



March 24-26, 2023

# Experiments With Unusual Materials for Magnetic Loop Antennas

*John Portune / W6NBC*



***This loop is an  
unfinished experiment***

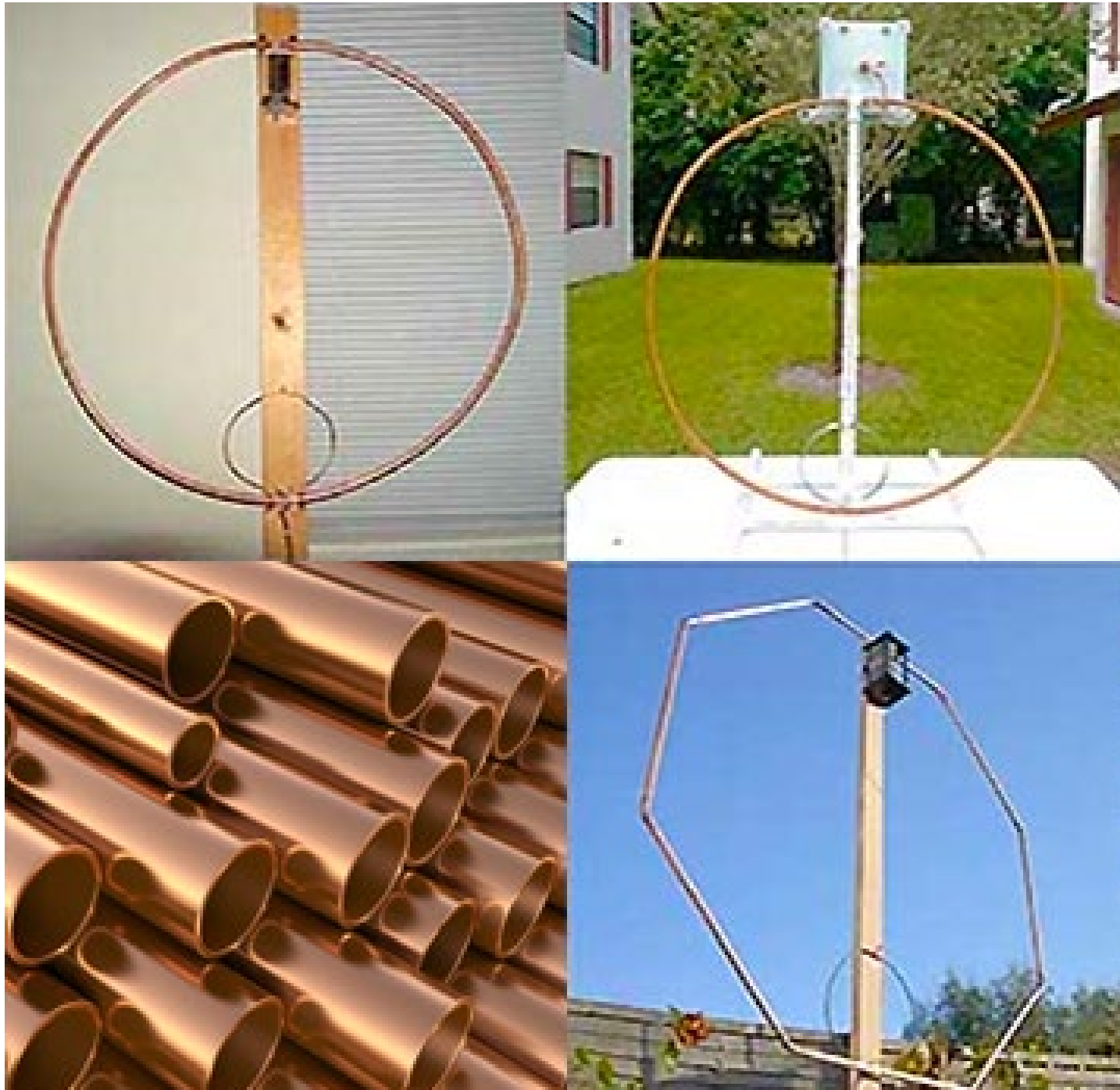
***I DON'T HAVE BUILD-IT PLANS***

***Many details are still to be worked out***

***I do, therefore, want your suggestions***

**w6nbcmail@gmail.com**

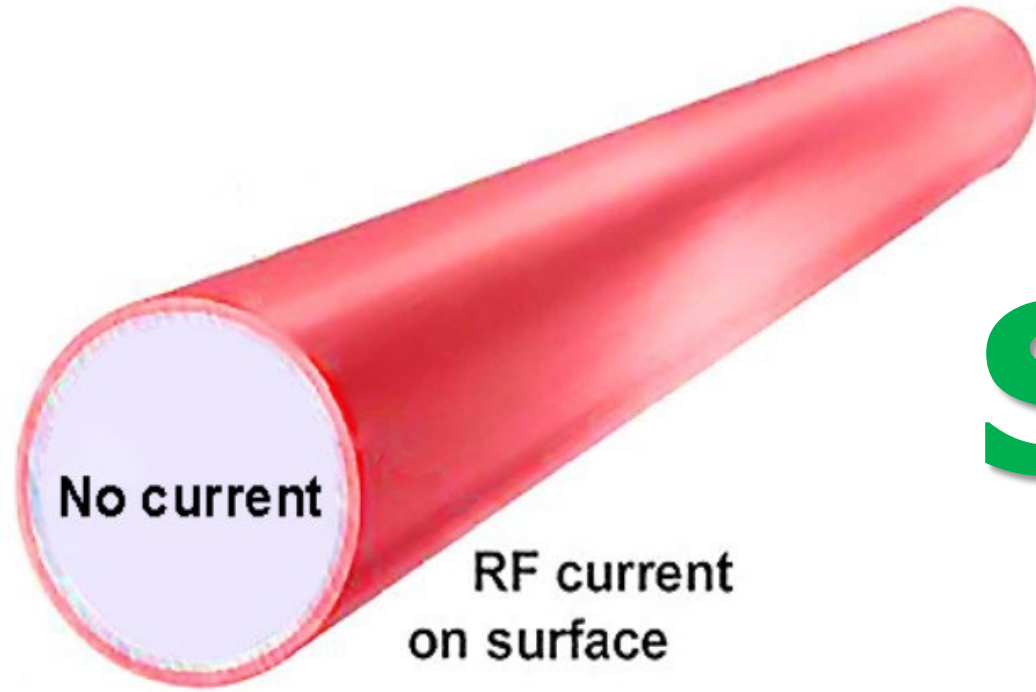
**w6nbc.com/slides.html**



**A SURPRISE**

*Copper pipe  
work well  
for mag loops*

**But it isn't  
OPTIMAL or  
necessary**



# **WHY?**

# **Skin Effect**

**The center of  
the conductor  
isn't needed**



# More Optimal Materials



**A Common Question**

**Are There Other  
Materials?**

# MG Chemicals Shielding Paints

Copper/Silver

Nickel



# Copper Nickel



# Conductive Fabric

Soft Conductive Copper Nickel Plated Electricity Magnetic RF Shielding Fabric for Smart Meters 39"x43"

Visit the Amradiel Store

★★★★☆ 38 ratings | 17 answered questions

\$13<sup>99</sup>

✓prime

FREE Returns

Size: Width 43" inch / Length 39" inch

Width 43" inch / Length 39" inch  
\$13.99  
✓prime

Width 43" inch / Length 78" inch  
\$24.99  
✓prime

Width 43" inch / Length 197" inch  
\$62.99

50 meters long  
\$600.00

100 meters long  
\$1,100.00

Material

Nickel+copper+polyester

Color

Silver

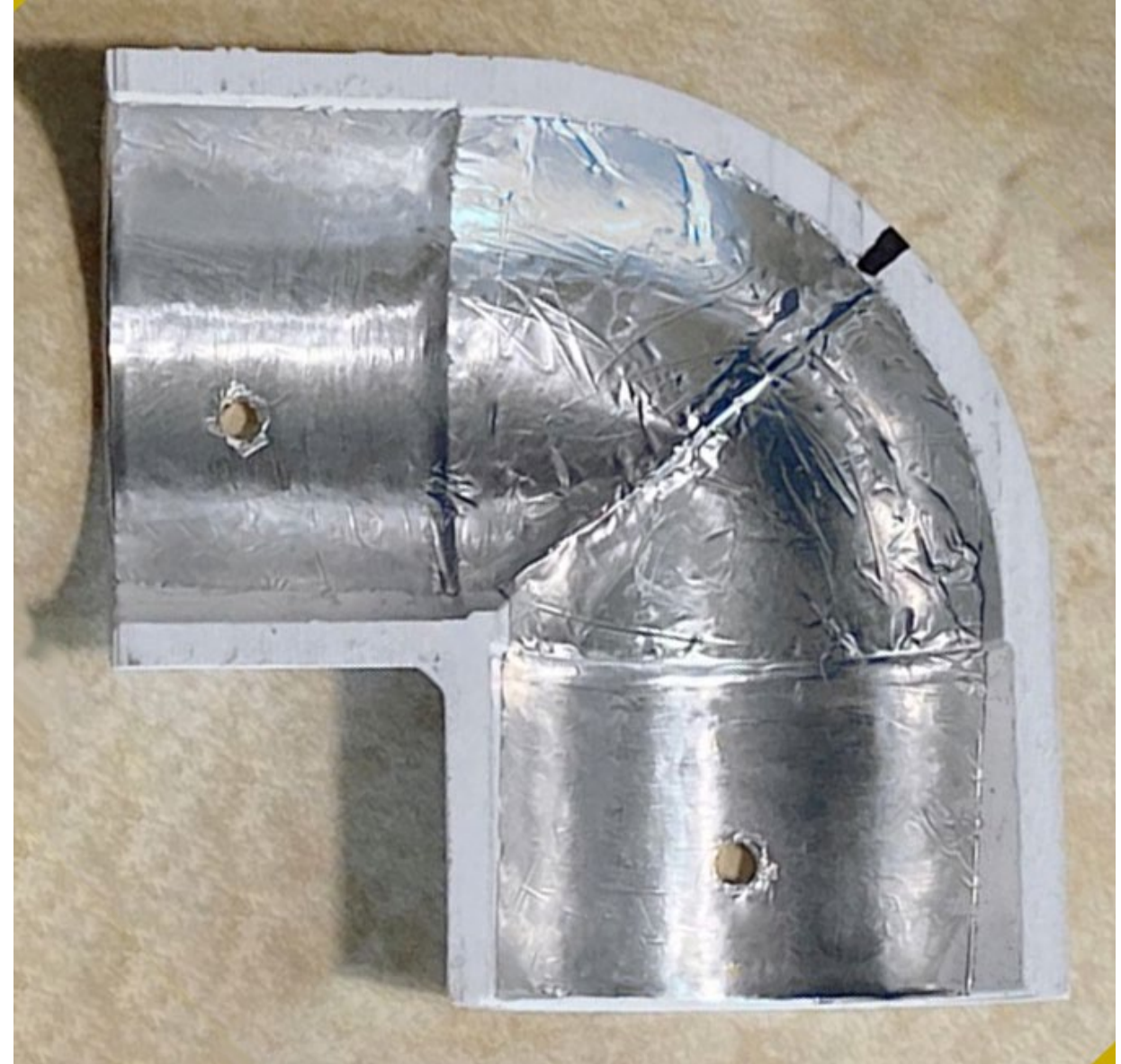
Fabric Type

Polyester

≈ 0 Ω → Ohmmeter



**4 ft. square  
optimized  
PVC & foil  
mag loop**





## Mission Darkness TitanRF Faraday Tape

### High-Shielding Conductive Adhesive Tape Roll

Used to Connect TitanRF Fabric Sheets  
or Seal RF Enclosures

1in x 10ft

**\$10.00**  
(\$1.00 / Foot)

1in x 164ft

\$96.00  
(\$0.59 / Foot)

2.5in x 10ft

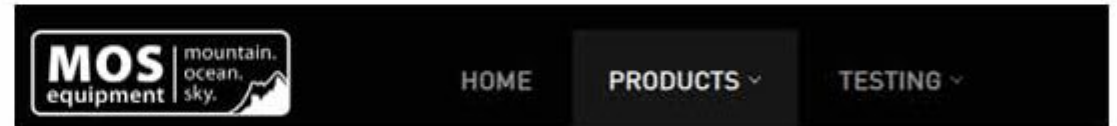
\$20.00  
(\$2.00 / Foot)

2.5in x 164ft

\$200.00  
(\$1.22 / Foot)

10in x 10ft

\$45.00  
(\$4.50 / Foot)



MISSION DARKNESS  
TITANRF RADIATION  
SHIELDING THROW BLANKET

\$ 150



MISSION DARKNESS  
FREEROAM FARADAY BELT  
BAG

\$ 60



MISSION DARKNESS EMF  
BLACKOUT BEANIE

\$ 80





# Faraday Curtains

**Shielding  
Noise: In/Out**





Brand: Beistle  
Foil Cone Hat  
\$9.99



Joylife Metallic Bucket Hat  
Amazon Prime \$14.99



Brand: Generic  
Tin Foil Hat for Conspiracy Theorists  
Price: \$34.99  
Color: White  
Size: Select Size  
Size Chart  
Product Details  
Fabric Type  
Fit Type  
Pattern







**Stainless  
Steel**

**Conductive  
Yarns**



# ***Experimental*** **Magnetic Loop**

**For Portable Operation**



**HF Mountain Toppers,  
RV'ers, Portable**

**Radios**

**Portable Power**

**Computers**

**Antennas – A problem**

**→ Small Whip? Wire over bush ?**







# Magnetic Loop?

- Small
- High Performance

Can it be made ?

- **Light** enough
- **Portable** enough



**POSSIBLE,  
with the right  
Materials**



**Mountain Bike Inner  
tube  
29 x 2.5-3 in.**



**Easily inflates  
to 3 ft. x 4 in.**

**Add a  
Conductive  
Fabric casing  
and  
a break-down  
PVC Stand**



# Ready for Transport







## Bell AirStrike CO2 Bicycle Tire Inflator

[Visit the Bell Store](#)



18 ratings

\$13<sup>59</sup>

List Price: \$19.49 ⓘ

✓prime

Get a **\$100 Amazon.com Gift Card** upon approval for the Amazon Business American Express Card. Terms apply.

- Any Valve Pump Head allows you to easily connect to Presta or Schrader Valves without an adaptor, just press on to any valve
- The Bell CO2 inflator is a fast and easy way to inflate any bike tires while on the road or trail
- One 16g threaded cartridge included - one cartridge can inflate a completely flat tire
- Fits in jersey pocket or bike bag

[Report incorrect product information.](#)



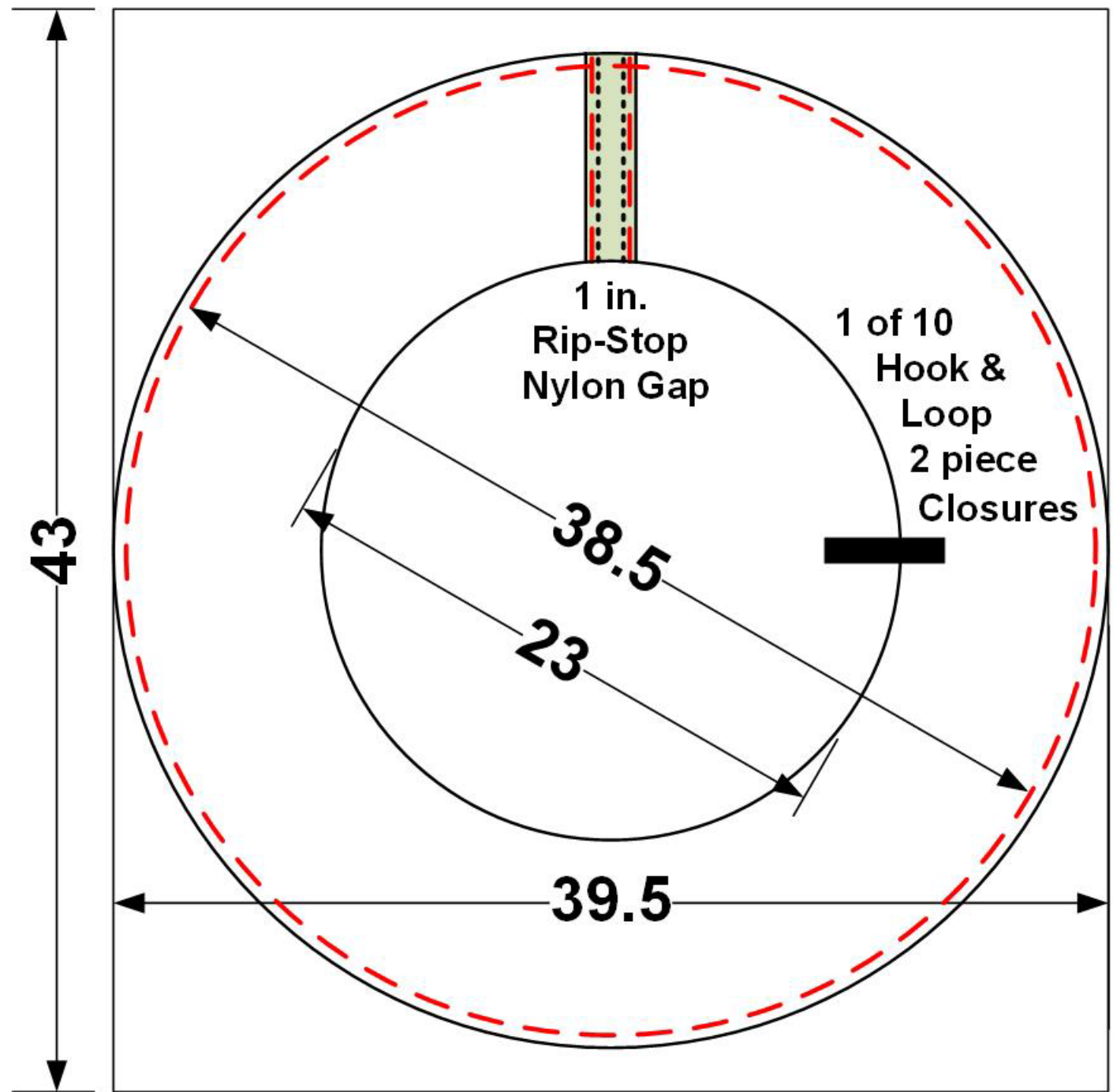
Gorilla Force, Value Pack 16g Threaded CO2 Cartridges, Fits All Bike Tire Inflators

★★★★★ 3,155

\$12.99 ✓prime

# Sewing Pattern

**1 in. rip-stop  
nylon gap  
for tuning  
capacitor  
(width not  
critical)**





**Corrugated  
box cardboard  
half circle  
fabric making  
template**





**Marked,  
pre-trimmed,  
taped or  
pinned fabric  
layers ready  
for sewing**





# Coats & Clark Dual Duty XP Heavy 125 YD Black Polyester

Brand: Coats

**#14/16 machine needle**



| 37 answered questions

\$4<sup>81</sup> (\$0.01 / Foot)

✓prime

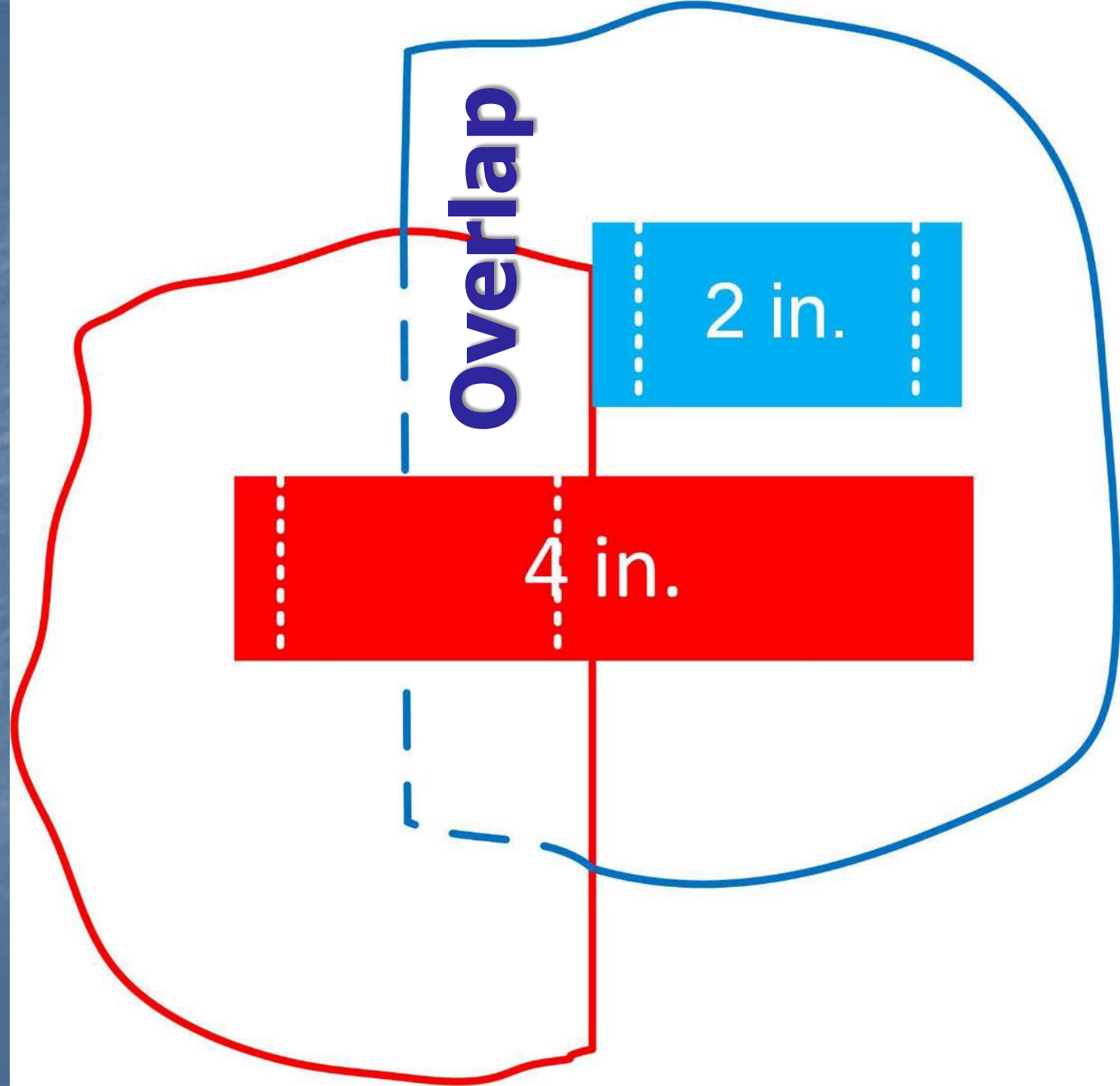
FREE Returns ▾

Save up to 6% with business pricing. Sign up for free  
Amazon Business account

Eligible for **amazon**smile donation.

# 10 Hook & Loop (Velcro) Closures

(Offset for  
illustration )



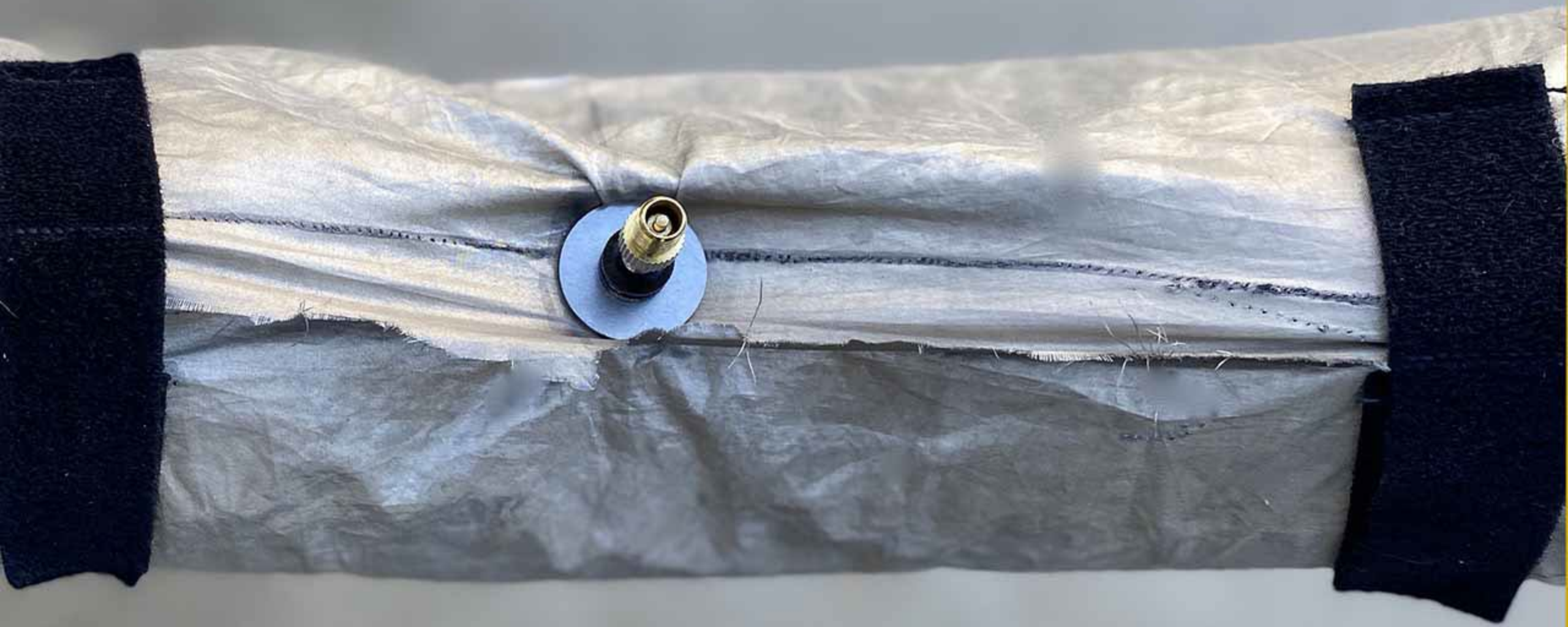


# Finished Casing

10 one inch  
hook and loop  
closures  
fabric overlaps





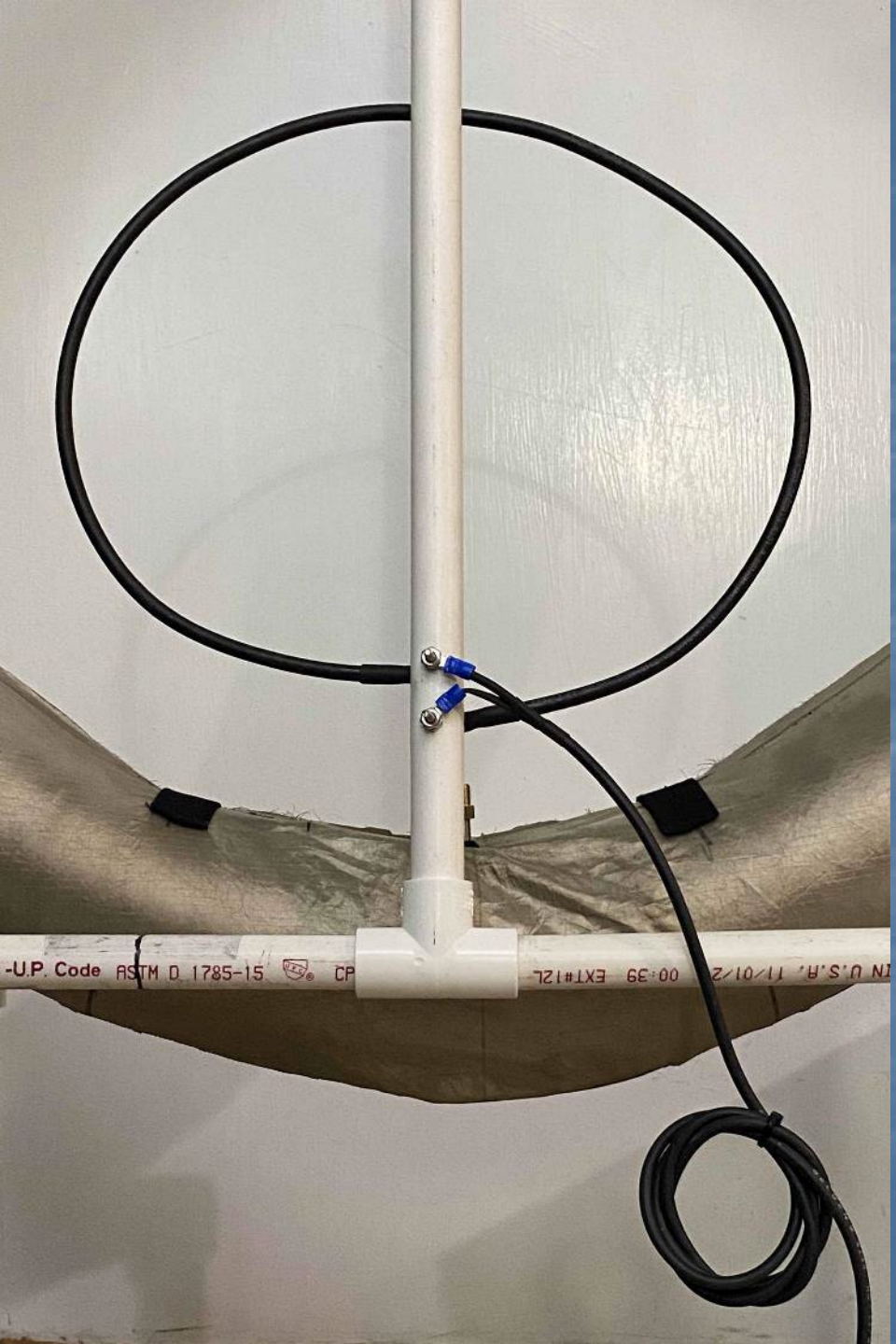




**Completed  
Inflated  
Loop with  
Coupling Loop  
and Tuning  
Capacitor(s)**



# Coupling Loop

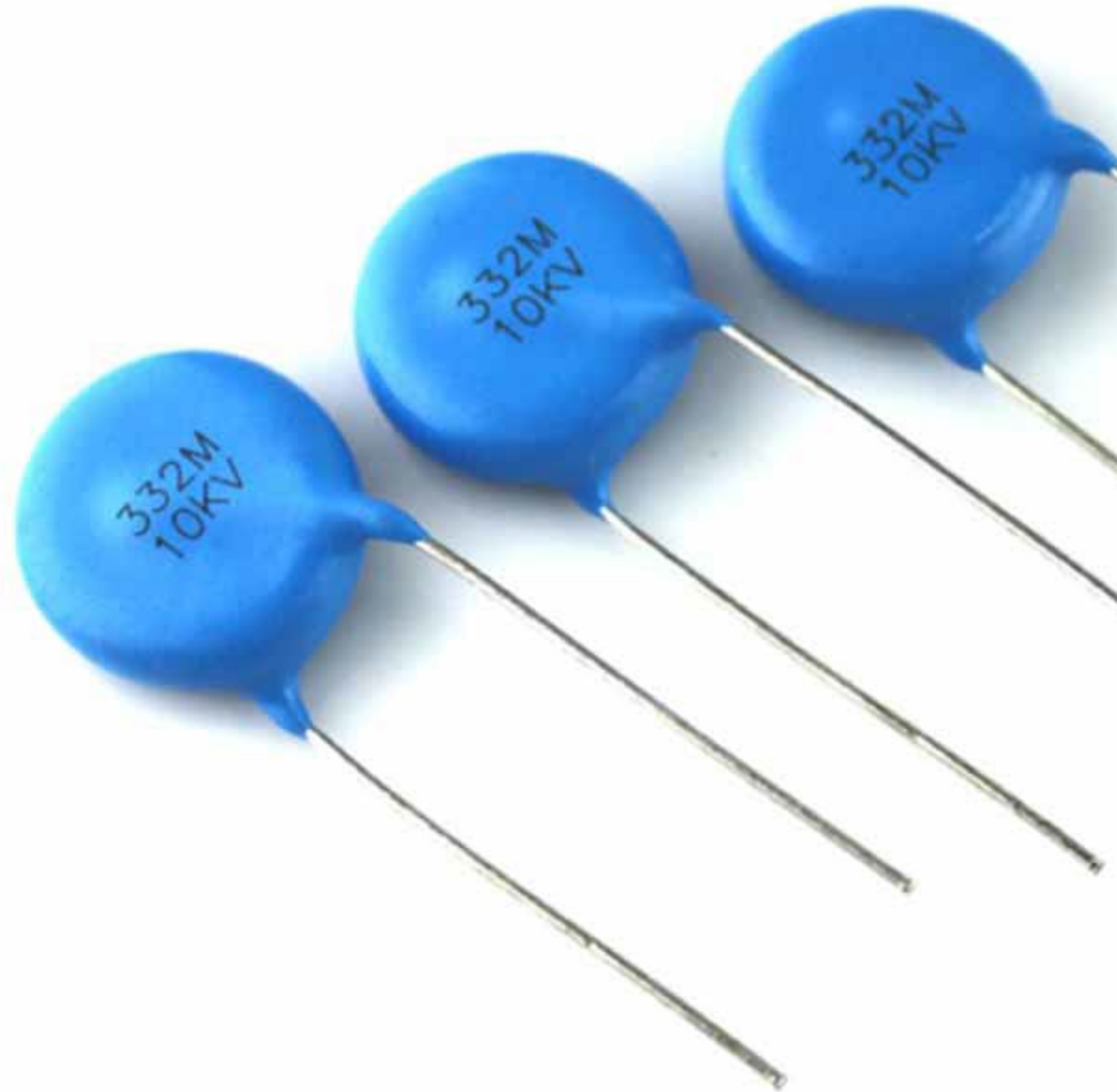


# Traditional 1/5 Dia. Separate Coupling Loop RF Transformer

# Tuning Capacitor [s]



# Band Tuning

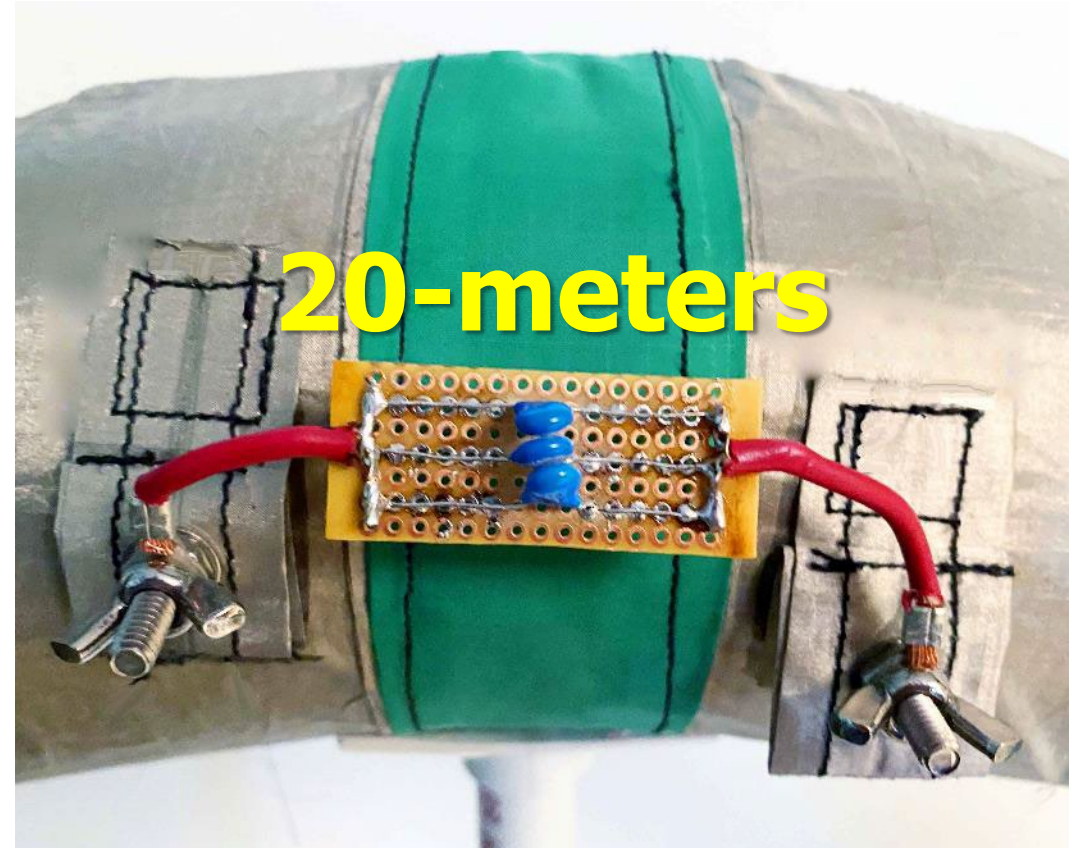


**High Voltage  
Disc Ceramic  
Capacitors**

# Band Tuning – 1 set/band

<http://www.iw5edi.com/software/magnetic-loop-calculator>

MHz	Cap. pf
1.8	5993
3.5	1385
7	339
14	79
21	30
28	13

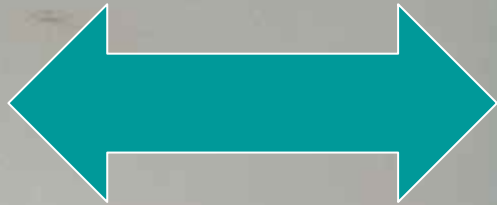


**2-3 KV**

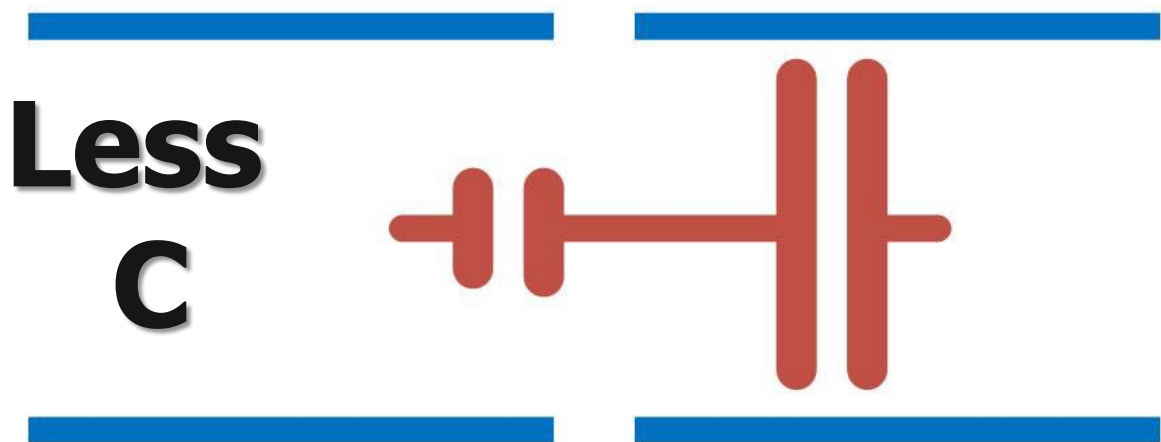
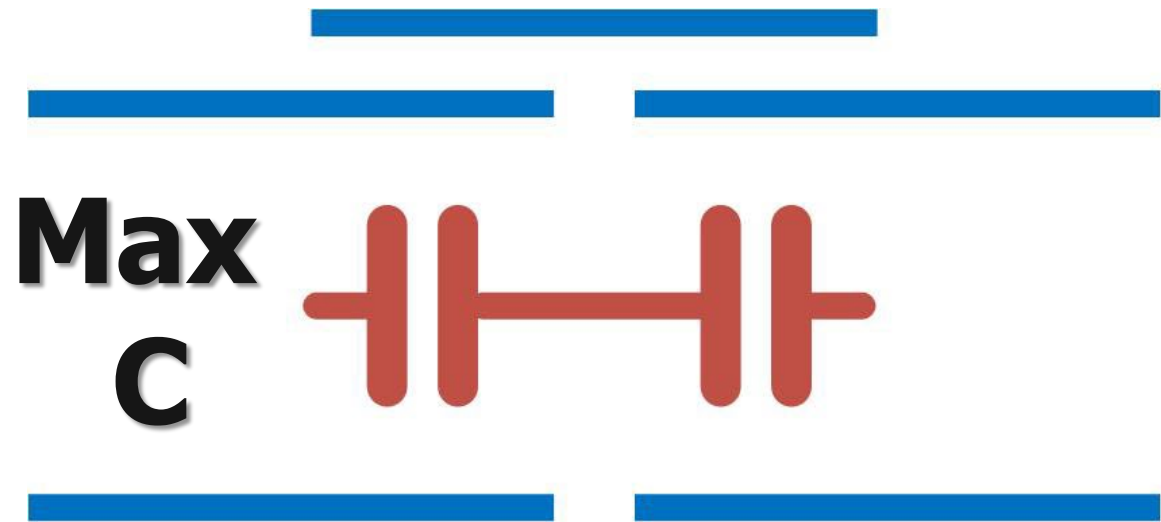
**GAP**

**Linear fine  
tuning capacitor**

**Band capacitor**





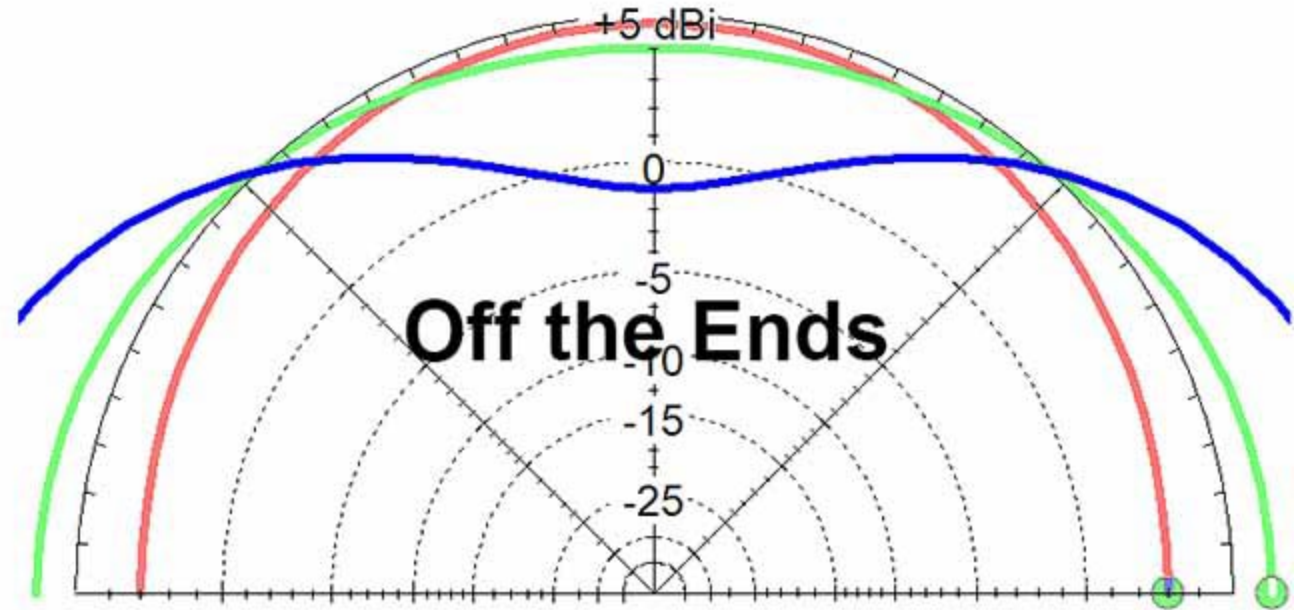
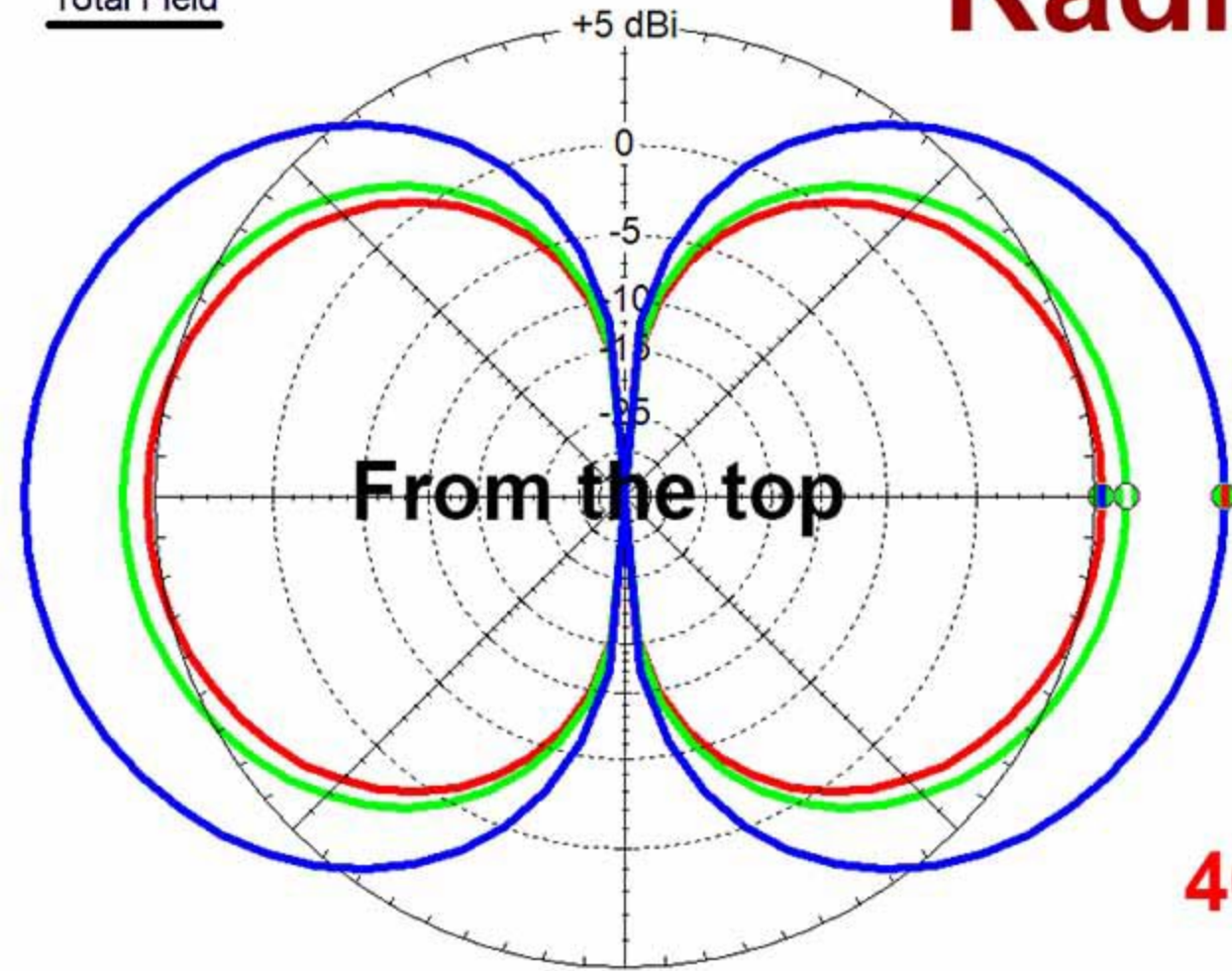


# Linear Capacitor

Two  
capacitors  
in series

Total Field

# Radiation and Gain EZNEC Pro/4+



**40-meters 20-meters 10-meters**



***AGAIN – This loop is an  
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***Pool  
Backwash  
Tubing***



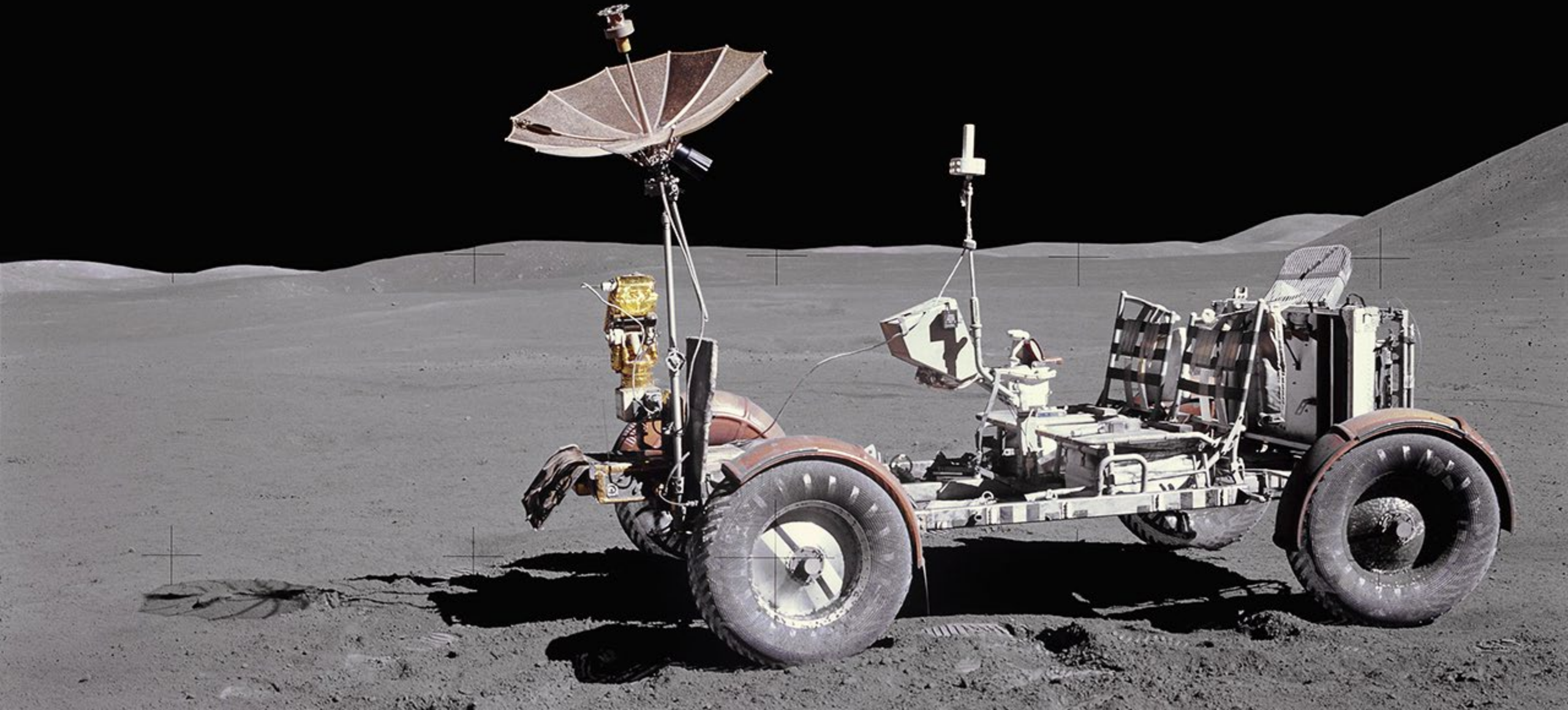
***Heat  
Shrink  
Tubing***



***Pool  
Noodles***



*Who says conductive fabric antennas are a bad idea?*





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## Questions and Answers

*Beginning now*

**Power Point slides**  
**[w6nbc.com/slides.html](http://w6nbc.com/slides.html)**

**Email: [w6nbcmail@gmail.com](mailto:w6nbcmail@gmail.com)**