

# Chasing Radiosondes or Radios from Heaven!

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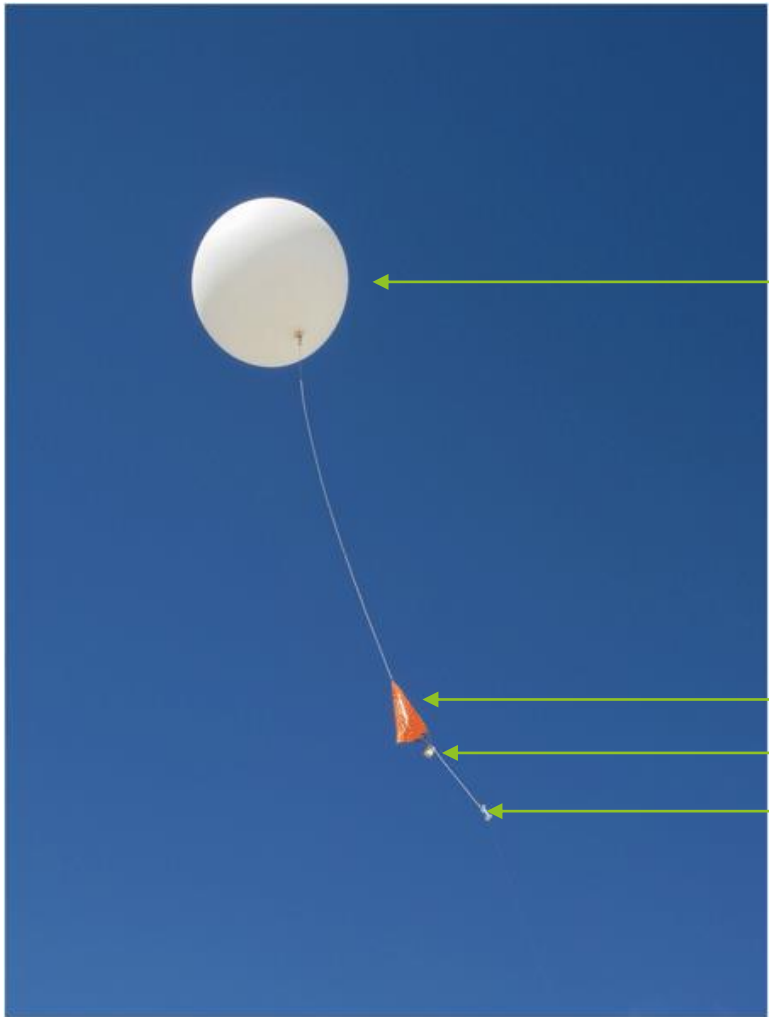
[mwlaney16@gmail.com](mailto:mwlaney16@gmail.com)

# What is a RadioSonde?

- ▶ Radio- Device for the transmission and/or reception of electromagnetic waves of radio frequency, especially those carrying sound messages.
- ▶ Sonde- French for probe.

Essentially, it is a remote sensing device used by the National Oceanic and Atmospheric Administration (NOAA). This device gathers atmospheric data (temperature, pressure, relative humidity, and windspeed) in relation to location and altitude (using GPS) and transmitting this information back to NOAA for weather prediction modeling.

# What is a RadioSonde?



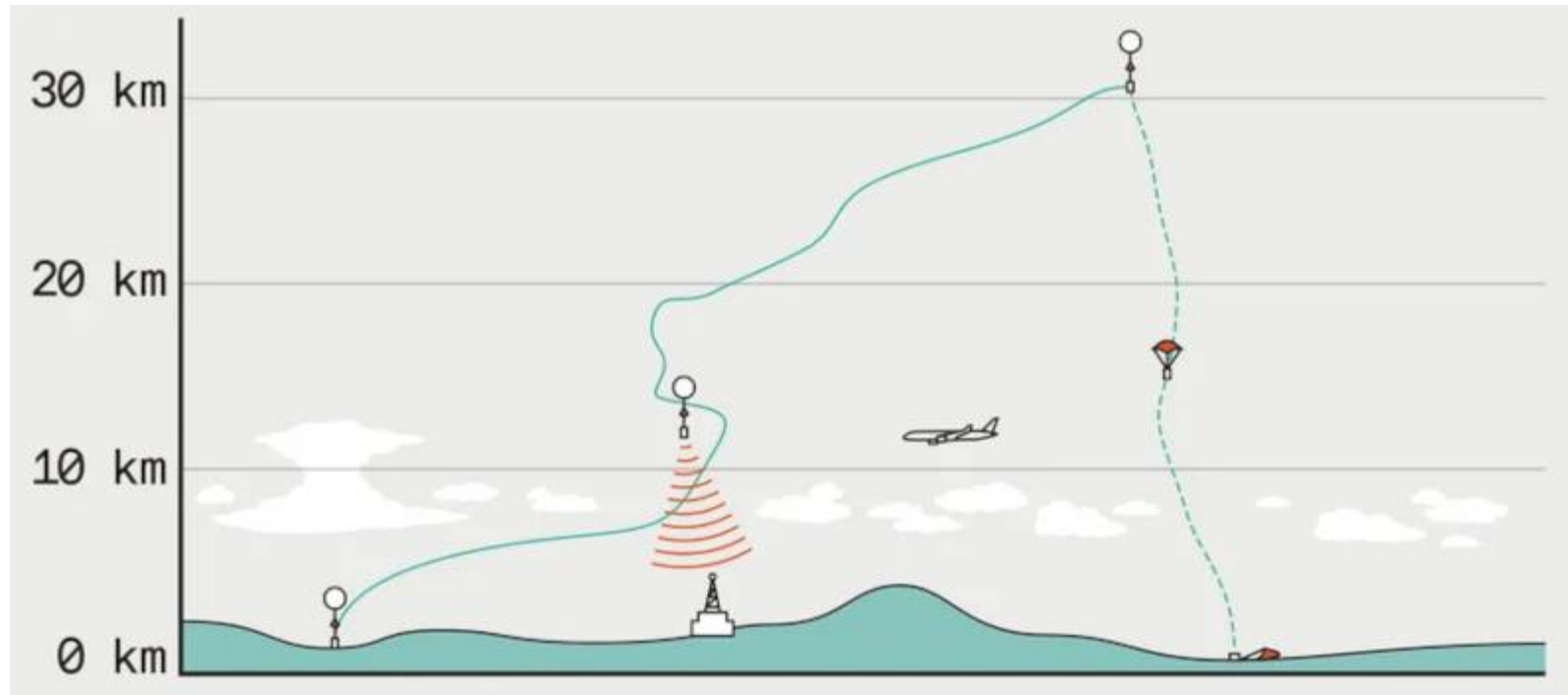
Balloon (filled with Hydrogen)

Parachute

Winder

RadioSonde

# What is a RadioSonde?



# What is a RadioSonde?

## Visalia RS41-NG

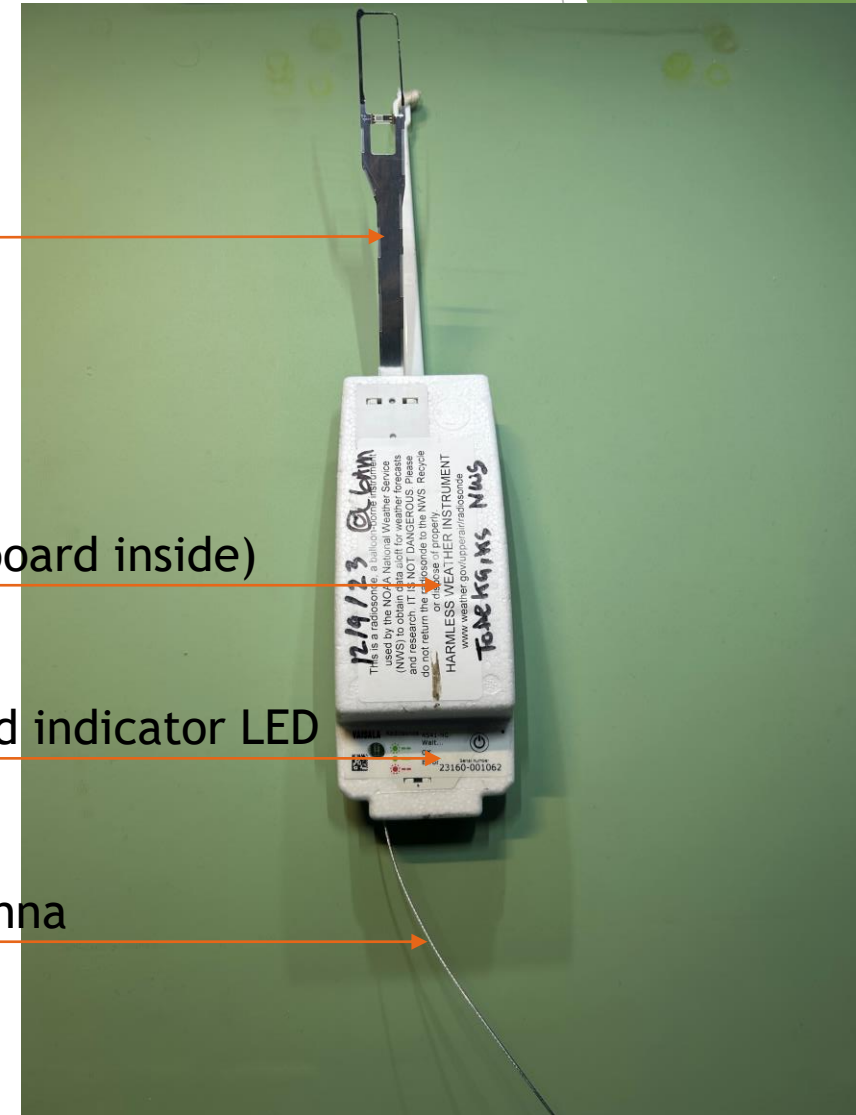
- ▶ Transmits from 400 to 406 MHz FM
  - ▶ 60mW transmitting power
  - ▶ Uses GFSK modulation at 4800 bps and 4.8 kHz.
- ▶ Powered by 2 AA Lithium Batteries
- ▶ Has GPS tracking
- ▶ Measures:
  - ▶ Temperature
  - ▶ Humidity
  - ▶ Pressure
  - ▶ Wind (with GPS speeds)

Sensor

Body (circuit board inside)

On/off button and indicator LED

Radio Antenna



# Cool Beans, how do I get a RadioSonde?

You need:

- ▶ A UHF Handheld Radio
- ▶ Directional (Yangi or loop) antenna

Suggested Items

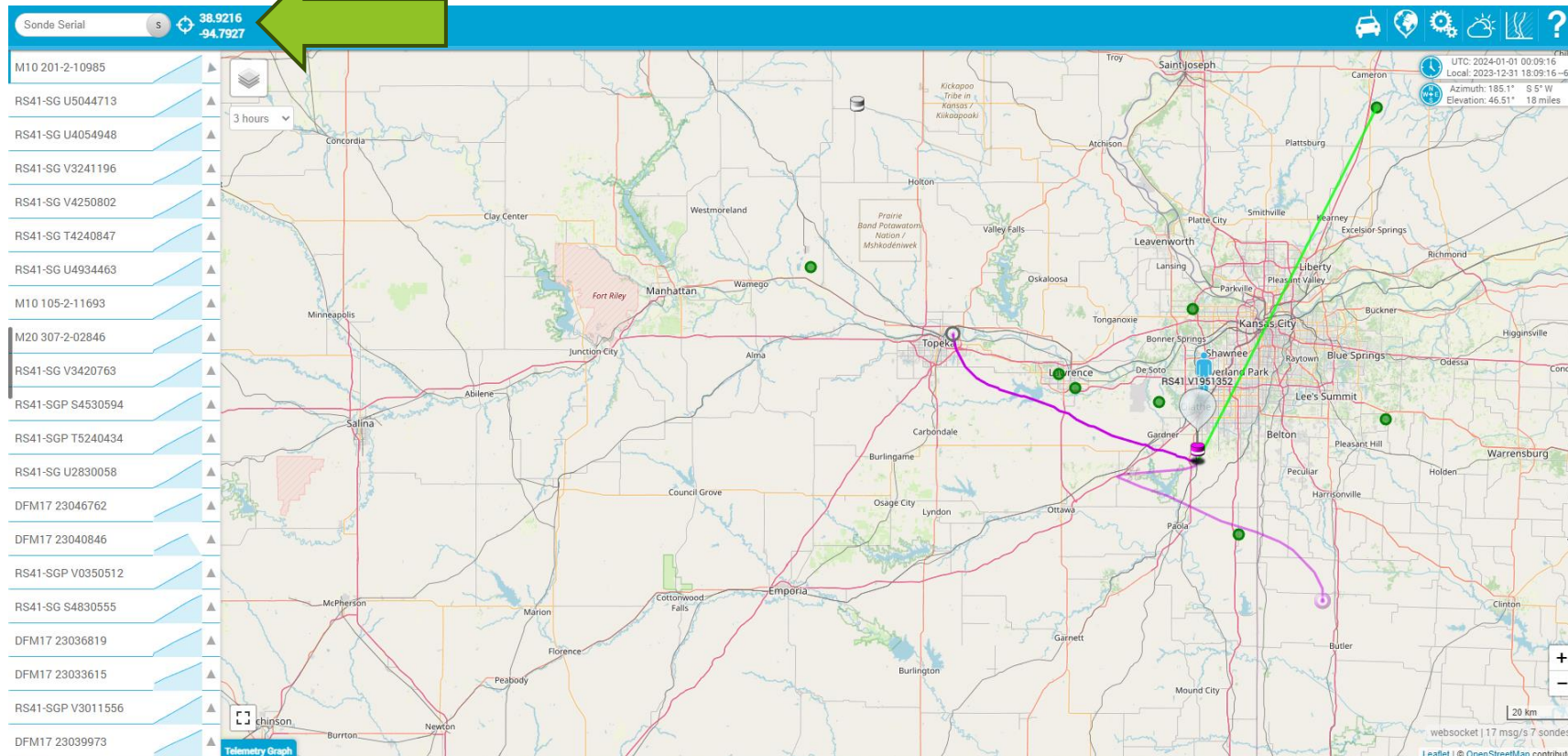
- ▶ Antenna attenuator



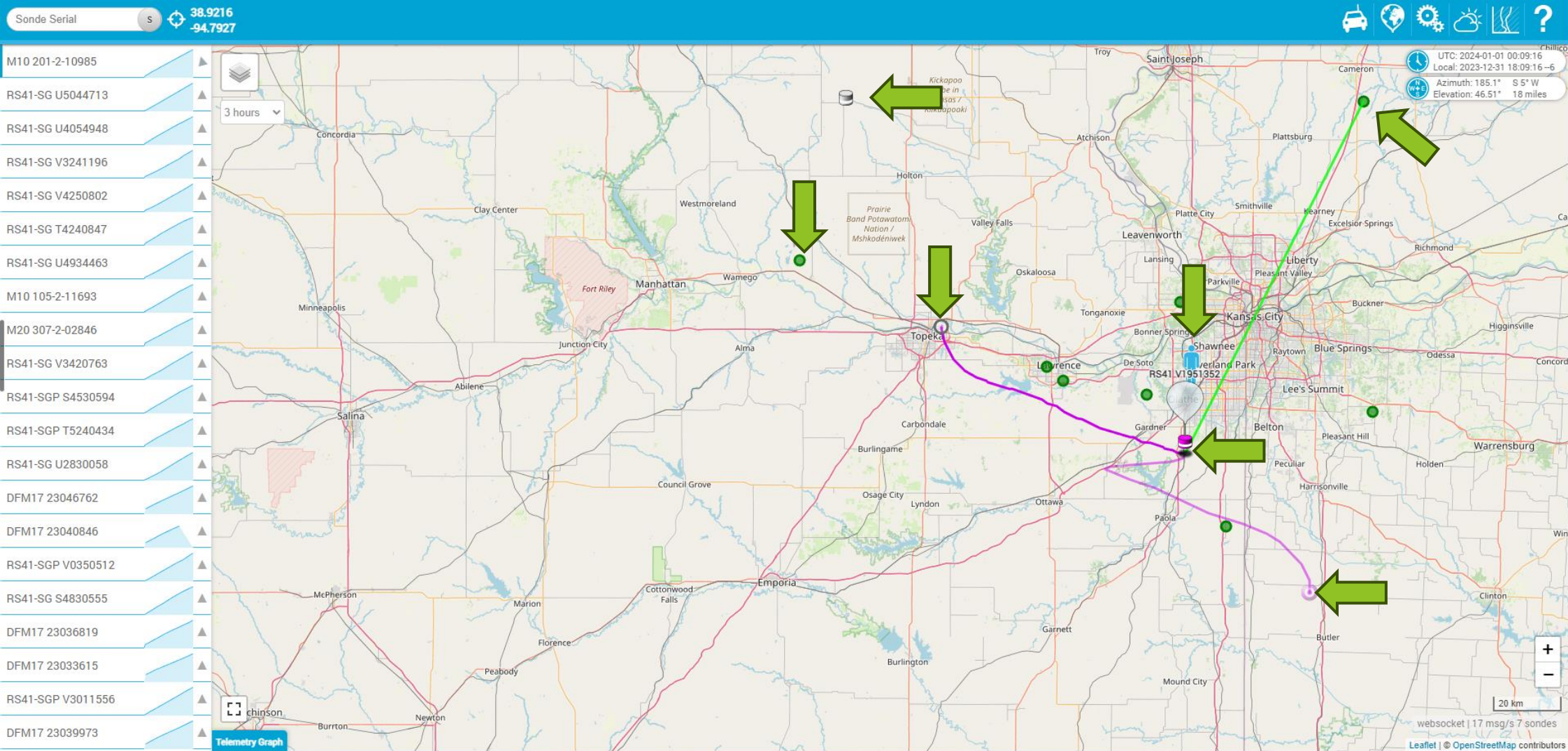
# Cool Beans, how do I get a RadioSonde?

Go to the SondeHub website ([sondehub.org](https://sondehub.org))

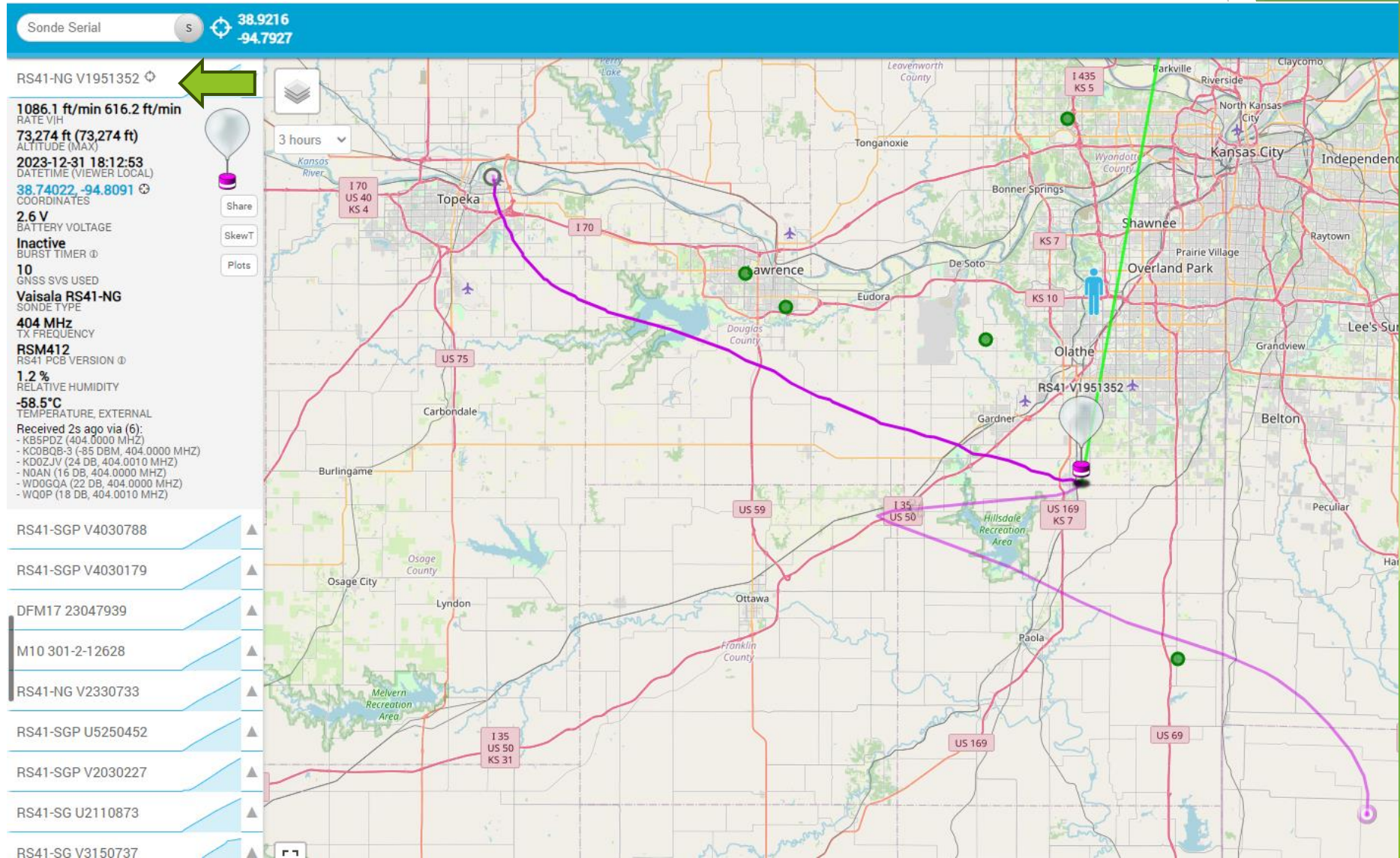
- ▶ Make sure to click on the “your location” area in the upper left side of the page before bookmarking. This way when you use bookmark it always takes you to your QTH.



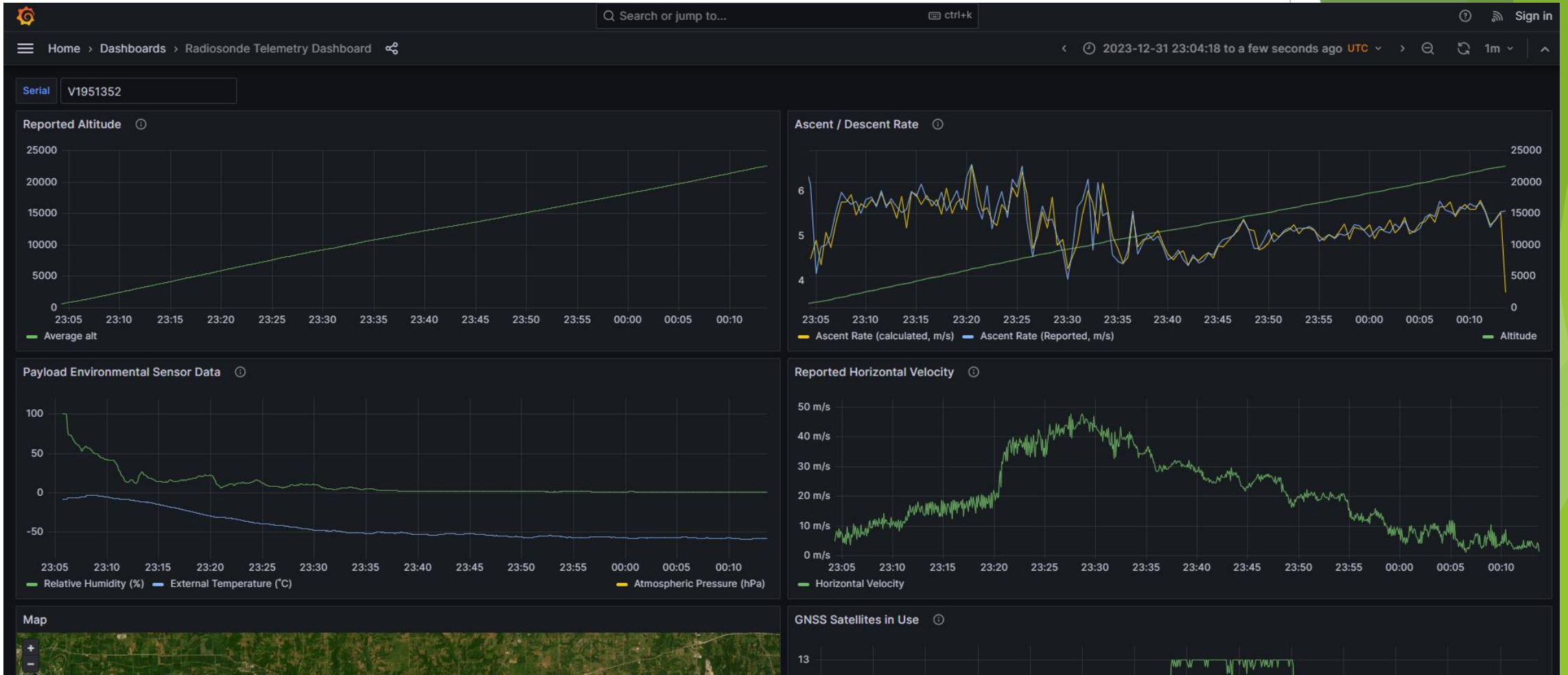
# SondeHub



# SondeHub



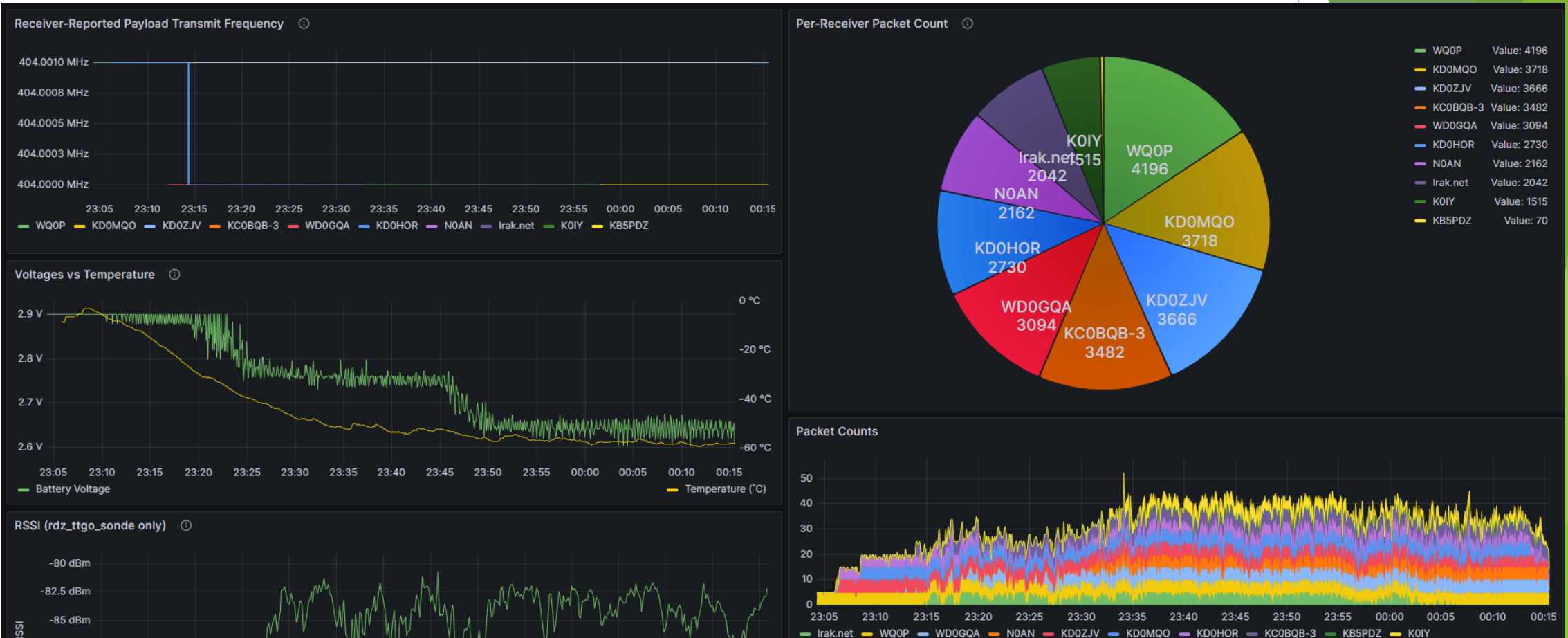
# SondeHub



# SondeHub



# SondeHub



# Cool Beans, how do I get a RadioSonde?

- ▶ Set you radio to the Sonde frequency. If it is in the line of sight of you, you should be able to pick up the data transmission while it is airborne.
- ▶ When the Sonde is an hour or so into its flight, click on the predicted location (this will shift until it lands) to get the coordinates of where it is expected to land, and plan out your trip.

RS41-NG V1951352

1087.0 ft/min 1416.3 ft/min  
RATE VIH

78,323 ft (78,323 ft)  
ALTITUDE (MAX)

2023-12-31 18:17:22  
DATETIME (VIEWER LOCAL)

38.73321, -94.81481  
COORDINATES

2.6 V  
BATTERY VOLTAGE

Inactive  
BURST TIMER

10  
GNSS SVS USED

Vaisala RS41-NG  
SONDE TYPE

404 MHz ←  
TX FREQUENCY

RSM412  
RS41 PCB VERSION

1.1 %  
RELATIVE HUMIDITY

-58.2°C  
TEMPERATURE, EXTERNAL

Received 5s ago via:  
- NOAN (16 DB, 404.0000 MHZ)

Share  
SkewT  
Plots

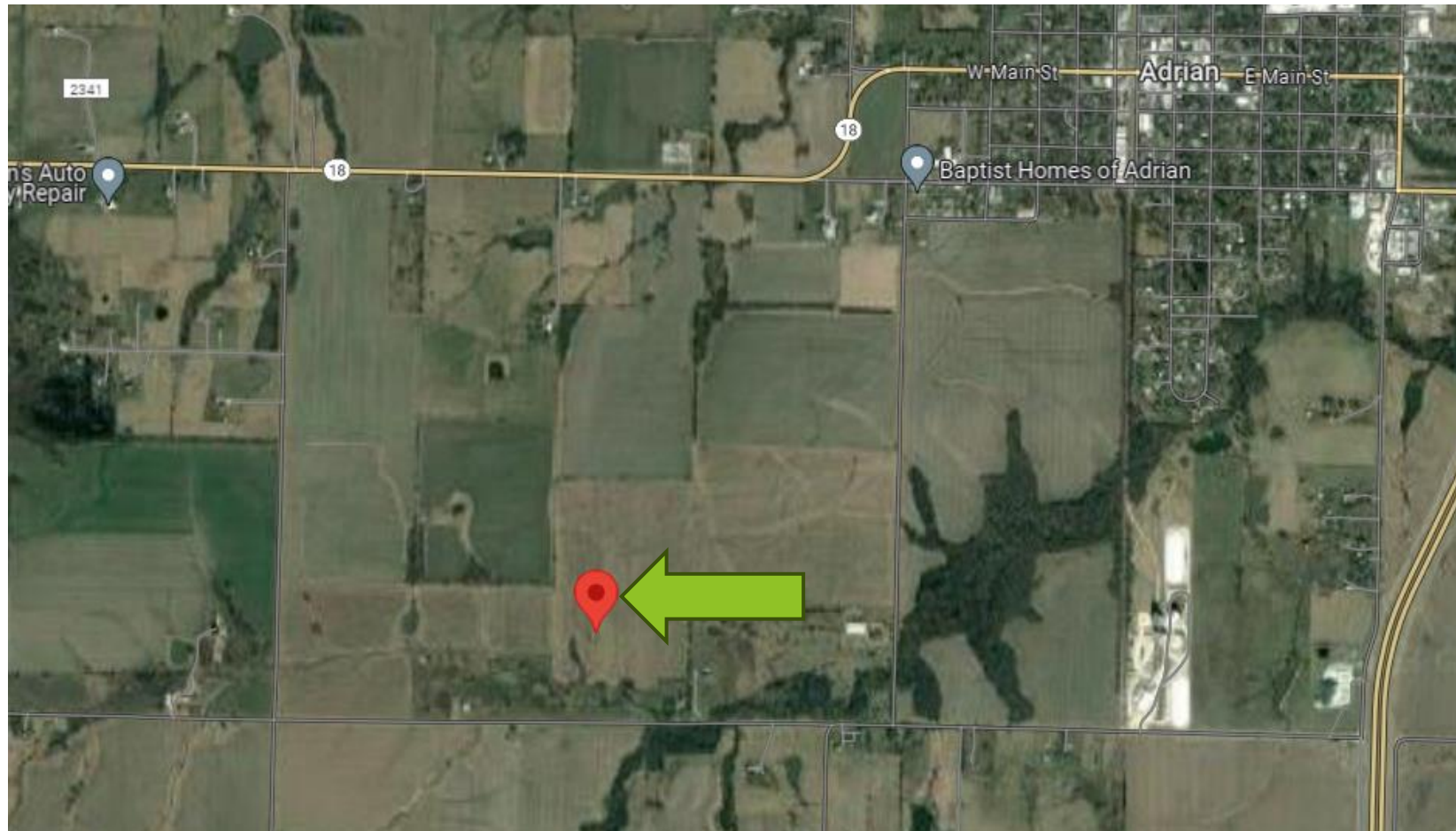
Map showing the predicted flight path of a radio sonde. The path is indicated by a purple line starting from the top left and moving towards the bottom right. A green dot on the path indicates the current predicted location. The map includes labels for roads (US 169, KS 7, US 69) and locations (Paola, Peculiar, Harrisonville, Pleasant Hill). A data popup window is visible in the bottom right corner.

2023-12-31 19:56:17 UTC--6

Altitude: 870 feet  
Location: [38.3829, -94.37114](#)  
Prediction Type: Standard  
Ascent Rate: 5.5 m/s  
Burst Altitude: 32800 m  
Descent Rate: 3.2 m/s

# Cool Beans, how do I get a RadioSonde?

This sonde is going to land in the vicinity of the town of Adrian, MO. Most likely in a farm field. If possible, get there about 2 hours after it was launched, then you may see it come down. More then likely it will be down by the time you get there.



# Cool Beans, how do I get a RadioSonde?

If you have a mobile radio in your car set it to the Sonde frequency, if not use your handheld, but I recommend you get a magnetic VHF/UHF antenna to mount on your car roof or trunk for best gain on getting signal once it is on the ground.



When you get about  $\frac{1}{2}$  mile from the Sonde or closer you should start hearing the data transmission.

# Cool Beans, how do I get a RadioSonde?

Chase Mode

Enable  Off

Callsign

Notice: If you enable this, your location will be uploaded to SondeHub; making it publicly visible on the map for up to 12 hours.

Last updated	3h 27m ago
Latitude	38.9216
Longitude	-94.7927
Altitude	0 m
Accuracy	59 m
Speed	0 m/s

Report Recovery

You can report a recovery here. Enter the serial number (no type code, e.g. 'S1234567'), tick recovered/not recovered, and add some notes. If the sonde is not on the map, type its callsign into the top-left search box and press enter to retrieve historical data. You can then mark it as recovered. Optionally, you can use your location instead of the sonde's last location.

Serial

Recovery Success  Yes  No

Use Car Position  On  Off

Notes

Report Result

I'm not a robot

reCAPTCHA Privacy Terms

Submit

Hopefully, you have cell phone coverage, and you can see what the last reading was on SondeHub. Also, I recommend that you set the Chase Mode option on SondeHub so others know you are going for it.

- ▶ Enable Chase mode and enter you call sign or another identifier if not a licensed Amateur Radio operator.

Once you get in the vicinity find a safe place to park, and use your mad foxhunting skills to find the Sonde. **If on Private Property, do you best to find out whose it is and get permission to go on it to recover Sonde.**

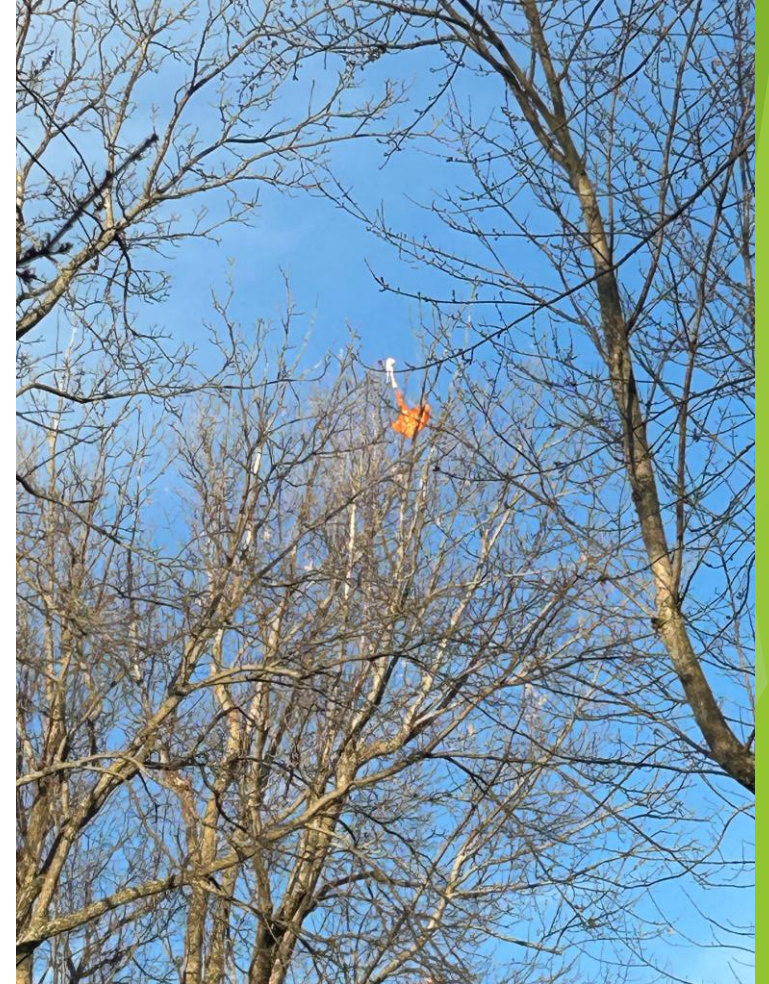
- ▶ If you find it enter the serial number, (V1951352 in this example), mark if you found it or if it was not able to be recovered (e.g.g it is high up in a tree, landed in a lake, etc).



# Cool Beans, how do I get a RadioSonde?

Some good tips:

- ▶ Bring a long painter's pole with a hook on the end and/or an extendable pruners pole to get Sondes within reach in trees. (Trees like to eat Sondes just like kites and model rockets).
- ▶ Bring a friend, lots of the time you will be rural areas, and safety is paramount. I recommend wearing a reflective orange vest
- ▶ Be prepared. Have first aid kit, water, appropriate clothes for weather. Also, look up and program you HT for the local amateur radio repeater(s) in case cell coverage doesn't work and you need help. Muck Boots are a great thing to have!
- ▶ Print up an area map and look up on the county assessor's website who owns what parcels so that you know who to ask for permission to go on their land. If no one is home, leave a note.



# Cool Beans, how do I get a RadioSonde?



Hope for success but prepare for failure. Some time the best you get is you pick up the signal (some one may have recovered it and took it inside, while leaving it in transmit); it may have gotten eaten by lake, tree or roof of large building; Homeowner may say no to go on their property.

Did I mention Muck Boots being a good thing?



# I got a RadioSonde, now what?

## Serial Number Match

RS41-NG V2351062

0.0 ft/min 0.0 ft/min  
RATE VIH

1,131 ft (110,049 ft)  
ALTITUDE (MAX)

2023-12-09 07:45:50  
DATETIME (VIEWER LOCAL)

39.27572, -94.22773  
COORDINATES

2.7 V  
BATTERY VOLTAGE

07:25:15  
BURST TIMER

404 MHz  
TX FREQUENCY

67.1 %  
RELATIVE HUMIDITY

Vaisala  
MANUFACTURER

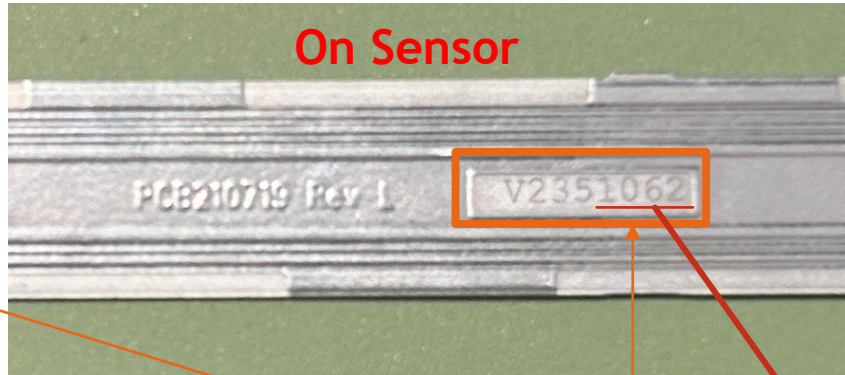
10  
GNSS SVS USED

3.1°C  
TEMPERATURE, EXTERNAL

Vaisala RS41-NG  
SONDE TYPE

RSM412  
RS41 PCB VERSION

Received 26d 6h ago via:  
- KD0MQO (8 DB, 404.0010 MHZ)



Serial Number

RS41-NG V2351062

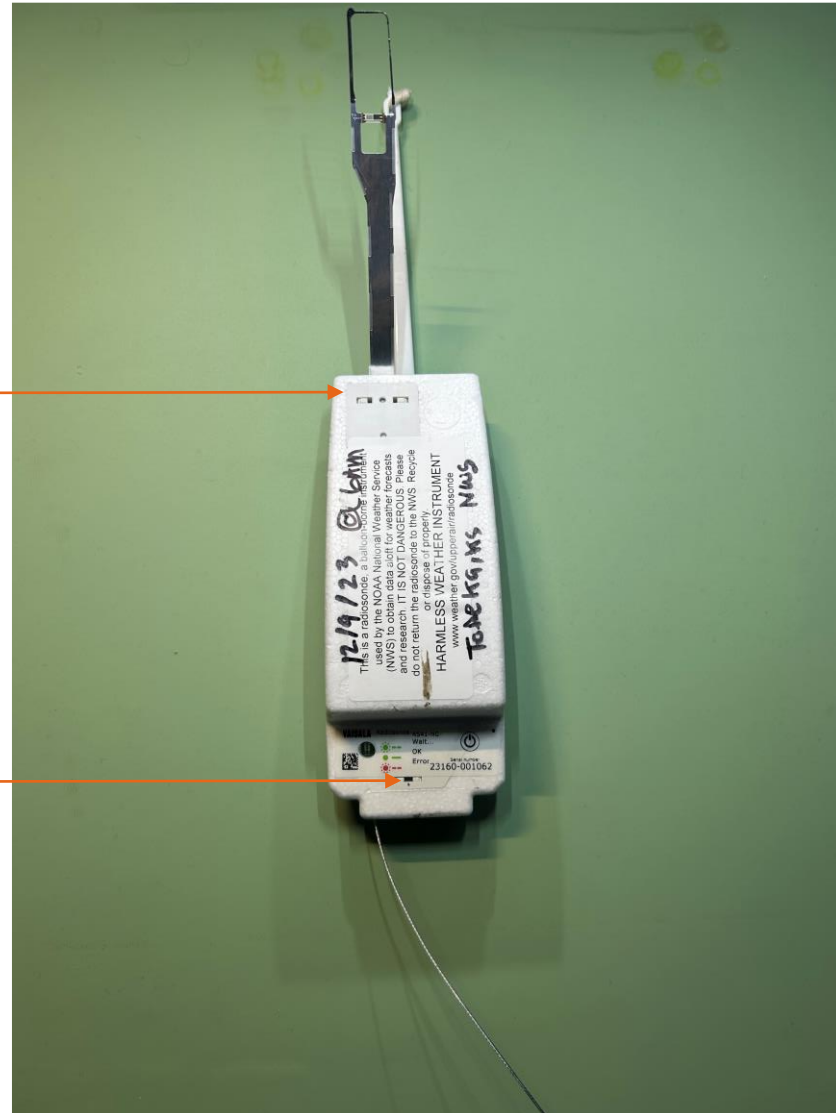
VAISALA Radiosonde RS41-NG-  
Wait...  
OK  
Error  
Serial n...  
23160-01062

# I got a RadioSonde, now what?

YOU TAKE IT APART!!!

Pinch Clip

Remove Clip



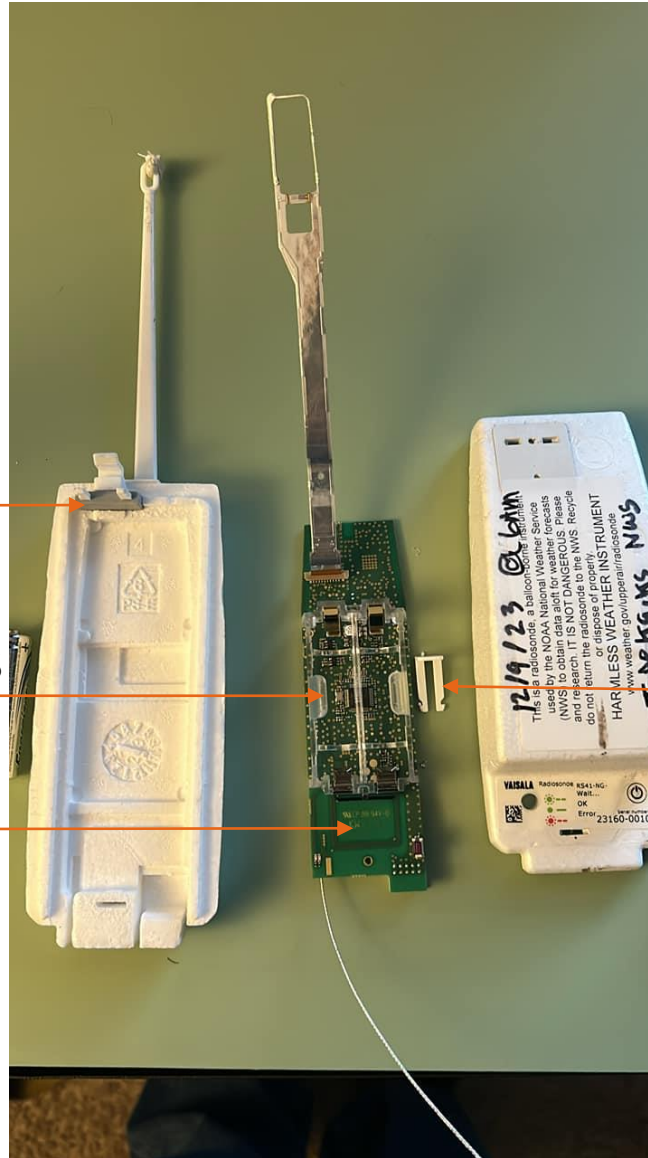
# I got a RadioSonde, now what?

YOU TAKE IT APART!!!

Clip

2x AA Battery Holder  
w/ 2 Energizer Lithium Batteries

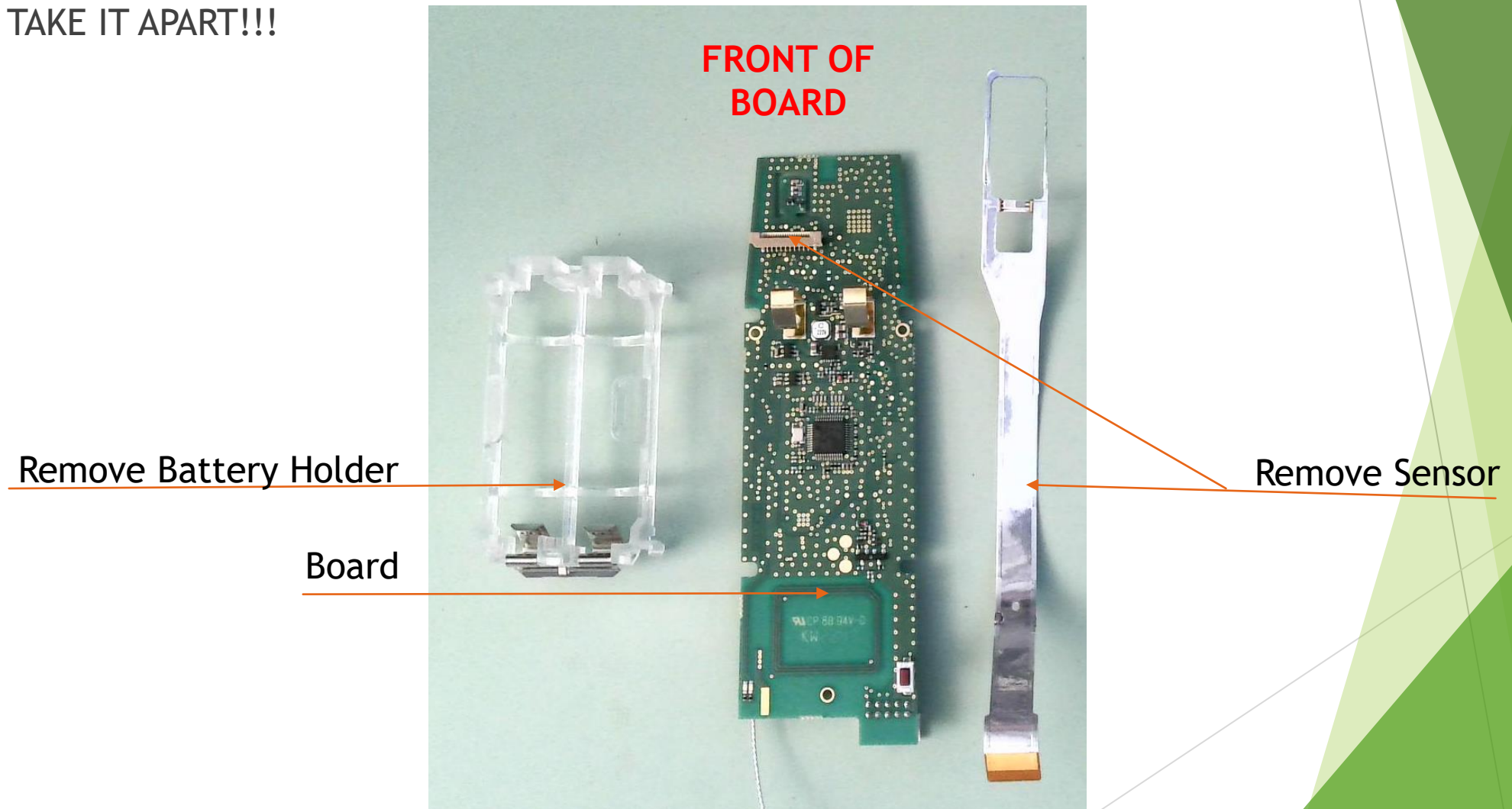
Board



Clip

# I got a RadioSonde, now what?

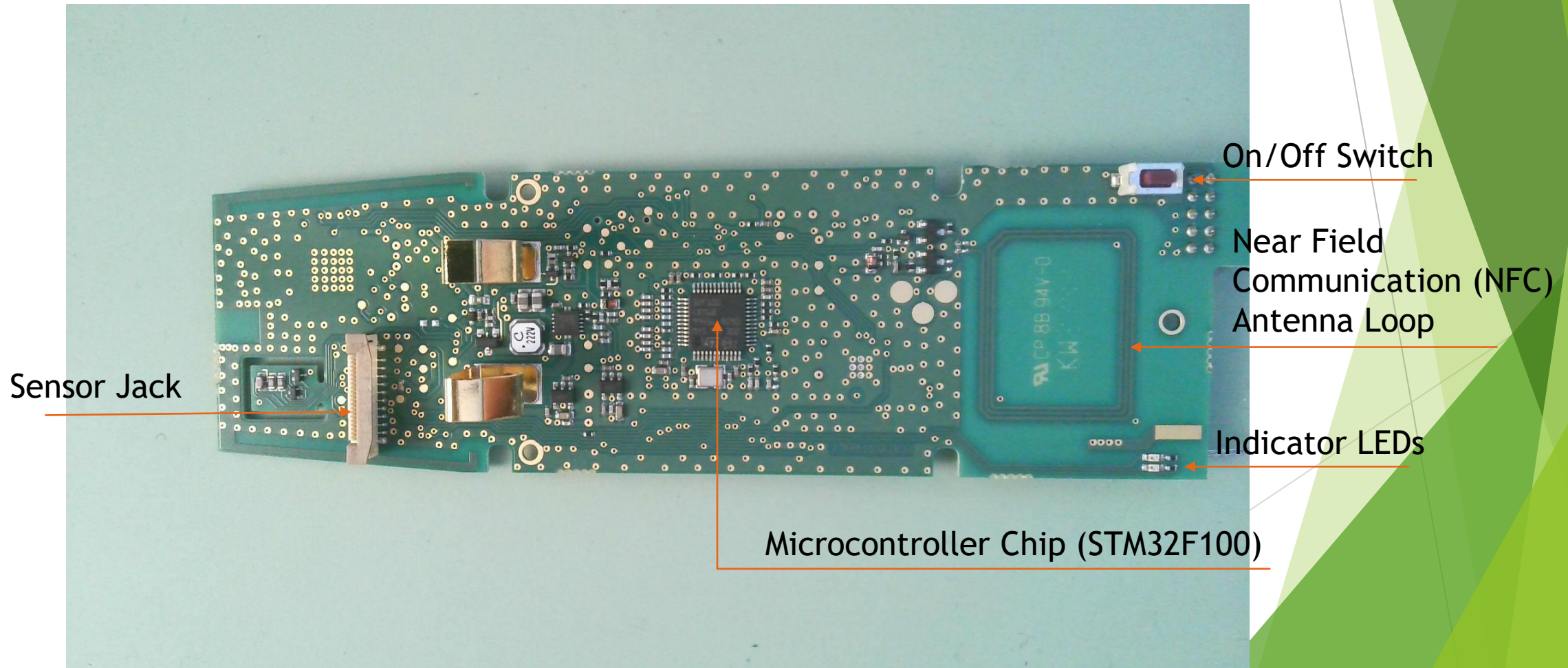
YOU TAKE IT APART!!!



# I got a RadioSonde, now what?

YOU TAKE IT APART!!!

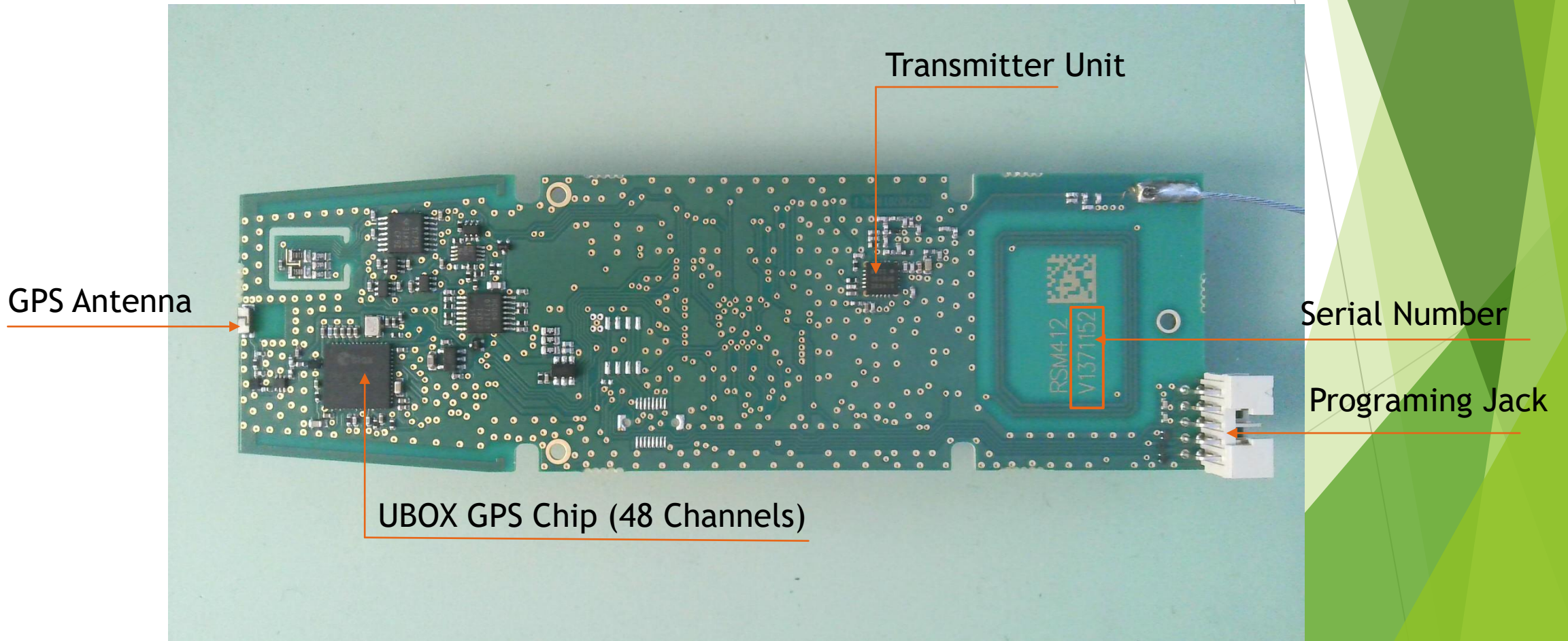
**FRONT OF BOARD**



# I got a RadioSonde, now what?

YOU TAKE IT APART!!!

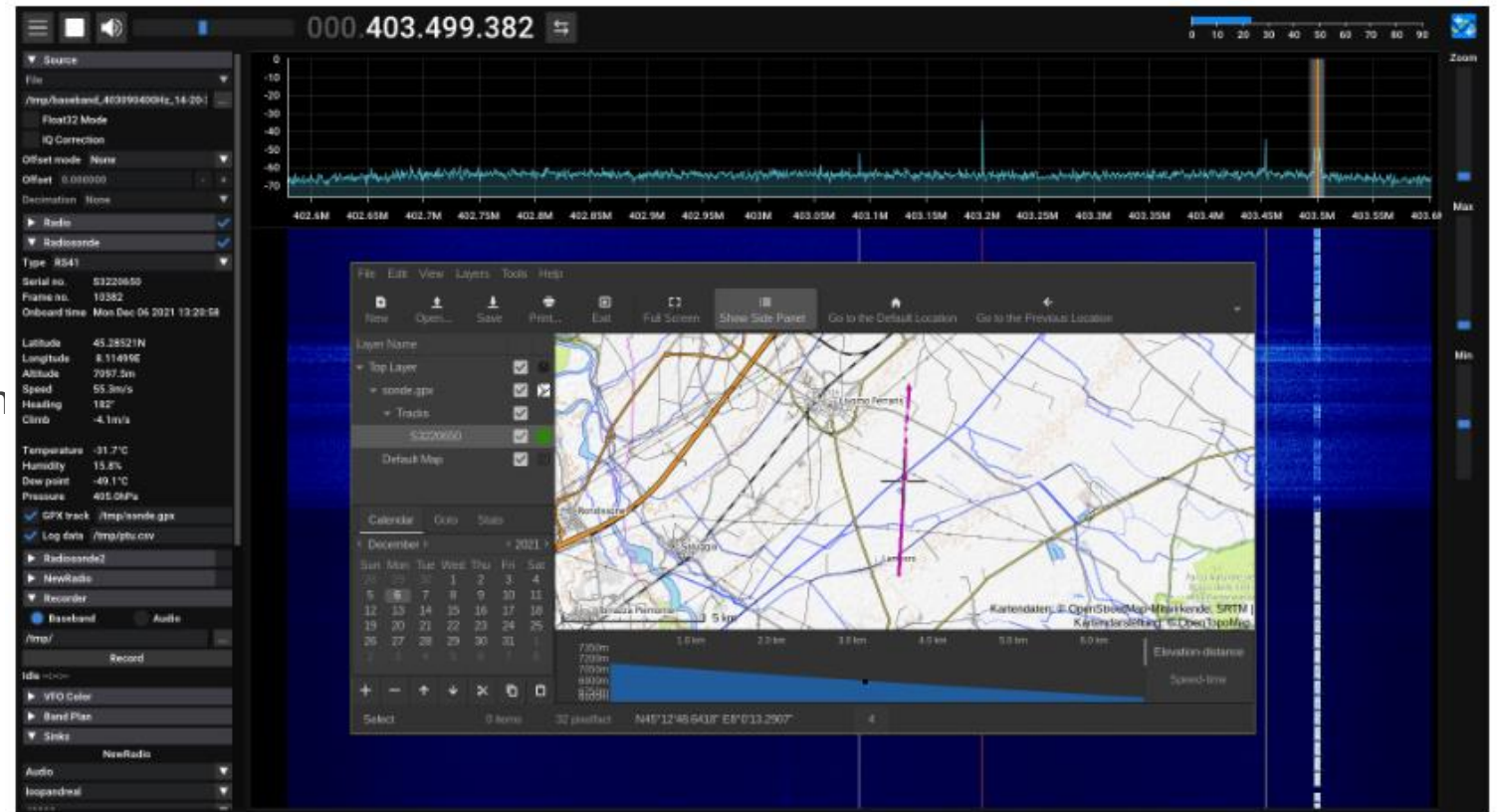
**BACK OF  
BOARD**



# Cool stuff, but what else can I use this for?

## RadioSonde decoder plugin for SDR++

- ▶ The STM32F100 chip is programable (like an Arduino) and there are websites that will show you how to reprogram for:
  - ▶ Creating a UHF Fox for Fox hunting (transmitting your call in CW)
  - ▶ Creating a weather station for your backyard (SDR++ has a RadioSonde Plugin, [https://github.com/dbdexter-dev/sdrpp\\_radiosonde](https://github.com/dbdexter-dev/sdrpp_radiosonde) ).



# Cool stuff, but what else can I use this for?

- ▶ The STM32F100 requires a STLINK V2 USB programmer to link computer with Sonde
- ▶ You can download the driver (STSW-LINK009) from the ST website:  
<https://www.st.com/en/development-tools/stsw-link009.html>



Any Questions?

# Trees 4, Don't Shoot Me Please Zones 2, Me 4



Thank you and Happy Hunting!!!