

*21cm Hydrogen  
1 meter  
Umbrella Radio Telescope*

*Design Goal :  
balance*

*Cost Complexity Portability Performance*



<https://www.youtube.com/watch?v=ymclkNnCeCc>

# White Satin Photo Umbrella



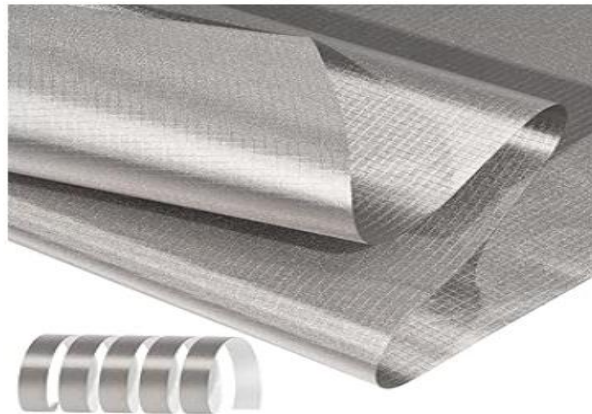
Westcott 2005 45in.  
Optical White Satin  
Umbrella

\$21<sup>90</sup>

*with fiberglass ribs*



## Nickel Copper Faraday Fabric



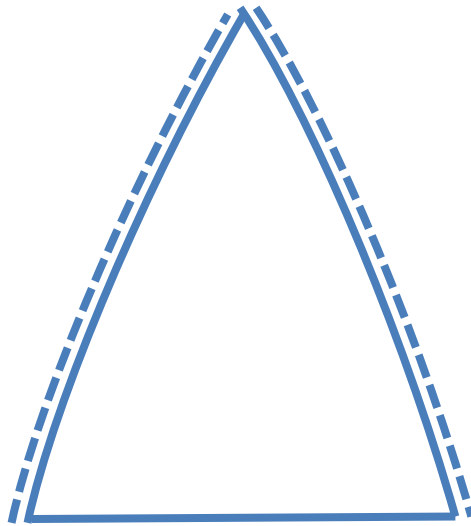
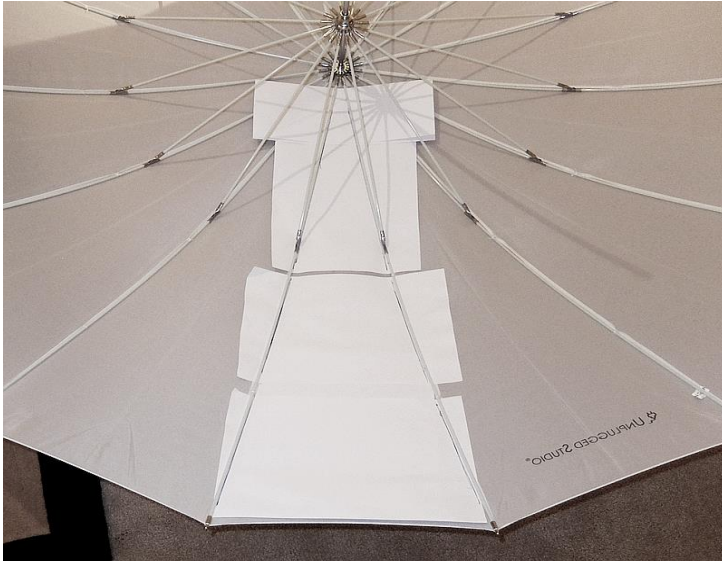
Brand: Dingbaayee

\$23<sup>98</sup>

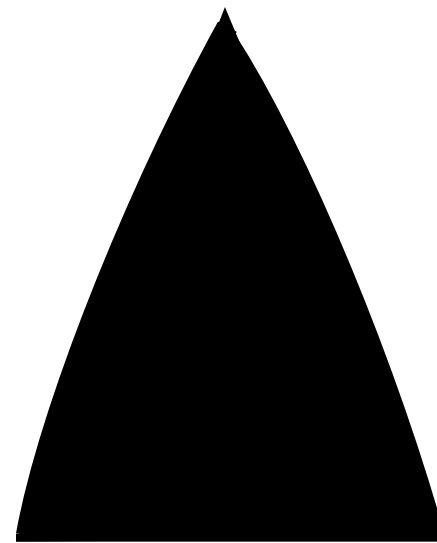
Faraday Fabric, Faraday  
Cloth 43"x118" with  
Faraday Tape Military  
Grade Protection Nickel  
Copper Faraday Cloth  
for WiFi, GPS

Brand: Dingbaayee

**Trace Shape on Paper & make a  
Cardboard Template**

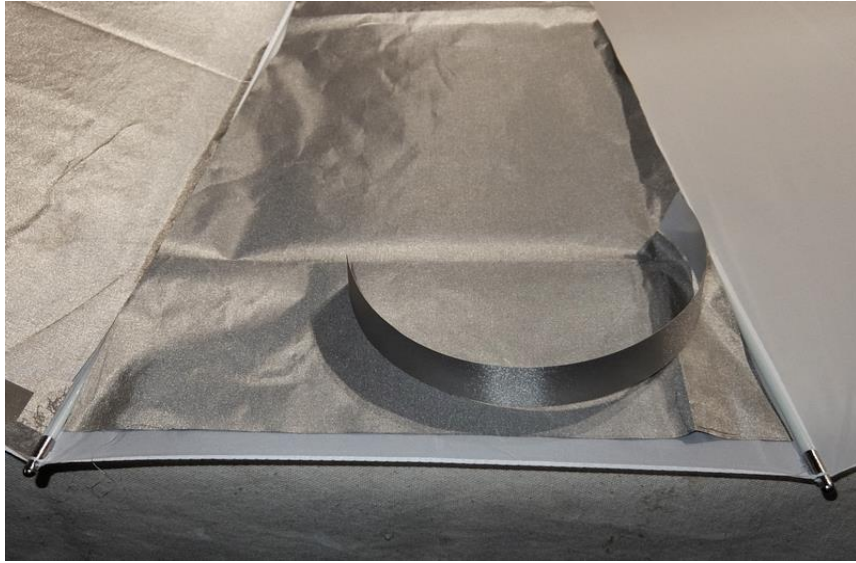


**Cut width 1/4" - 3/8" oversized to  
Extend Under Ribs**



**Make a Cardboard or Foam Core Board  
Template**

**Align panel with ribs and attach with 1" tape at outer edge  
Make small cutouts for rib <> umbrella tie strings**



**Spray umbrella then segment with contact cement  
Protect previously installed panels**



**Use dry brush to install  
Push edges of panel segment under ribs to overlap**



# 21cm ( 1.42GHz ) Loop Feed Components



Parrish's Magic Line Round Cake Pan, 6 x 2

Brand: Parrish Magic Line

★★★★★ 243 ratings

\$9<sup>99</sup>

✓prime One-Day

FREE Returns

Get a \$100 Gift Card: Pay \$0.00 ~~\$9.99~~ upon approval for the Amazon Print No annual fee.

Size: 6 x 2 Inch

6 x 1 Inch

--

**6 x 2 Inch**

**\$9.99**

✓prime

8 x 1 Inch

--



Click image to open expanded view



Boobrie SMA Coaxial Cable Connector SMA to F Coax Connector F Female to SMA Male Adapter for LAN / LMR Wireless Antenna Devices / RF Coaxial Cable / WiFi Radios External Antenna Pack of 2

Visit the Boobrie Store

★★★★★ 106 ratings

\$6<sup>19</sup> (\$3.10 / Count)

✓prime One-Day

FREE Returns

With Amazon Business, you would have saved \$156.94 in the last year. Create a free account and save up to 5% today.

Compatible Devices	Scanner
Connector Type	Coaxial
Connector Gender	SMA Male, Male-to-Female, F type Female
Brand	Boobrie
Number of Ports	1

About this item





## Eowpower 270Pcs 8 Sizes Nylon Metric Sealing Washers Assortment Set

\$8.98

In Stock

✓prime & FREE Returns ▾

This is a gift [Learn more](#)

Style: Nylon

Qty: 1 ▾

Delete

Save for later

Add to list

## PMMA tube

The round pipe is made of PMMA material, with strong impact resistance and easy processing; Good insulation; Durable and long service life



## MECCANIXITY Acrylic Pipe Rigid Round Tube Clear 8mm ID 12mm OD 305mm(12") for Lamps and Lanterns, Water Cooling System

Brand: MECCANIXITY

★★★★★ ▾ 86 ratings

\$6<sup>99</sup>

✓prime  
FREE Returns ▾

Size: 8mm x 12mm

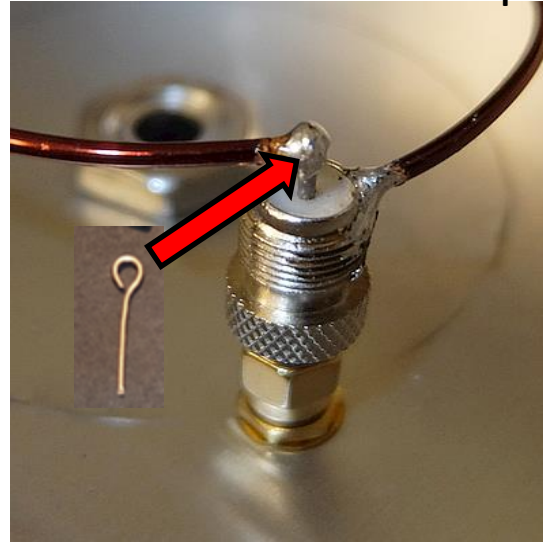
8mm x 12mm

9mm x 12mm

# 1.42 GHz Loop Feed Antenna Fabrication

adapted from OM6AA design  
[http://om6aa.eu/Loop\\_Feed\\_with\\_enhanced\\_performance.pdf](http://om6aa.eu/Loop_Feed_with_enhanced_performance.pdf)

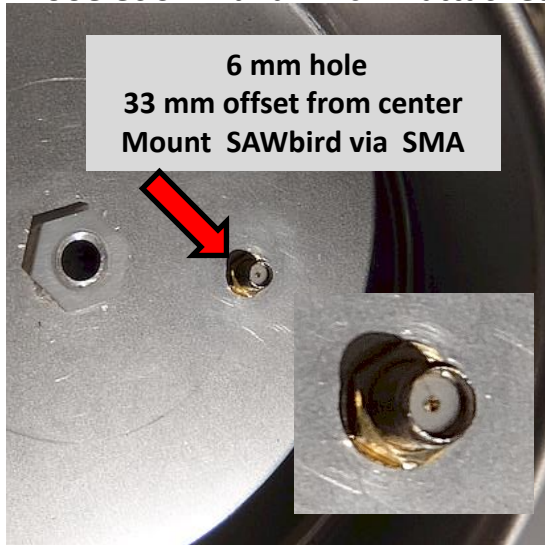
F-type <> SMA Adapter soldered to 21cm circumference wire loop



Completed Loop



noelec SAWbird H1 SMA attached to 6" dia x 2" deep Cake Pan



Complete Loop Feed Assembly





# Coaxial Cable

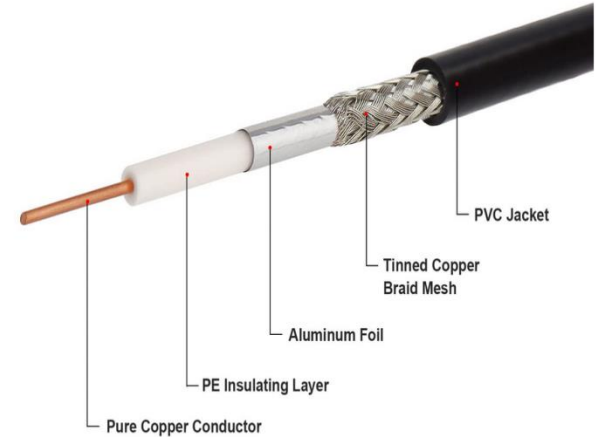


KMR240 SMA Male to SMA Male  
Coaxial Cable 50 ohm Coax Ultra  
Low Loss Antenna Extension for  
3G/4G/5G/LTE Network Equipment  
GPS, RF Radio (25FT)

Visit the MOOKEERF Store  
4.5 ★★★★★ 99 ratings | Search this page

\$22<sup>99</sup> (\$0.92 / Foot)

prime Two-Day



KMR240 Cable Signal Loss and VSWR									
Frequency	3FT	6FT	10FT	15FT	20FT	25FT	35FT	50FT	VSWR
1500MHz	0.29	0.58	0.96	1.44	1.92	2.4	3.36	4.80	≤1.15

# Electronic Components

## LNA ( Low Noise Amplifier )



Nooelec SAWbird+ H1 - Premium Saw Filter & Cascaded Ultra-Low Noise Amplifier (LNA) Module for Hydrogen Line (21cm) Applications. 1420MHz Center Frequency. Designed for Software Defined Radio (SDR)

[Visit the NooElec Store](#)

4.4 ★★★★★ 62 ratings | [Search this page](#)

\$44<sup>95</sup> (\$89.90 /100 g)

## SDR ( Software Defined Radio )



NooElec NESDR Smart XTR SDR - Premium RTL-SDR w/Extended Tuning Range, Aluminum Enclosure, 0.5PPM TCXO, SMA Input. RTL2832U & E4000-Based Software Defined Radio

[Visit the NooElec Store](#)

4.3 ★★★★★ 189 ratings

| [Search this page](#)

\$43<sup>95</sup>

 prime Two-Day  
FREE Returns

## Align Antenna and tie down with string & tent pegs

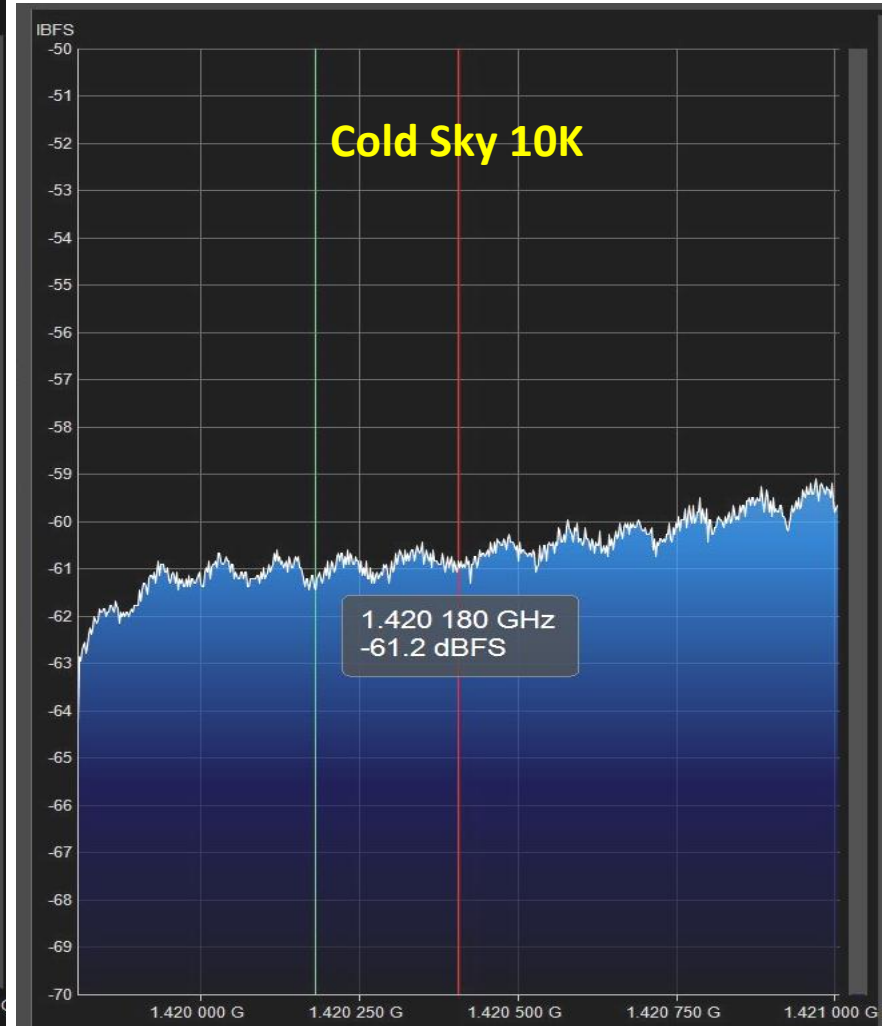
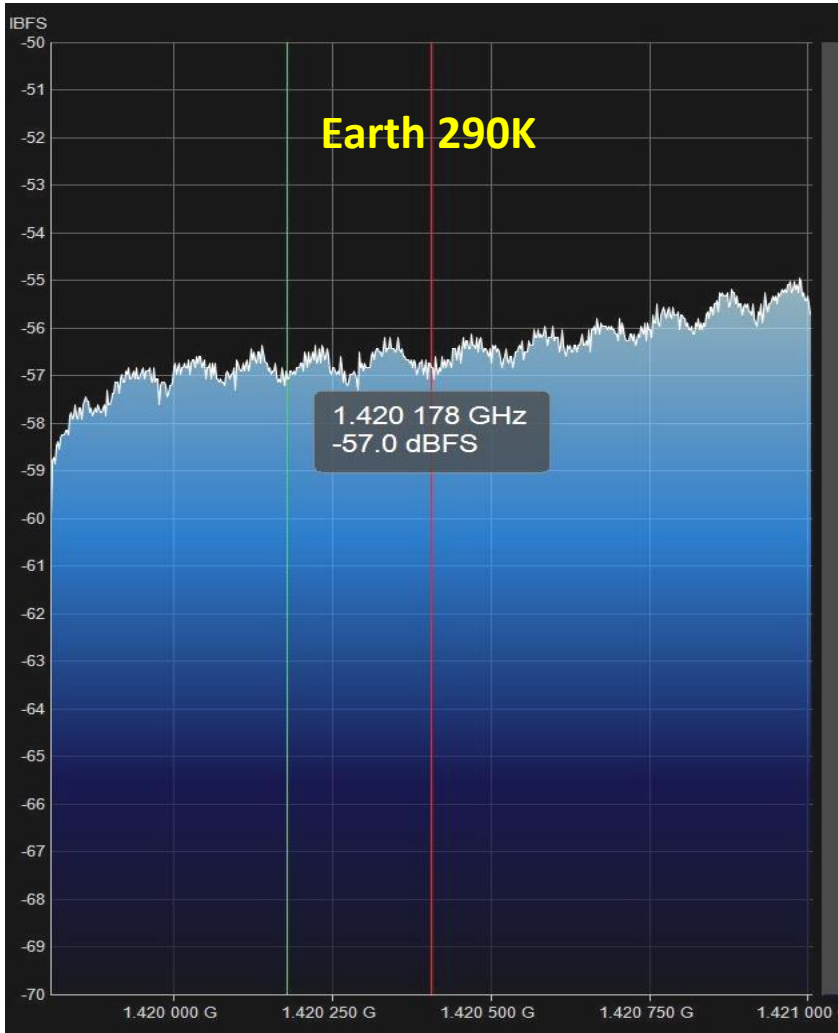


# Performance Verification Test

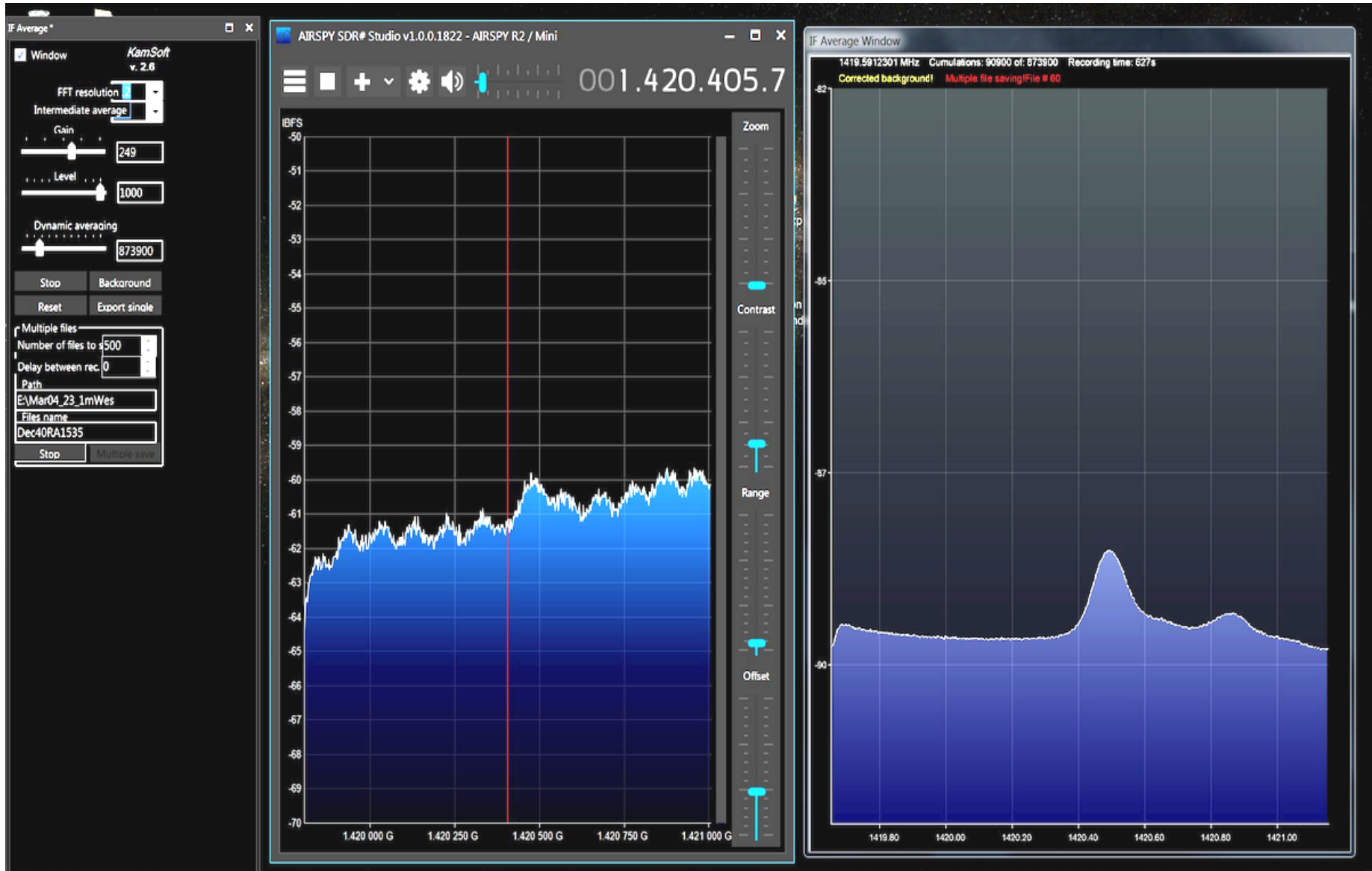
-57 dB

< Delta 4.2 dB >

-61.2 dB

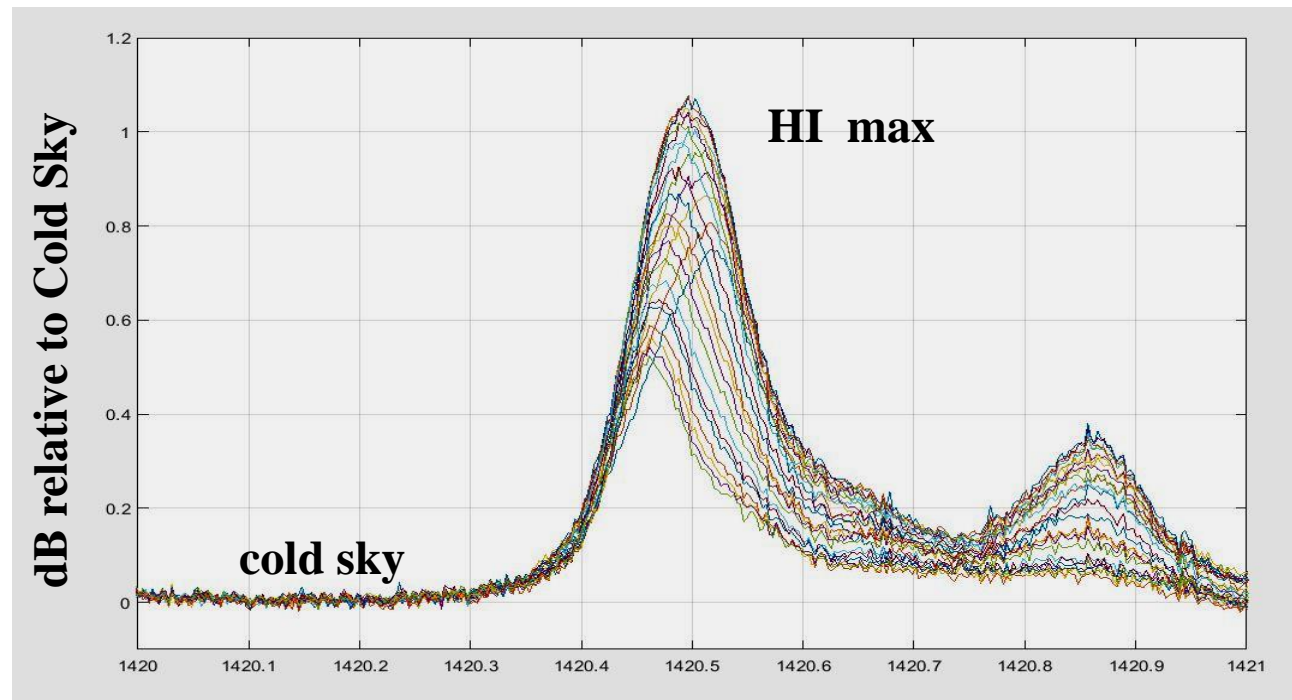
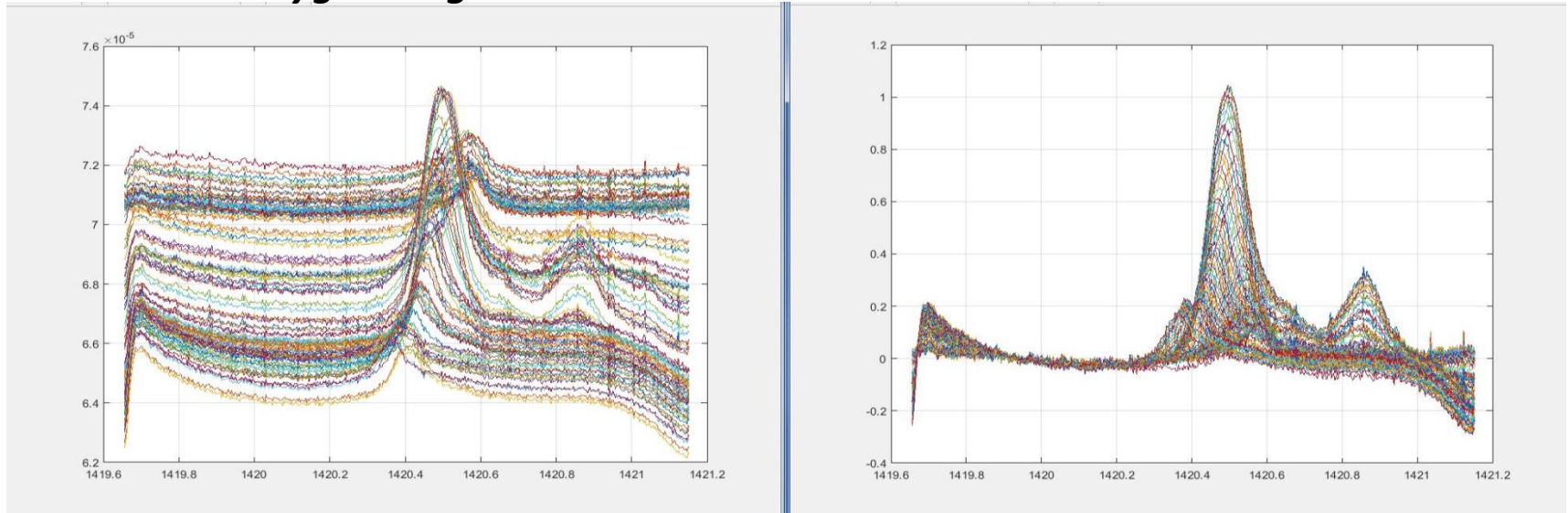


# Declination + 40 Deg RA 20:30 Hrs

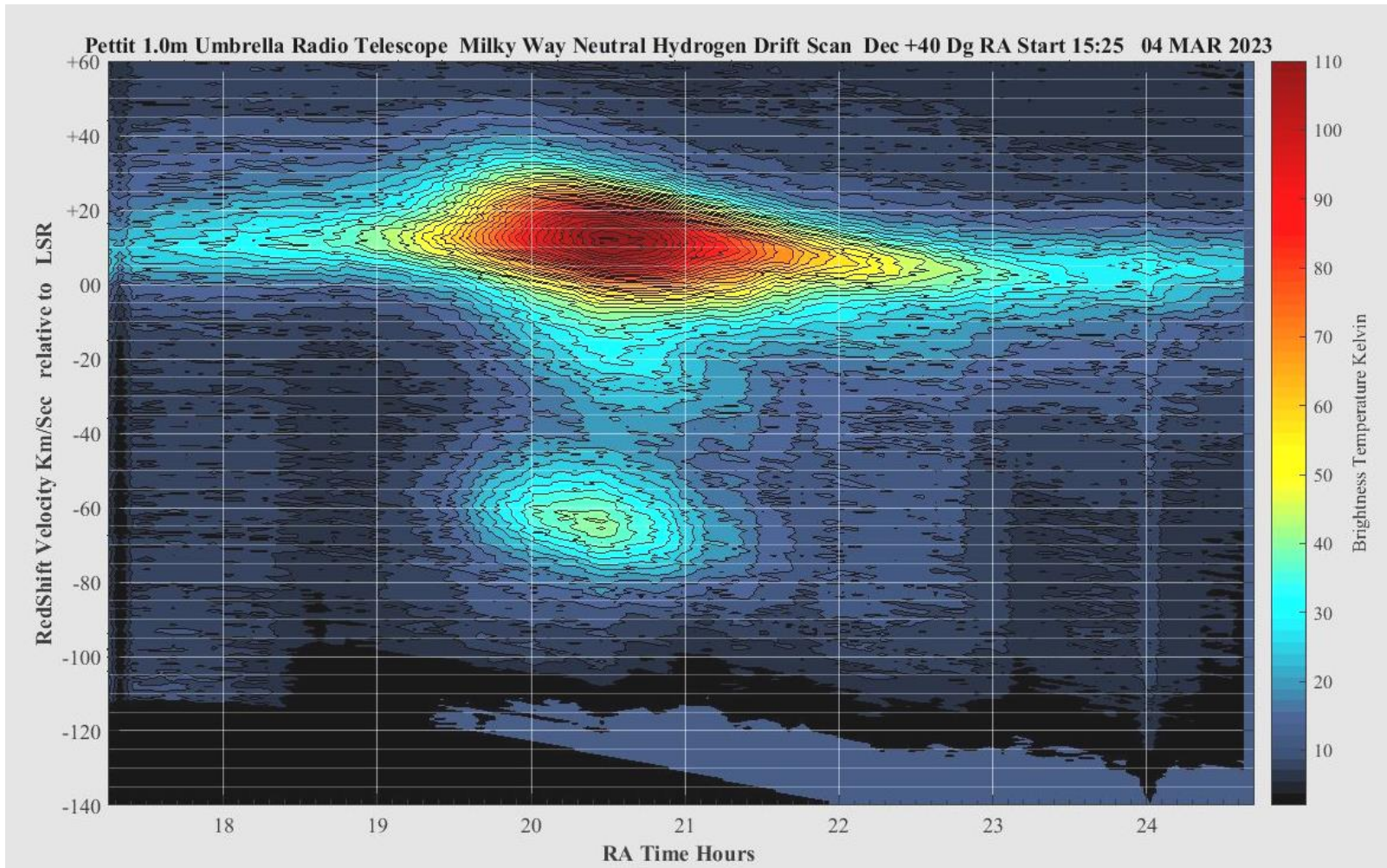


**Drift Scan of Hydrogen Clouds in Milky Way  
Cygnus region**

**105 ea 5 minute / sample Scans**



# Declination + 40 Deg RA 20:30 Hrs



*A Pettit 1m Photo Umbrella Antenna Dec +40 RA 20:30 Hrs @ 21 cm*

