

Slot Antennas

For

Ham Radio



Undiscovered

Country

In

Ham Radio

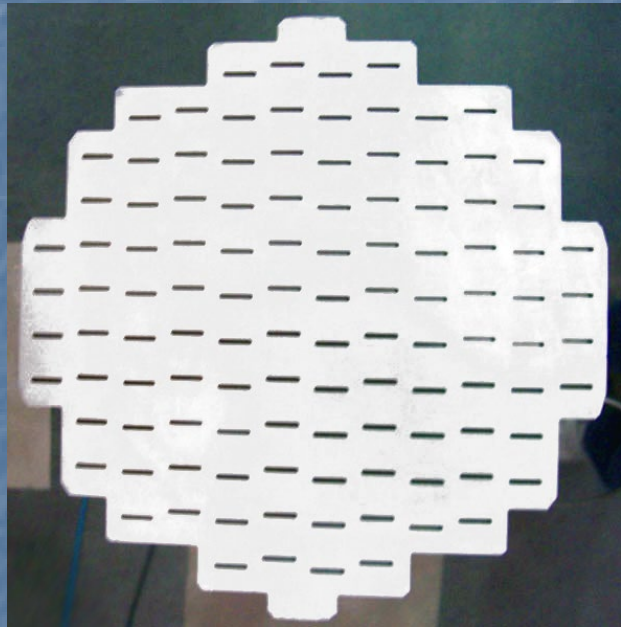


**Alan Blumlein 1938
EMI England
TV Broadcasting**



Like Most Hams

I knew very little about slots



**Microwave
Computers**



Aviation

**In 1938, hams
were all on HF**

**Little interest in a
VHF Antennas**



Wondered

**Could I hide
my 2-meter base
antenna in a
TV satellite dish?**

**My CC&R committee
couldn't
make me take it down**

FCC: 47 C.F.R. Section 1.4000, 1996,
prohibits restrictions... satellite dishes less
than one meter (39 in.) in diameter...

But wouldn't the
Don't fight the metal,
metal in a TV dish
cut a slot antenna
compromise
in the reflector
a 2-meter antenna?

An Efficient 2 Meter Antenna Disguised as a TV Satellite Dish

This vertically polarized horizontal slot antenna, cut into the reflector of a TV dish, might be the ultimate stealth antenna.

John Portune, W6NBC

I've long wondered if it would be practical to hide an efficient 2 meter base-station antenna in a TV satellite dish. My homeowners covenants, conditions, and restrictions (CC&R) would force me to take it down. But what if I could hide the metal in the TV dish? Could a 2 meter antenna be disguised as a TV dish? Finally, it struck me: don't fight the metal, take advantage of it, by cutting a half-wavelength-long slot antenna into the TV dish reflector.

A slot antenna is a narrow rectangular opening in a large conductive surface, such as a TV satellite dish. Slot antennas are familiar in the world of radio. They're common in TV broadcast antennas, the skin of an aircraft, and in mobile, marine, and cell phone applications. This TV dish slot is the complement to a dipole. It is also a great way to learn about slot antennas.



Figure 1 — Note the low visibility of the slot in my modified satellite TV dish.

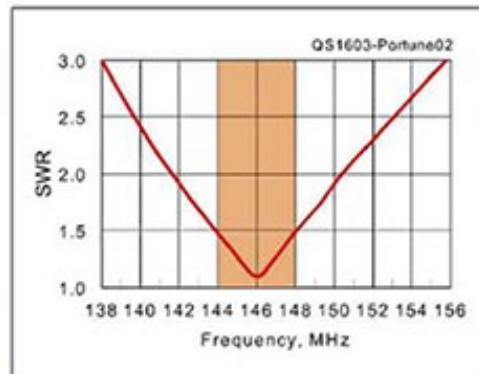
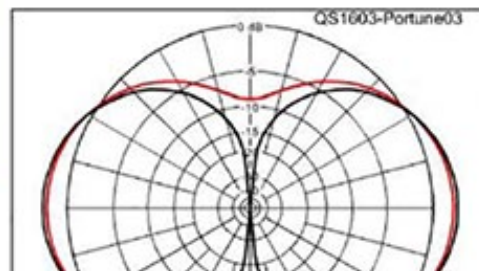


Figure 2 — Bandwidth of a single-saw-blade-cut TV dish slot antenna.



Slot Antennas For Ham Radio

John Portune W6NBC

24 in.



DIRECTV

7.5 in.

7.5 in.



Slimline

Vertically Polarized



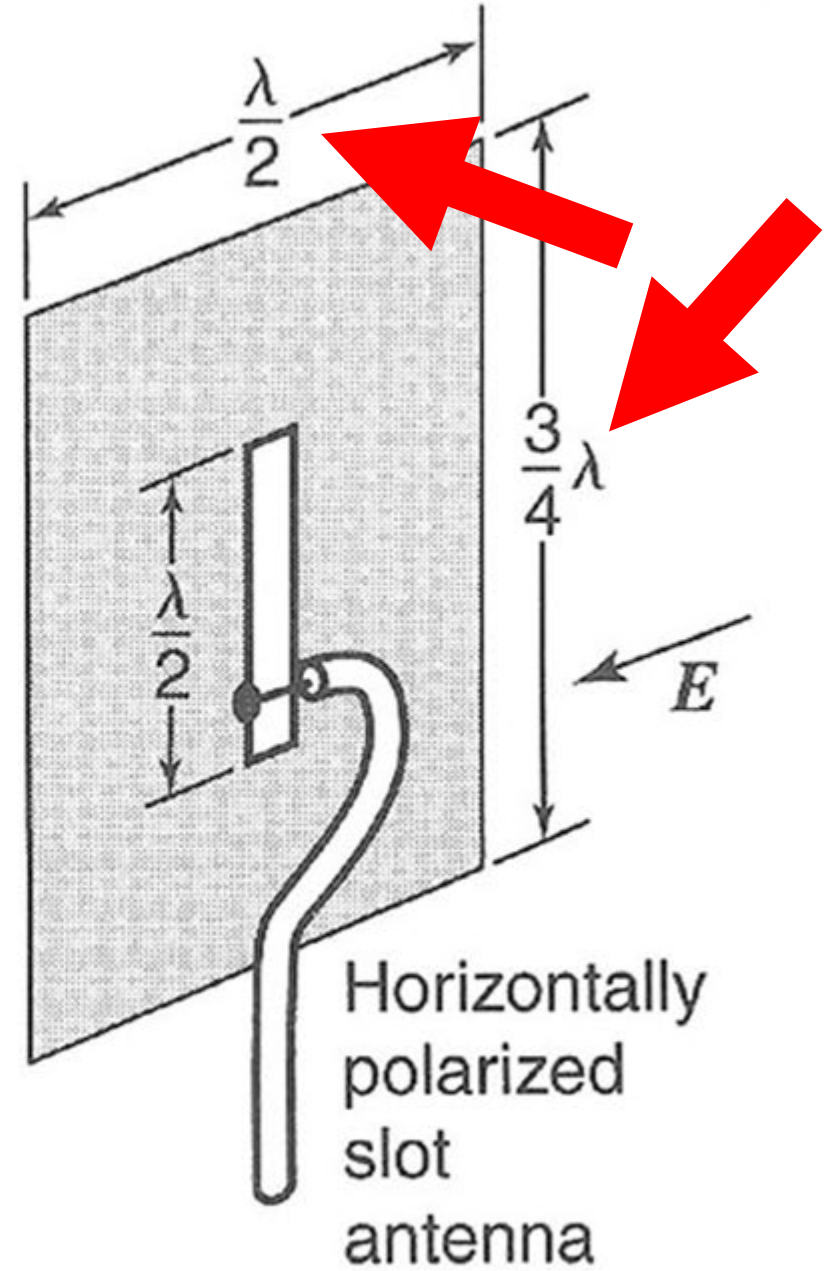
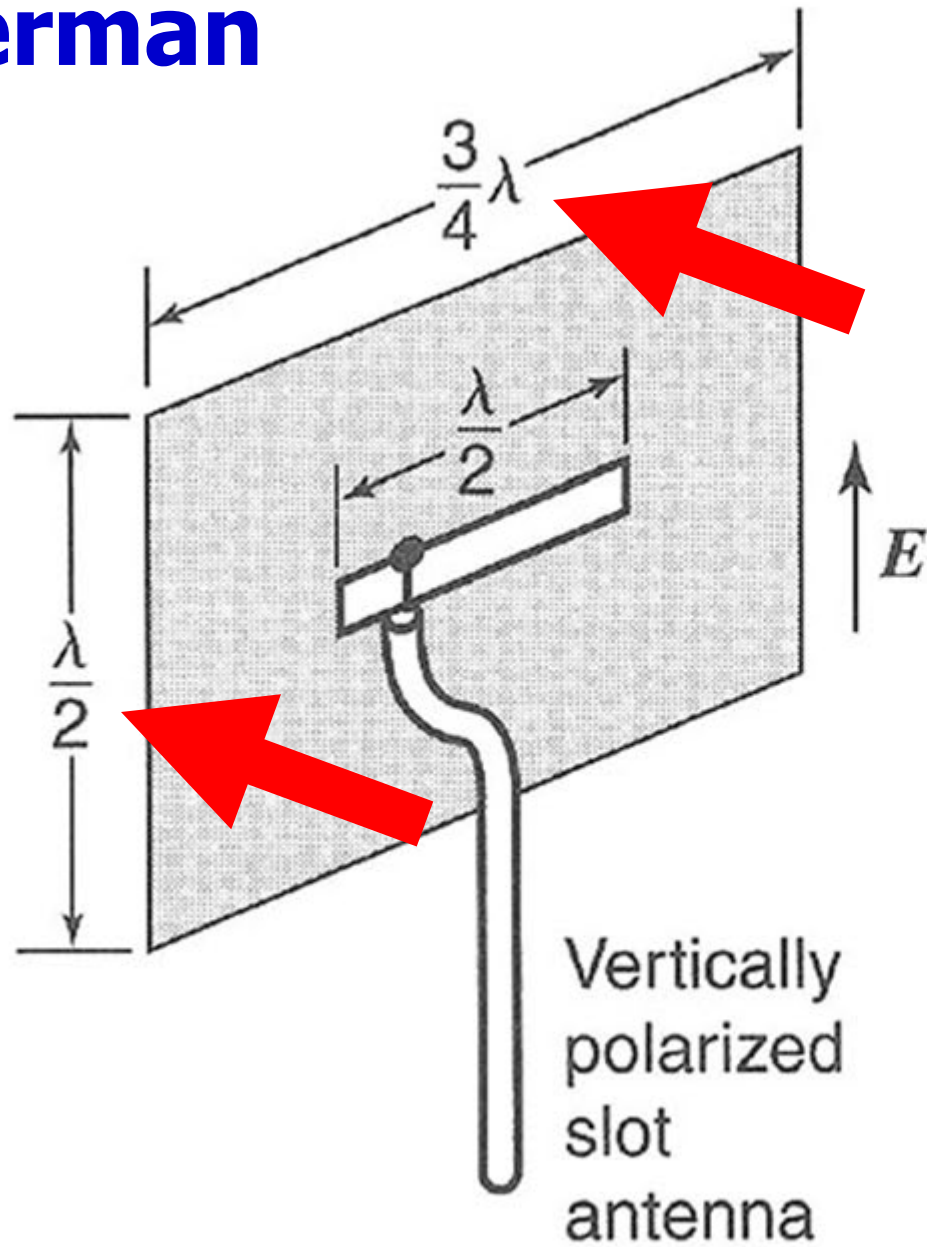
Wanted the Design Rules

Five Discoveries

1st Discovery

**Few Restrictions on
the Classical Slot or
Metal Plane Widths**

Terman



KJ6THU Grant

1/2 in. copper pipe > PLANE
1/16 in. spacing > SLOT



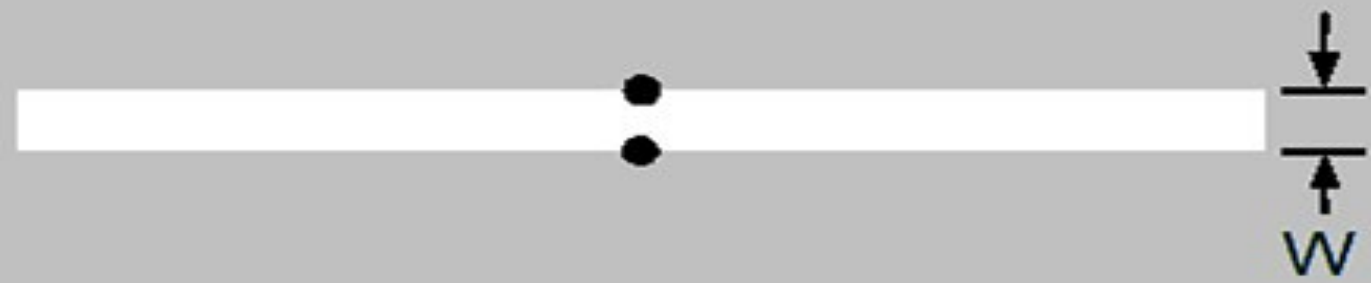
**1:1 Coax
Choke
Balun**

2nd Discovery

**How can a Hole
be
an Antenna?**



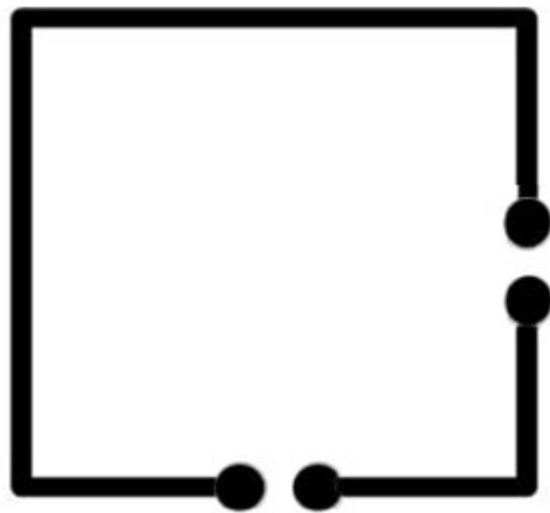
BOTH 1/2
Wavelength



Common Explanation



Jacques
Babinet's
Explains
Principle
Absolutely
Same size object &
hole
Nothing
reflect EM wave
same but for
polarization



ONE WAVELENGTH WIRE (QUAD) LOOP



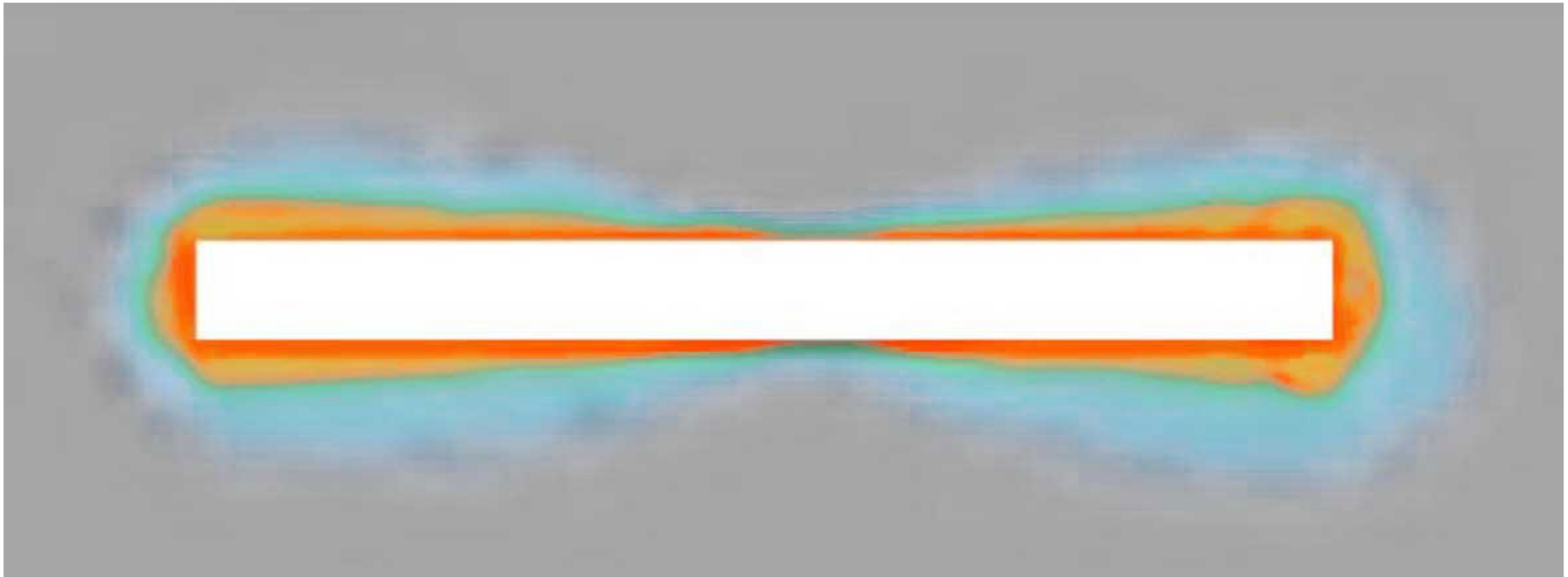
FOLDED DIPOLE



Feed Point

HALF WAVELENGTH SLOT ANTENNA

Current Around a Slot Antenna



3rd Discovery

**Can
Bend the
Slot and Plane**

Bent Slot

SWR

TUNE

18 in. x 18 in.

Aluminum Tape on Glass



Orthogonal Plane



QST March 2018

4th Discovery

The Plane

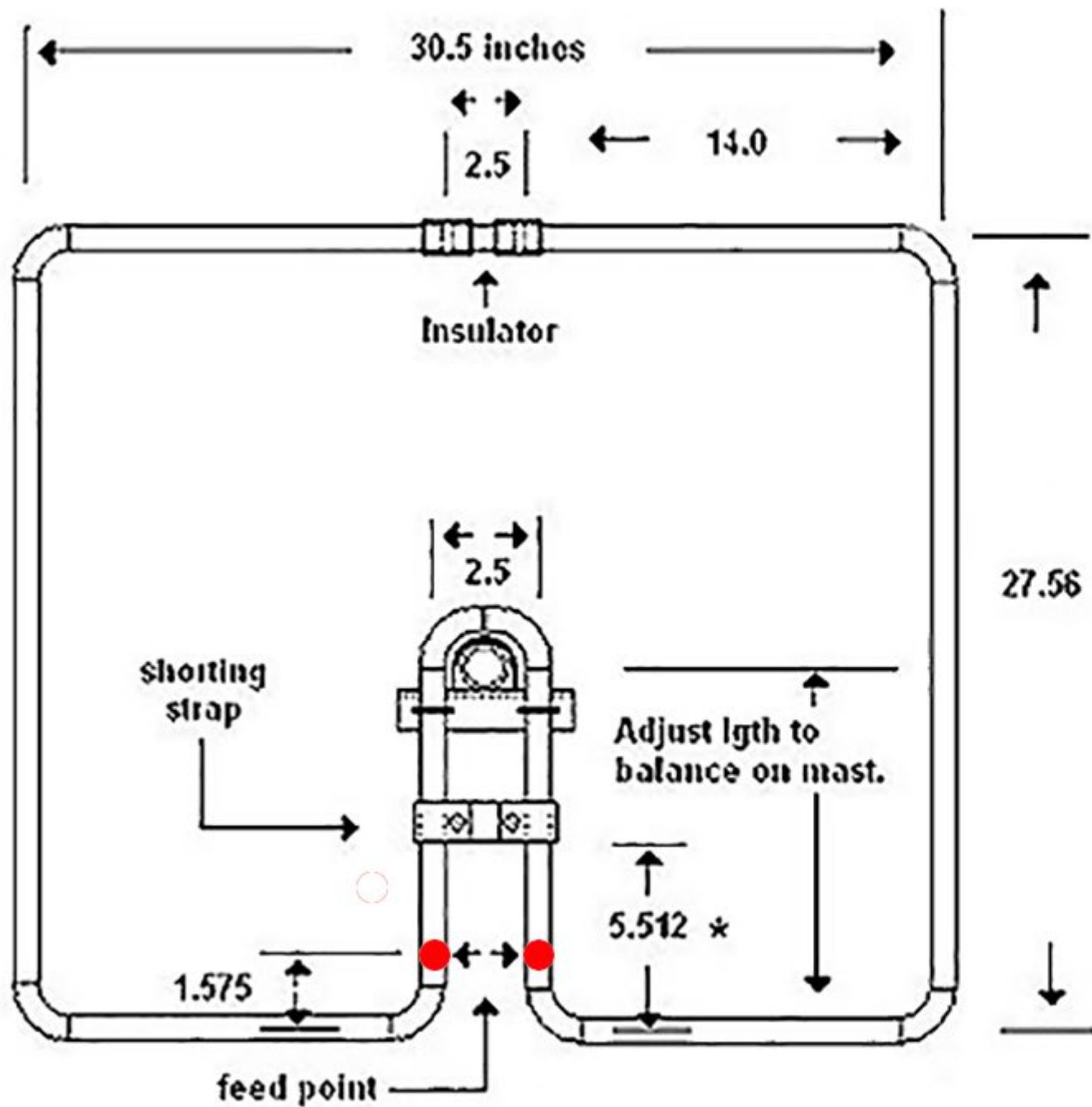
can be

VERY Narrow

HENTENNA

Skeleton Slot





6-meter Squalo



2m Slot-Cube

QST
Jan.
2019

Folded Skeleton Slot





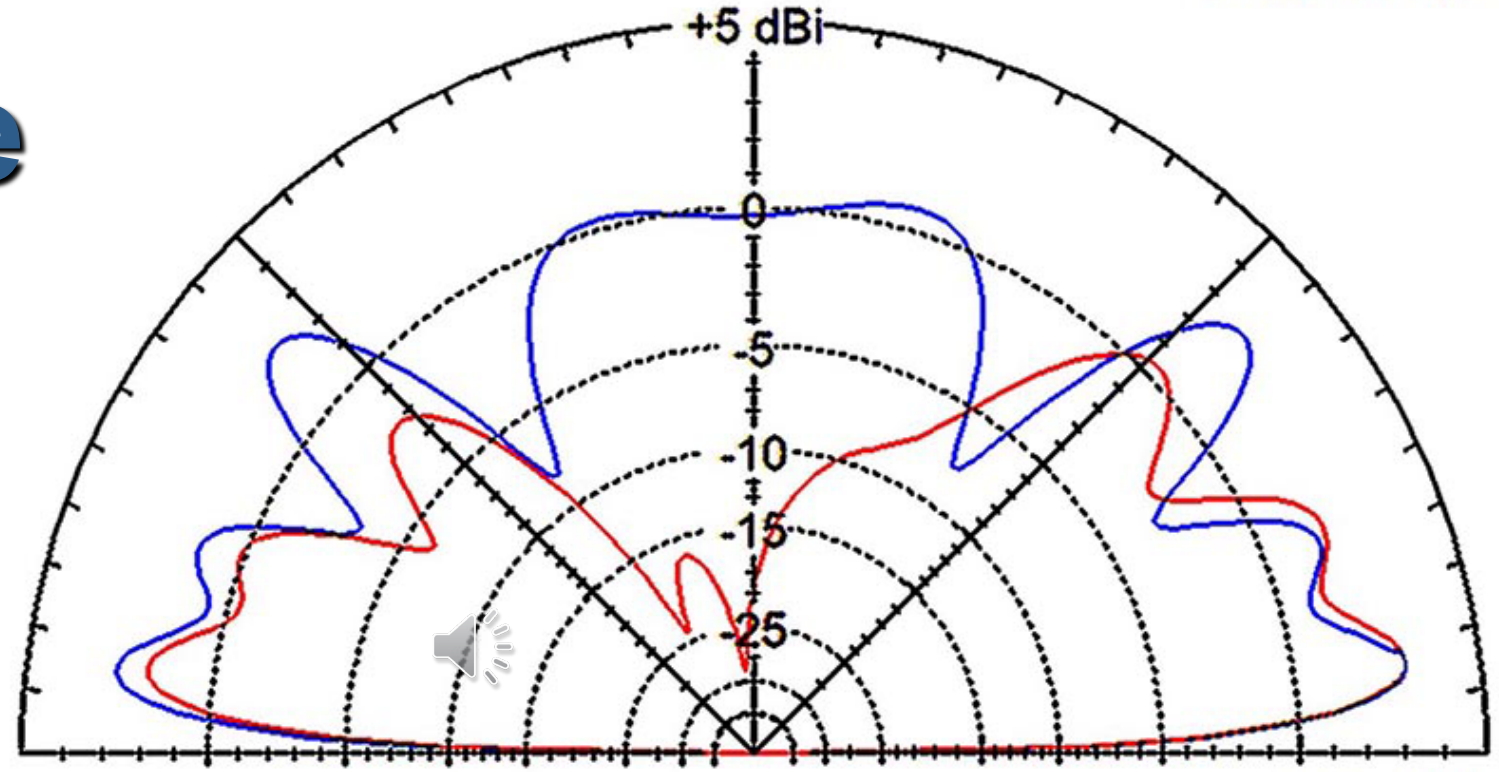
Hentenna

**Folded
Slot-Cube**

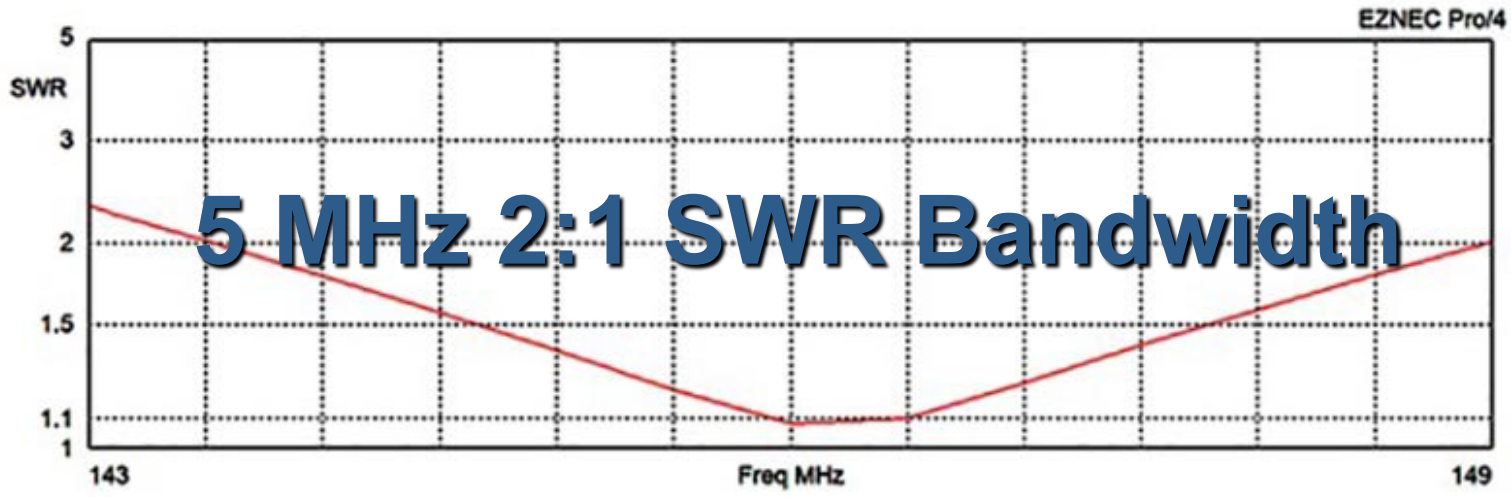


KB9IBT

Slot-Cube J-Pole

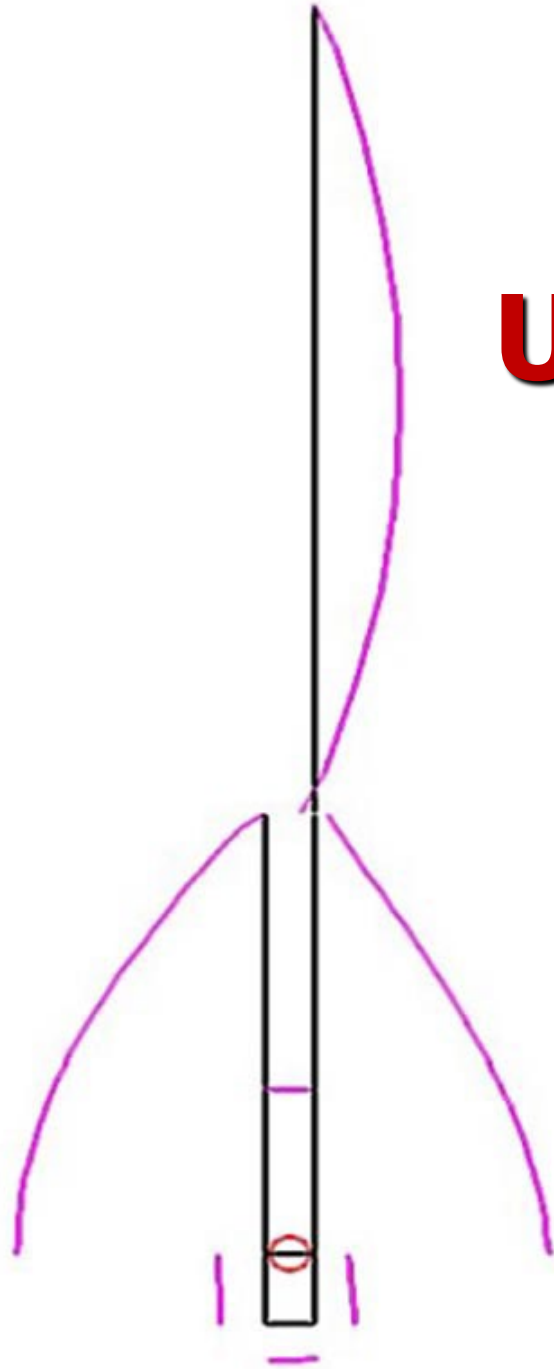


146.2 MHz



5th Discovery

**Not all Parts of
an Antenna
Radiate**



**Un-opposed
Current**

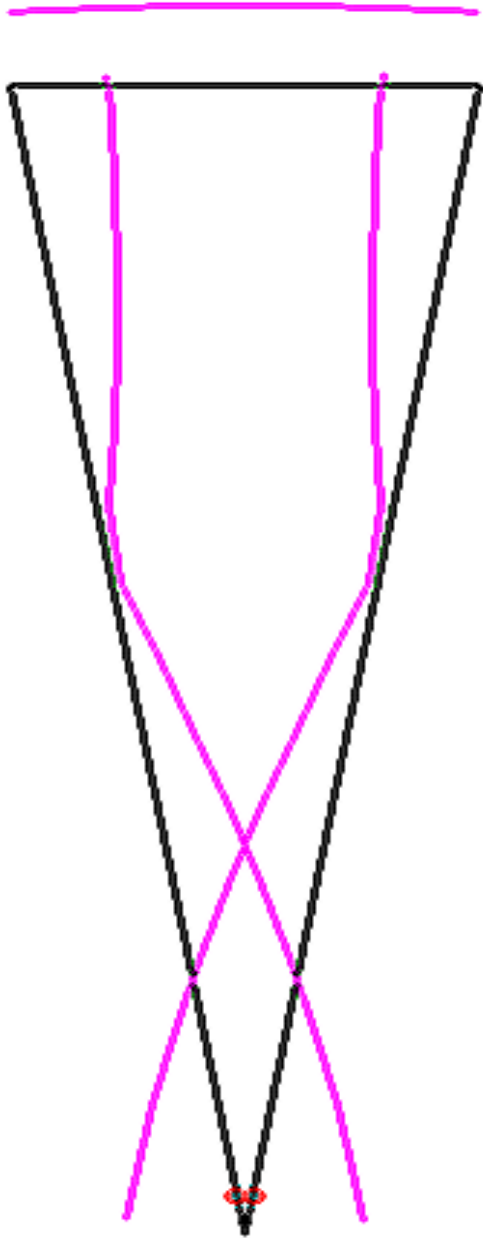
**Equal
Opposing
Currents**

**All Discoveries
Combined**

**Slots for
the HF Bands**

Double Inverted Delta Slot Vertical

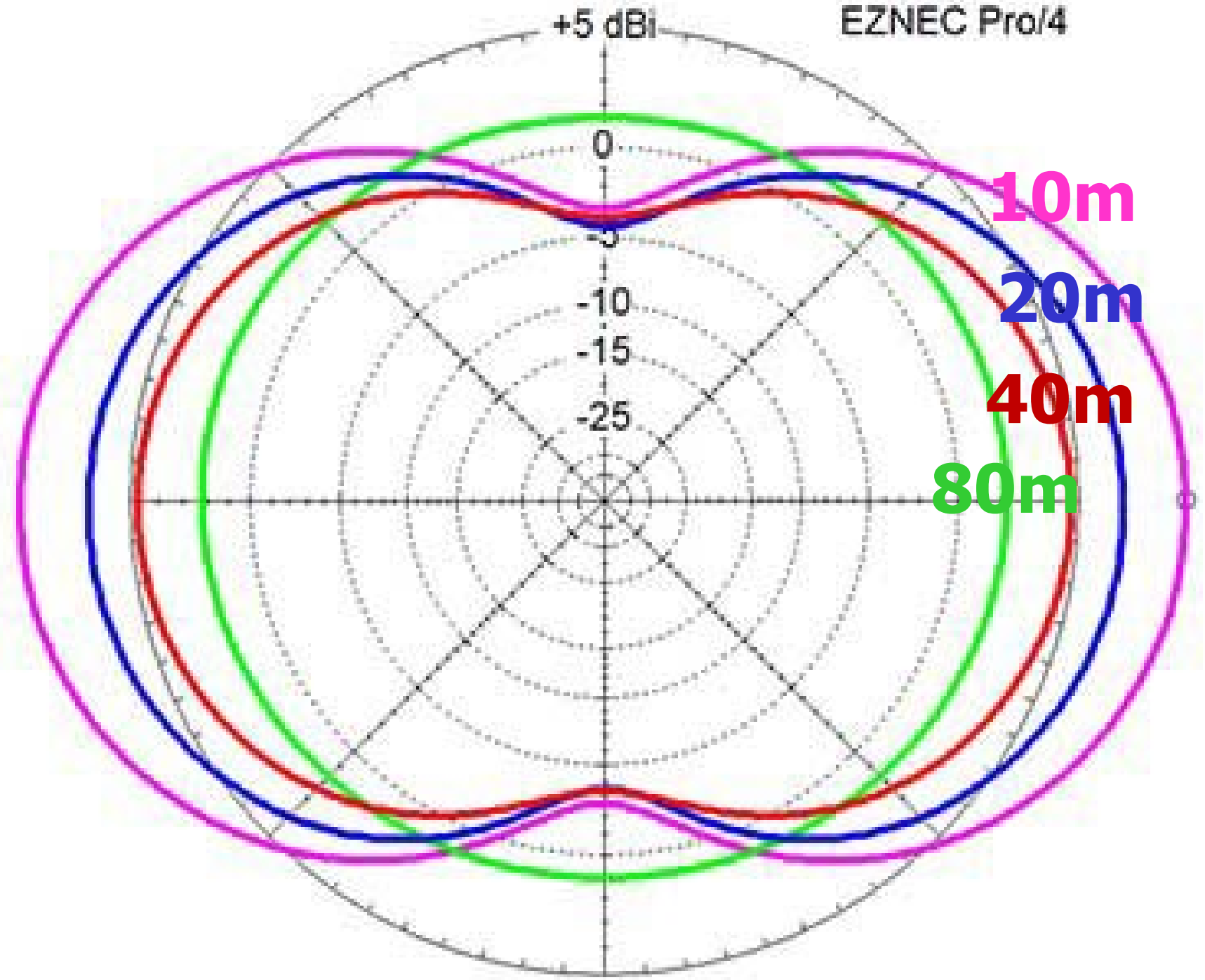
- 1. Horizontally-polarized**
- 2. Low radiation angle**
- 3. Elevated Radiation**



**Bottom
Currents
Produce no
Radiation**

Double Inverted Delta Slot Vertical

- 1. Horizontally-polarized**
- 2. Low radiation angle**
- 3. Elevated Radiation**
- 4. Azimuth Gain**



10m

20m

40m

80m

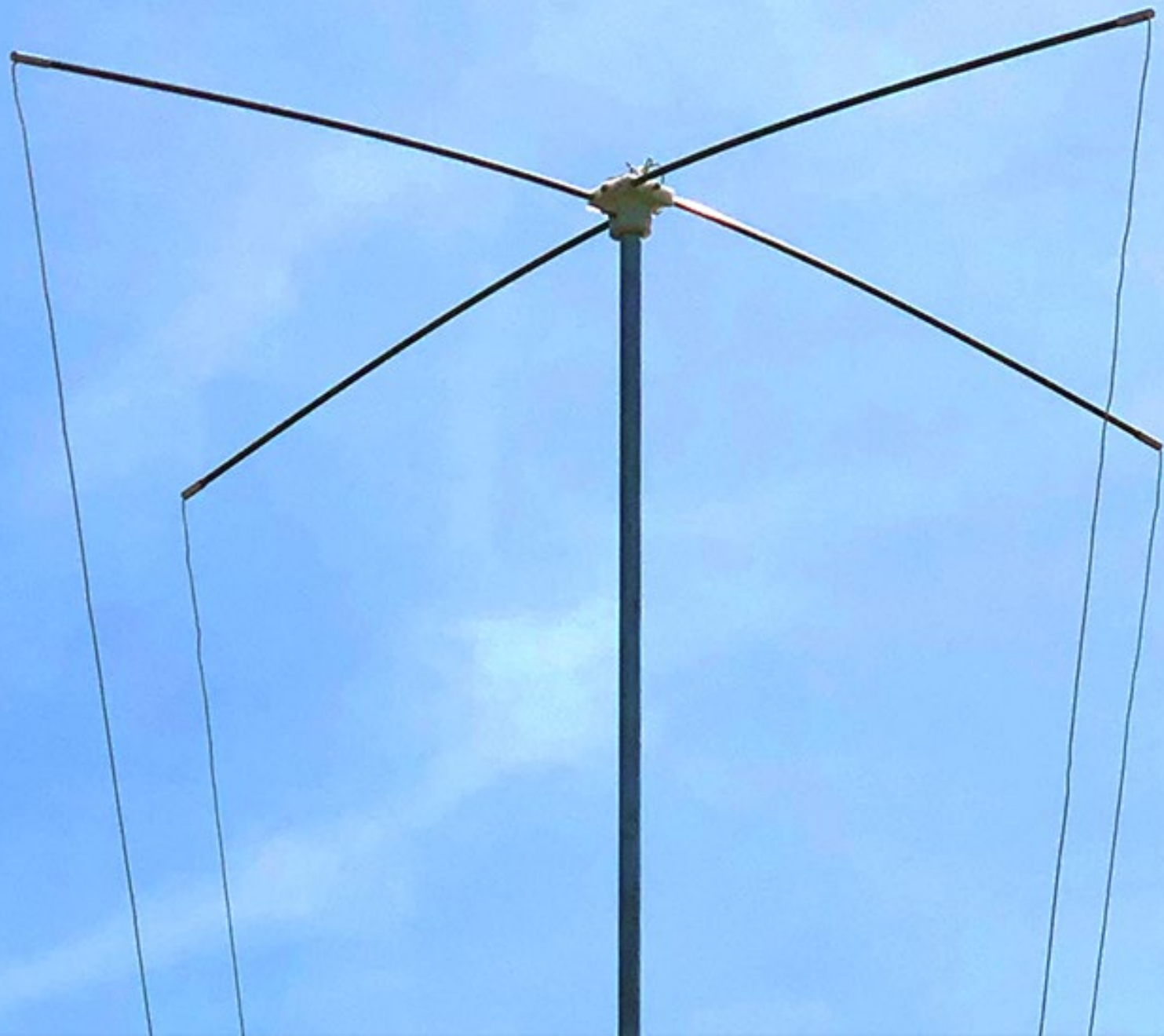
My Back Yard

No Guys

4 ft. Pipe in Soil
(No Concrete)

Base
Auto-Tuner





Collapses to 6 ft.
Easy one-man lift
Easily telescopes





DX Engineering Aluminum Tubing

★★★★★ 21 Customer Reviews

DX Engineering High-Strength Aluminum Tubes are ideal for your antenna projects. They are available in two types.



6063-T832 seamless drawn aluminum tubing is available in 1, 3, 6 and 12 ft. lengths. 6063-T832 tubing provides good resistance to general corrosion, including stress corrosion cracking, and an excellent surface appearance.

Most sizes (except 12 ft.) are available slit on one end for use with DX Engineering stainless steel element clamps. If un-slit ends are required for your applications, merely insert the slit end into the next larger size in the stack and use your own attachment method.

6ft. nesting sections 1 3/8 - 2 in.

6063-T832 seamless drawn aluminum tubing is available in 1, 3, 6 and 12 ft. lengths. 6063-T832 tubing provides good resistance to general corrosion, including stress corrosion cracking, and an excellent surface appearance. Most sizes (except 12 ft.) are available slit on one end for use with DX Engineering stainless steel element clamps. If un-slit ends are required for your applications, merely insert the slit end into the next larger size in the stack and use your own attachment method.

\$12.25 avg. 6 ft. lengths

Four 1/2 in. 4ft. fiberglass spreaders

DX Engineering DXE-FT0500-8 - DX Engineering Fiberglass Tubing



Fiberglass Tubing, 8 ft., 0.500 in. OD, 0.120 in. Wall, No Slit, Each

\$6.49

Five stainless hose clamps

Part Number: DXE-FT0500-8 [More Detail...](#)

Availability: In Stock

Estimated Ship Date: **Today**

Compare

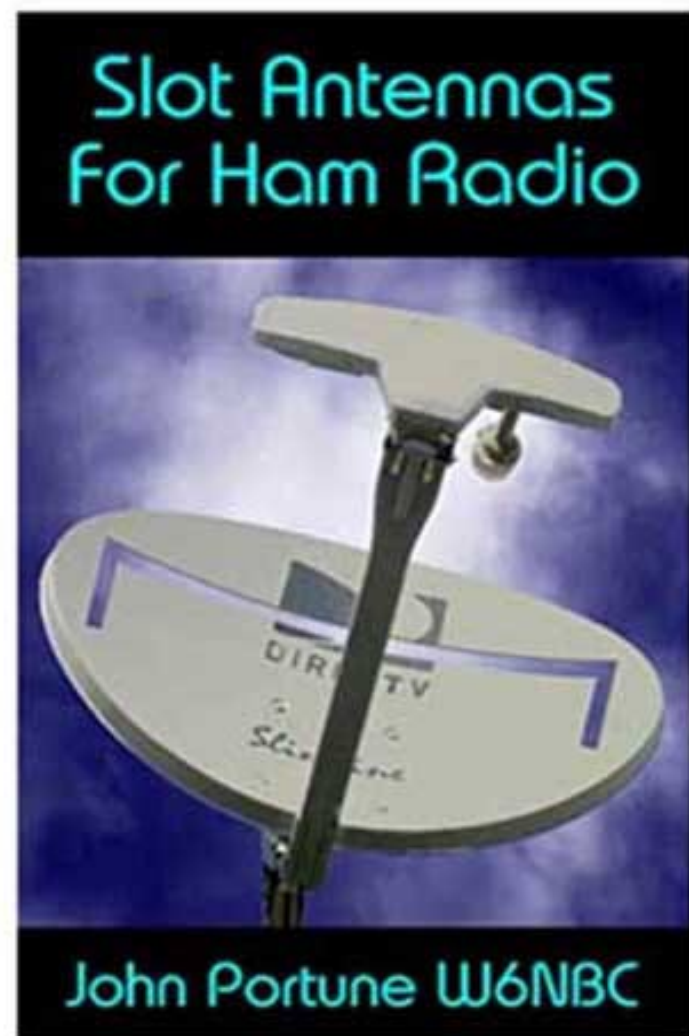
The Inverted Hen-Delta 6-Meter Antenna

An updated version of Koji Sugihara's, JJ1UMS, 1982 6-meter "Hentenna," the Hen-Delta improves performance and is easy to build and tune.

John Portune, W6NBC, and Jim Bailey, W6OEK

The Hen-Delta is based on a 1982 "Hentenna" design with a rectangular shape that was not optimum. We updated the design with our Hen-Delta antenna.





Slot Antennas for Ham Radio: The Forgotten Antenna Kindle Edition

by [John Portune W6NBC](#) (Author) | Format: Kindle Edition

★★★★☆ 16 ratings

Slot antennas have been overlooked by ham radio operators since they were introduced in 1938. An aura of mystery surrounds them. Here's how they work and practical homebrew slot antenna projects from HF to UHF.

\$4.95 to buy





DØGGY



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"That's all Folks!"