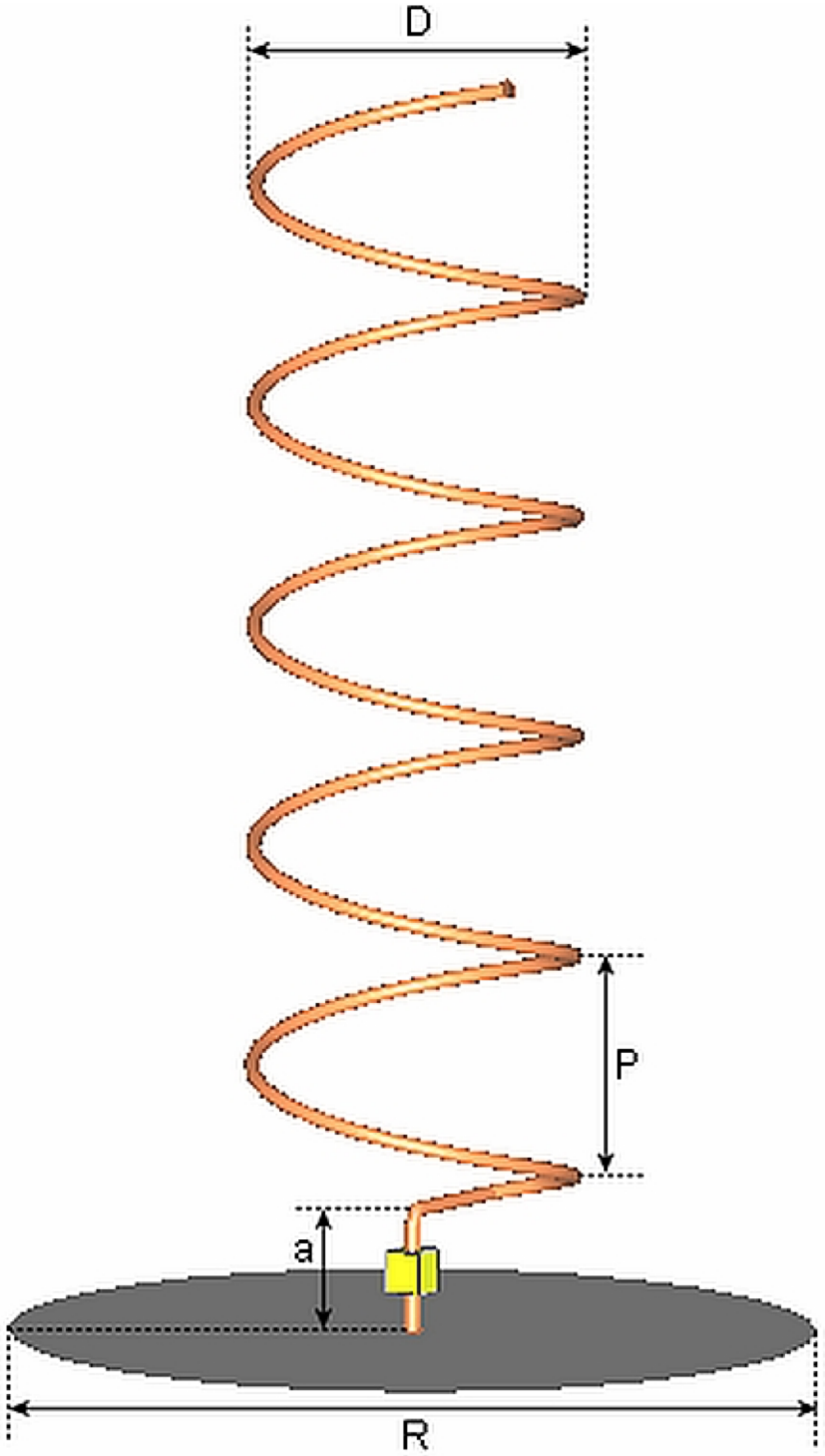
# A Right Hand Circularly Polarized Helical Antenna For High Altitude Balloon UHF Beacon Reception

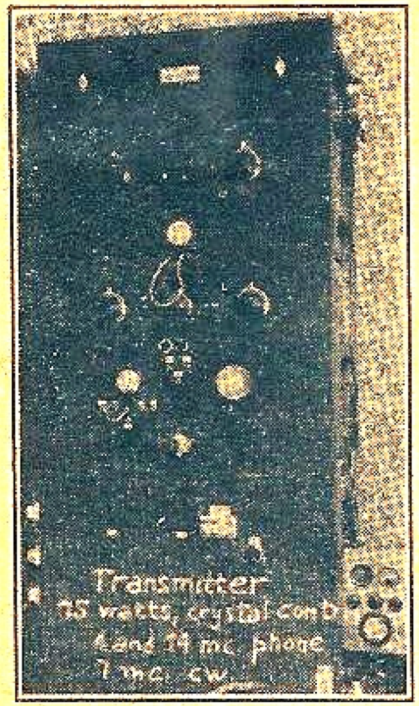



The Axial Radiating Helical Antenna wa

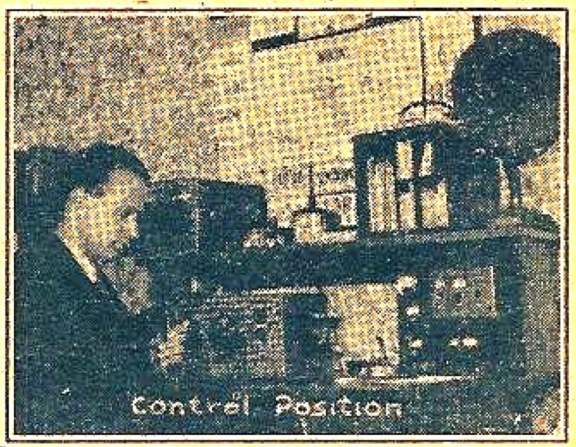
To his surprise the wire radiated a stron

The bandwidth is also quite generous, c

Arlington Blvd., ANN ARBOR, MICHIGAN, U. S. A.




# W8JK




Radio ~~Ur~~ ~~sigs wkd~~

on 193 at ~~E.S.T.~~

~~QSA~~ ~~Conds~~ ~~QRH~~ ~~mc.~~

DX QSO 34 countries in 5 continents

PORTABLE
W8BEE
Associate Institute of
Radio Engineers

Many thanks for your report on the reception of my 75 meter fone signals on Feb. 10, 1933.

Vy 73, JOHN D. KRAUS

W8JK also invented the Close Spaced Two Driven Element Beam that He published “Antennas” 1st Ed. In 1950 and 2nd Ed. In 1988.

Helix antenna

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Español

Themes:
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**Calculator**

QFH

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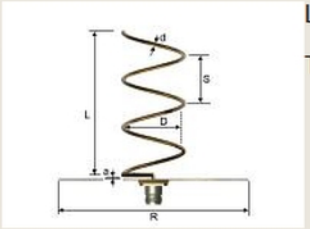
On this page:
Data input
Results

## Helix antenna design and construction details

### Input data (design requirements)

| | |
|---|---|
| Design frequency | 435 MHz |
| Number of turns | 8.5 |
| Turn spacing | 0.23 wavelengths |
| | Calculate |

### The results




Legend. The letters in the image are used in the table below.

To get a large version, click on the image.

| | | |
|---|---|---|
| Wavelength | | 689.6 mm |
| Ideal diameter (internal) | D= | 236.3 mm |
| Gain | | 12.47 dBi |

A quick Google search will fi

Entering 435MHz and 8.5 Tu

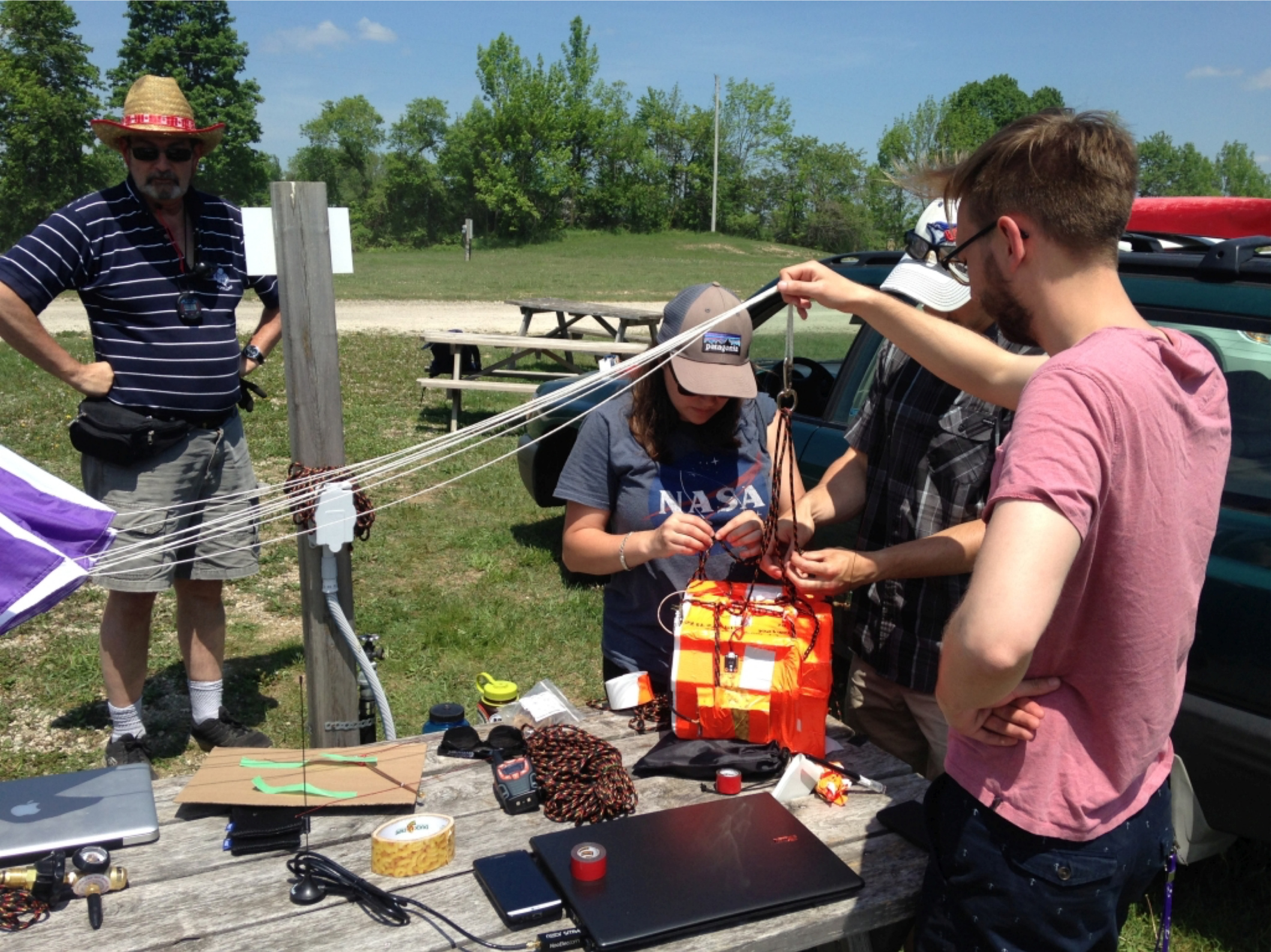
Back in the mid 80's I built a 2 meter 10 turn Helical on the flat roof of my

It was Huge! And had great Gain for the Phase 3 Amsat Satellites, when

| | | | |
|---|---|---|---|
| Wavelength | | 689.6 | mm |
| Ideal diameter (internal) | **D=** | 236.3 | mm |
| Gain | | 12.47 | dBi |
| Conductor diameter | **d=** | 13.7 | mm |
| Winding step (between centers) | **S=** | 158.6 | mm |
| Separation of the adapter section | **a=** | 6.6 | mm |
| Total conductor length | | 6452.9 | mm |
| Minimum reflector diameter | **R=** | 427.5 | mm |
| Total antenna length | **L=** | 1348.2 | mm |

## Design performance

| | | | |
|---|---|---|---|
| Bandwidth (@ -1dB) | Fmax/Fmin: | 1.06 | |
| | Fmax: | 448.86 | MHz |
| | Fmin: | 421.56 | MHz |
| Bandwidth (@ -3dB) | Fmax/Fmin: | 1.16 | |
| | Fmax: | 468.89 | MHz |
| | Fmin: | 403.55 | MHz |
| Beam width (@ -3dB) | | 37.1 | degrees |


NASA
Patagonia

Mission Requirement: Receive Beacon Transmission from Balloon

Balloon will carry an APRS Beacon, to enable Payload Recovery

Beacon Transmitter Power: 10mW, or +10dBm on 435 MHz
Path Loss from 100 000 ft = ~-130 dB
Balloon Antenna Gain = +6dBi Horizontally Polarized
Helical Receive Antenna Gain = 12 dBi
Path Margin = ~ -102dB
Receive MDS = -123dB

Signal Loss due to Polarization Mismatch unacceptable.
Therefor a Circularly Polarized Gain Receive Antenna is a Must!

A roll of annealed Copper Water Pipe.

A length of 1/2 inch plastic pipe.

A length of 2 inch plastic pipe.

A large Pizza Pan from WalMart.

Calculations were done.

Holes drilled at the required spacing.

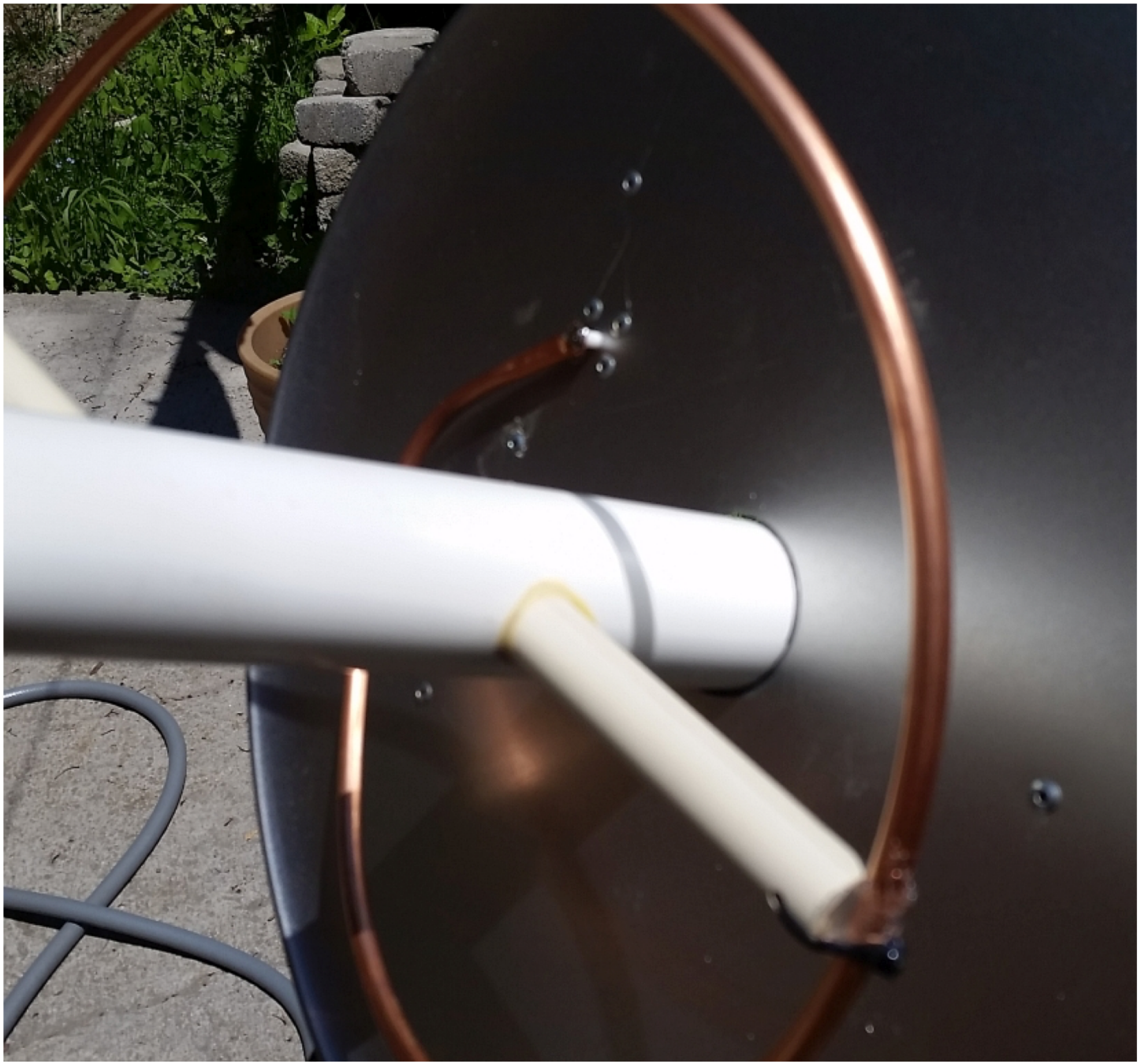
1/2 inch pipe cut to length and ends sha

Copper pipe marked every half circumfe

Aluminum Channel used to

Channel Pop Riveted to
1 x 2 Aluminum Angle and

Hole drilled and N connect

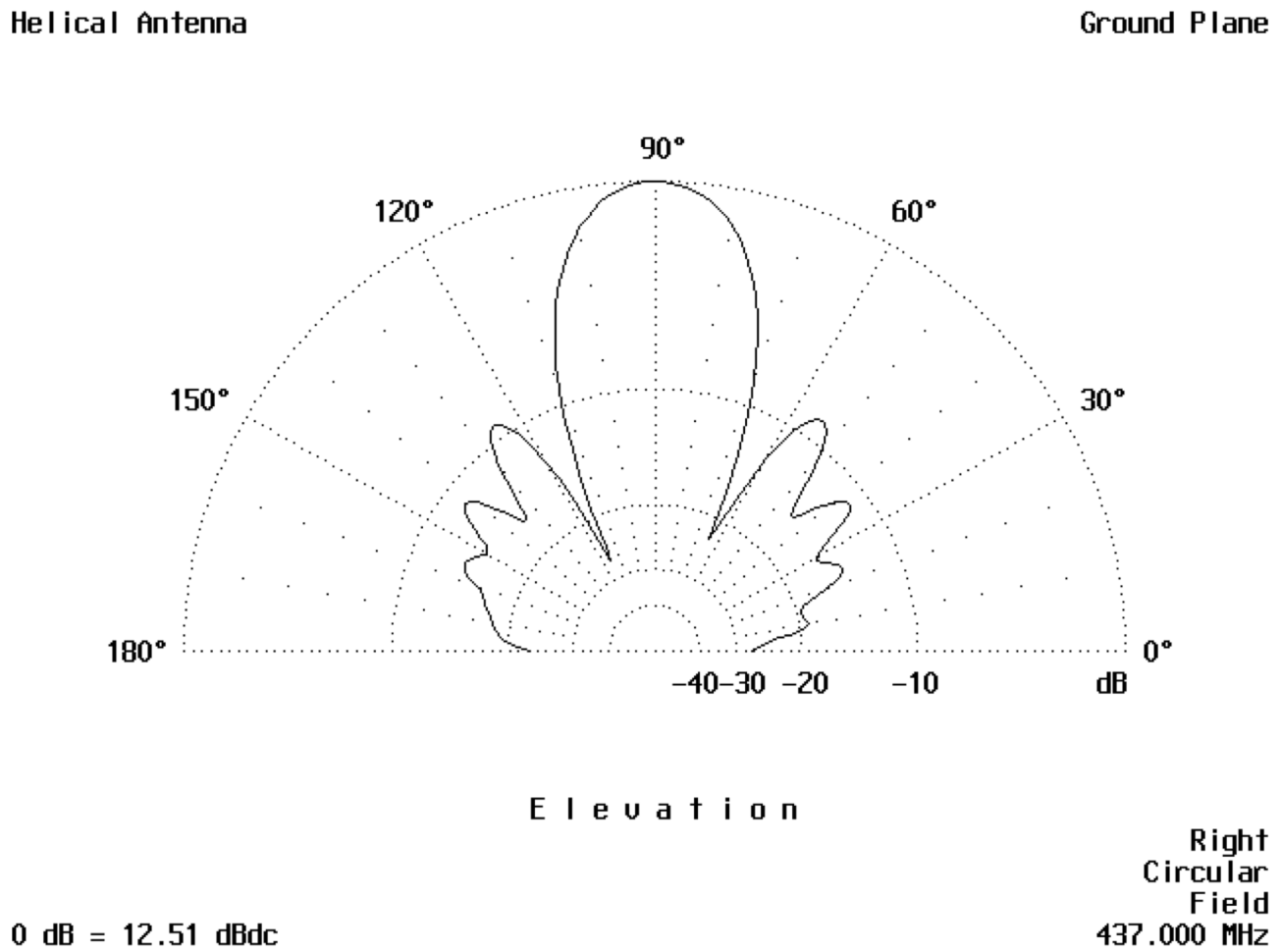


Helical Feedpoint

The Copper Pipe is be

Matching the antenna

# Helical Antenna Pattern



Up Up and Away