops any height works)
- Longer is better (monopole objective is $\frac{1}{4}$ WL or odd multiples, $\frac{1}{2}$ WL for dipoles)
- Inverted-L address lower frequencies (160M-40M)
- *Vertical WL Loops* address most HF bands (80M-10M)