SUWS Microwave WebSDR

Martin G8JNJ / Noel G8GTZ / Phil M0DNY

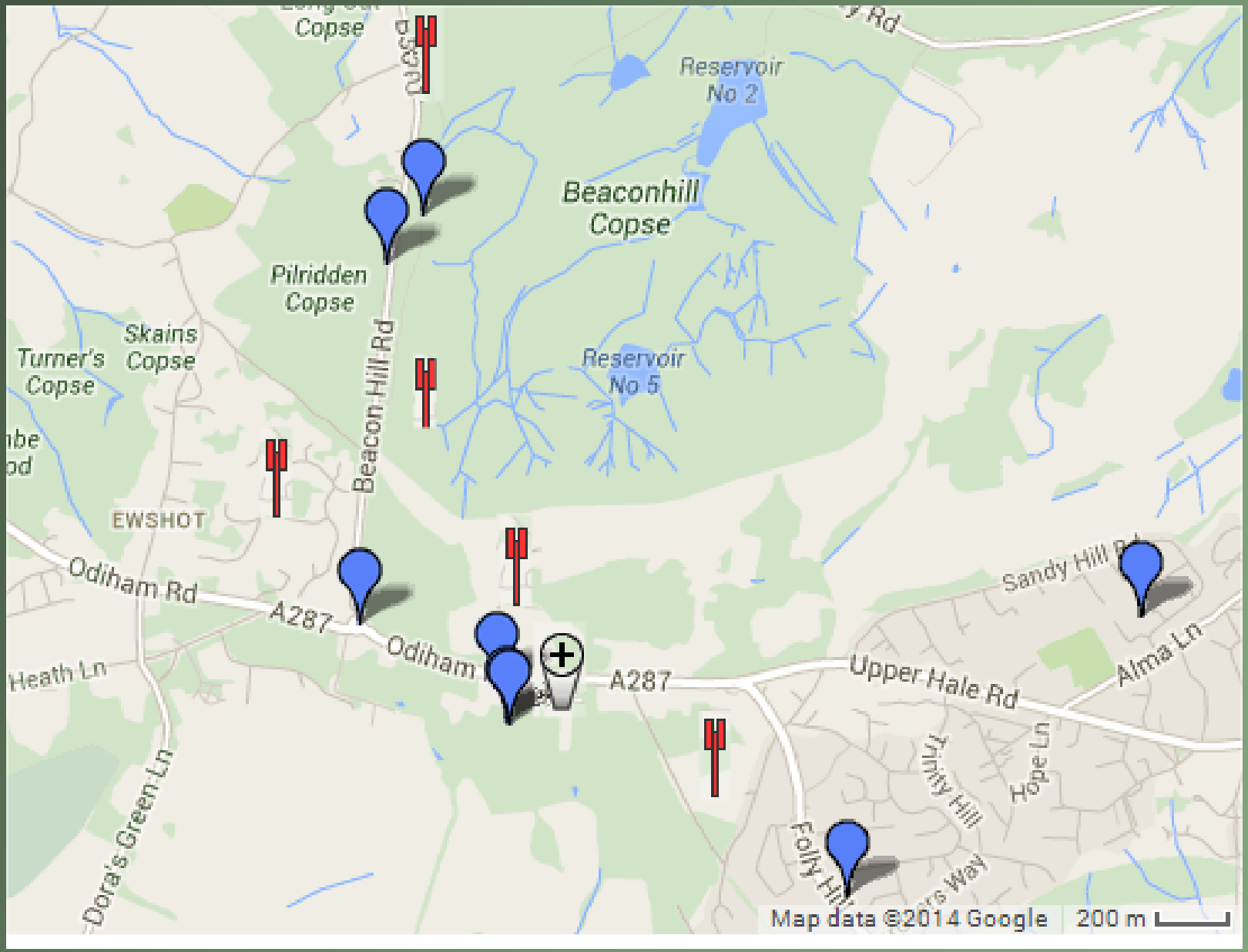
What is it?

- A system of remote SDR receivers which are on the web
- Useable by anyone with a standard web browser
- All modes and many users!
- The system at Farnham runs s/w developed by www.sdr.org
- More than 30 systems around the world
  - Most cover HF but Farnham covers VHF/UHF

Where is it?

IO91OF - Latitude: 51.23, Longitude: -0.82

The site


Reservoir No 2
Beaconhill Copse
Pilridden Copse
Skains Copse
Turner's Copse
Reservoir No 5
Beacon Hill Rd
EWSHOT
Odiham Rd
A287
Heath Ln
Dora's Green Ln
Upper Hale Rd
Alma Ln
Hope Ln
Trinity Hill
Map data ©2014 Google
200 m

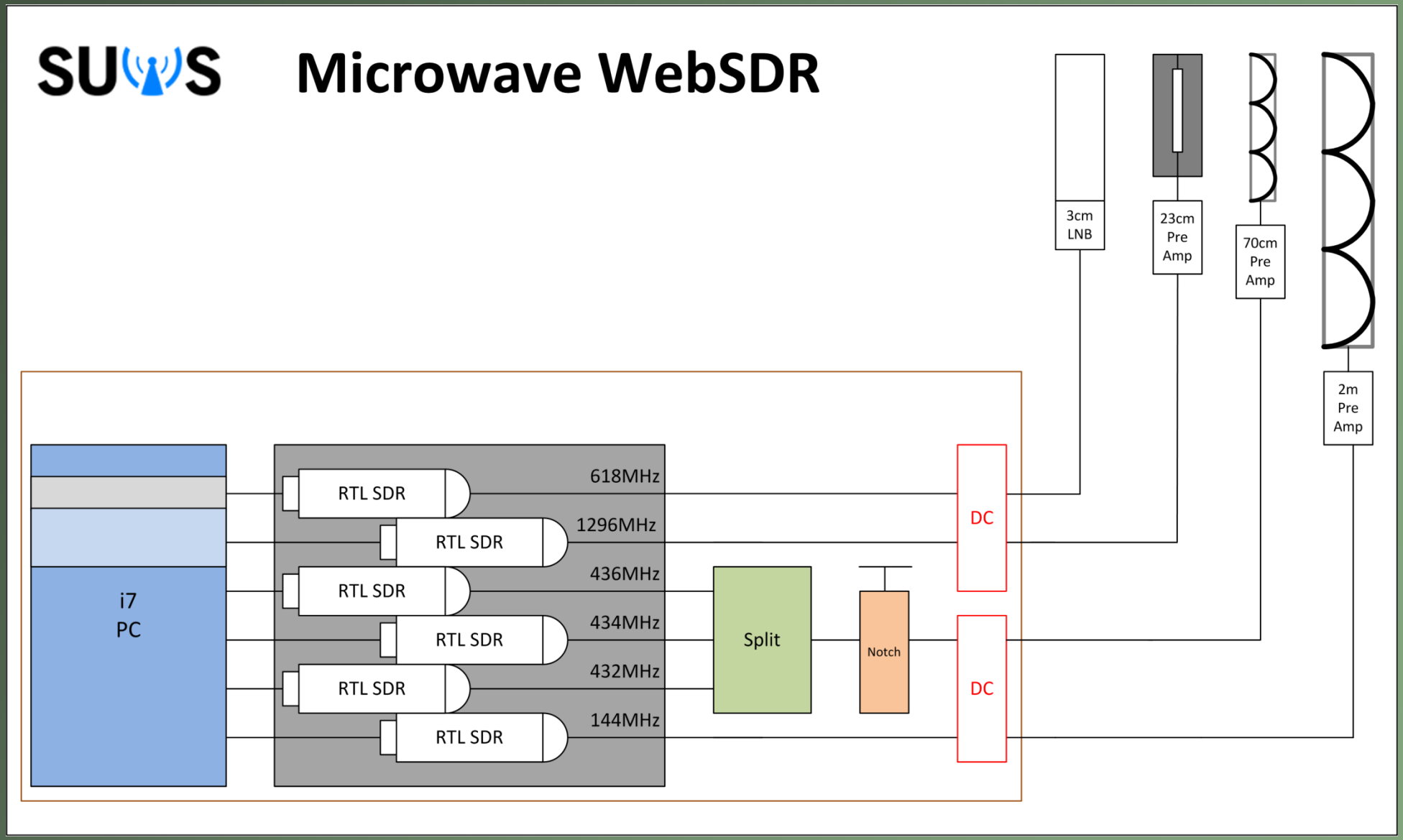
Farnham SDR is different!

- Most websdr cover HF and VHF using sound cards
  - Only 96 KHz band coverage
  - Just like Softrock
- OK for HF but no good for VHF / UHF
- Farnham uses the cheap £5 RTL dongles
  - Covers 2 MHz band!
  - 50 MHz up to 2 GHz!
  - And we run 6 of them!
  - But the rx performance could be better....

So why 6 receivers?

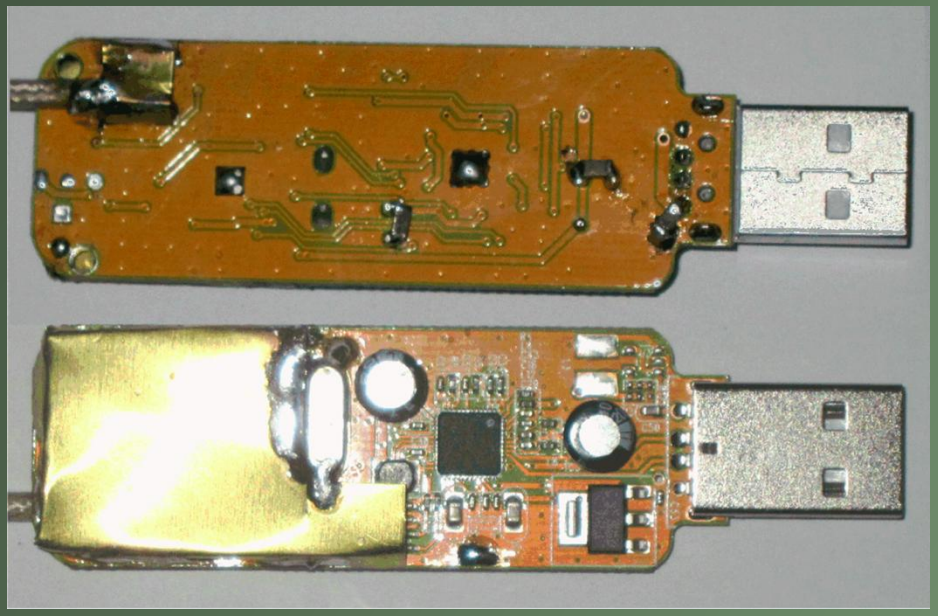
- So we can cover lots of bands!
  - 144 – 146 MHz = 2mts
  - 432 – 434 MHz = 70cms Narrowband and beacons
  - 434 – 436 MHz = 70cms FM & HAB & Satellites
  - 436 – 438 MHz = 70cms satellites
  - 1296 – 1298 MHz = 23cms NB and Beacons
  - 10368 – 10370 MHz = 10 GHz NB and beacons (via LNB)

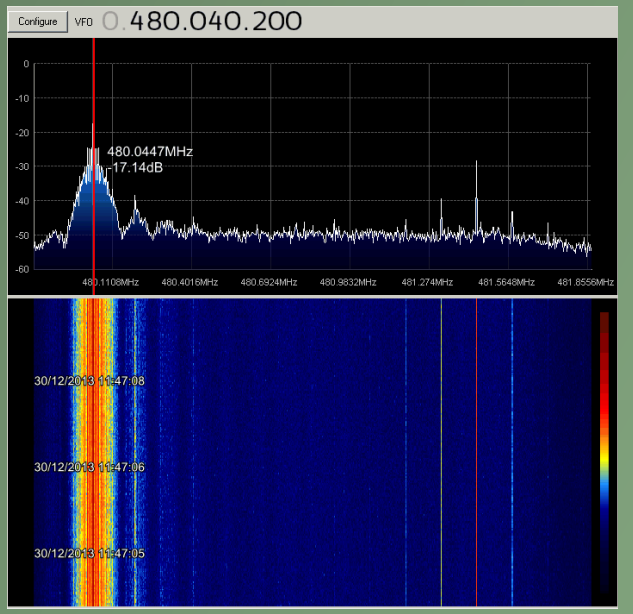
System Configuration

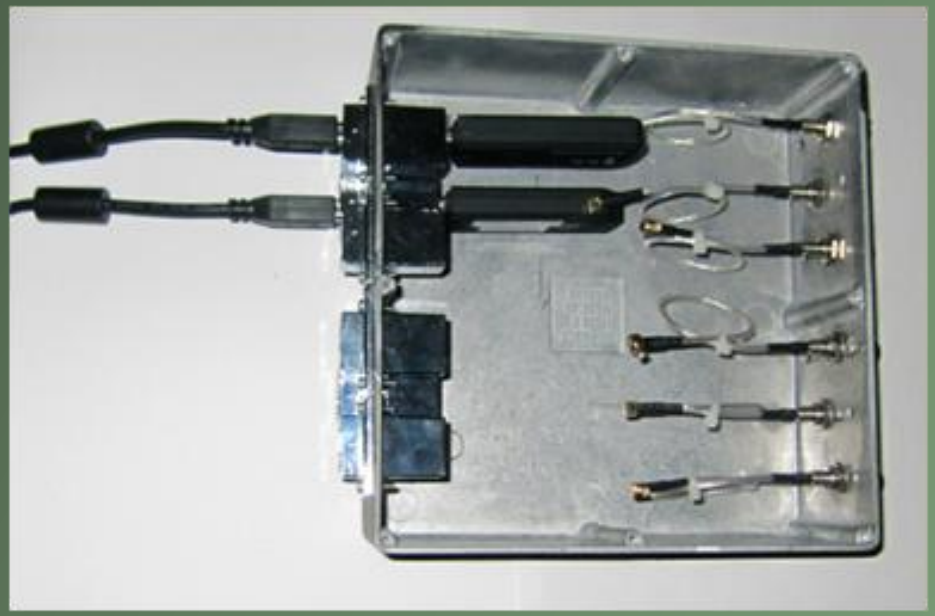


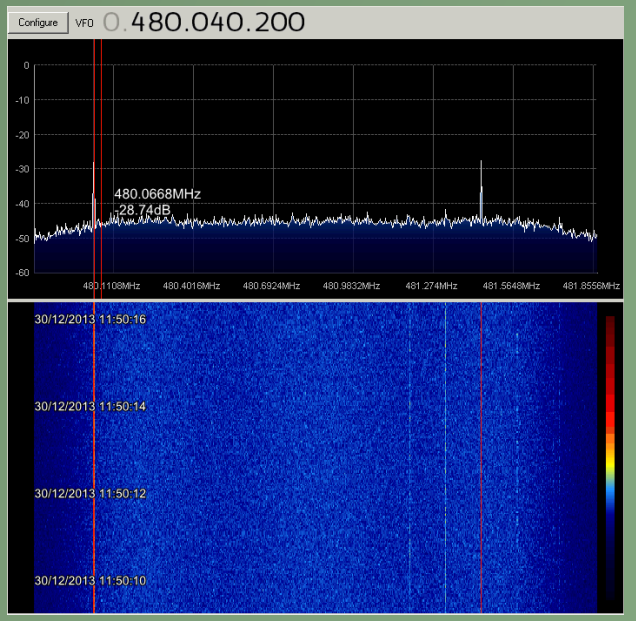
The RF in the shed

RTL-SDR Modifications







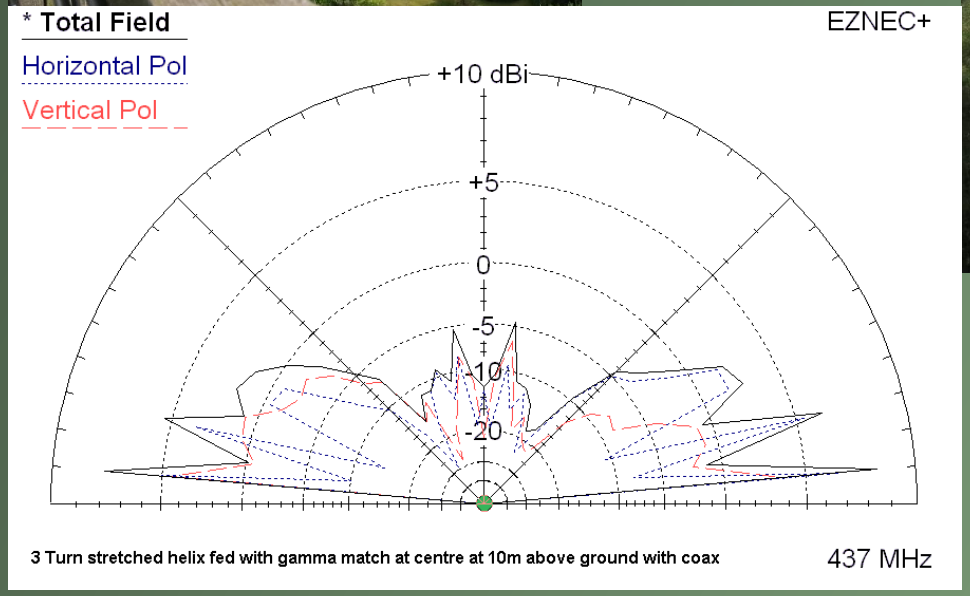


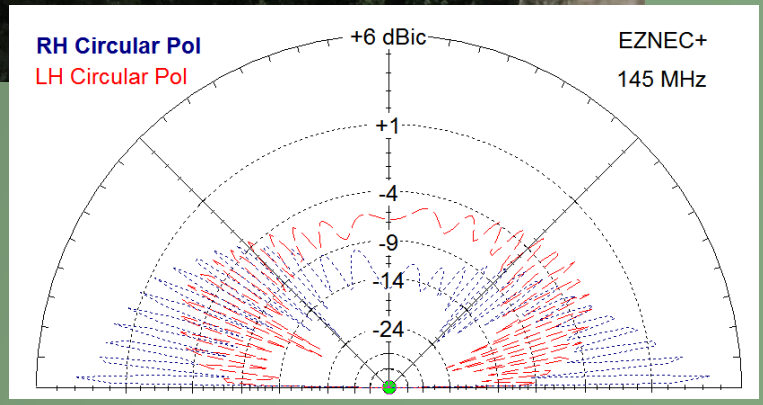
10 GHz rx for less than £25!

- 144, 432 and 1296 all just use the RTL dongle
- On 10 GHz the £5 RTL dongle is fed from a PLL satellite LNB
- Available from ebay for £15
- A stable sub 1dB NF rx on 10 Ghz for less than £25

uWave Antennas

VHF & UHF Antennas (Martin – G8JNJ)





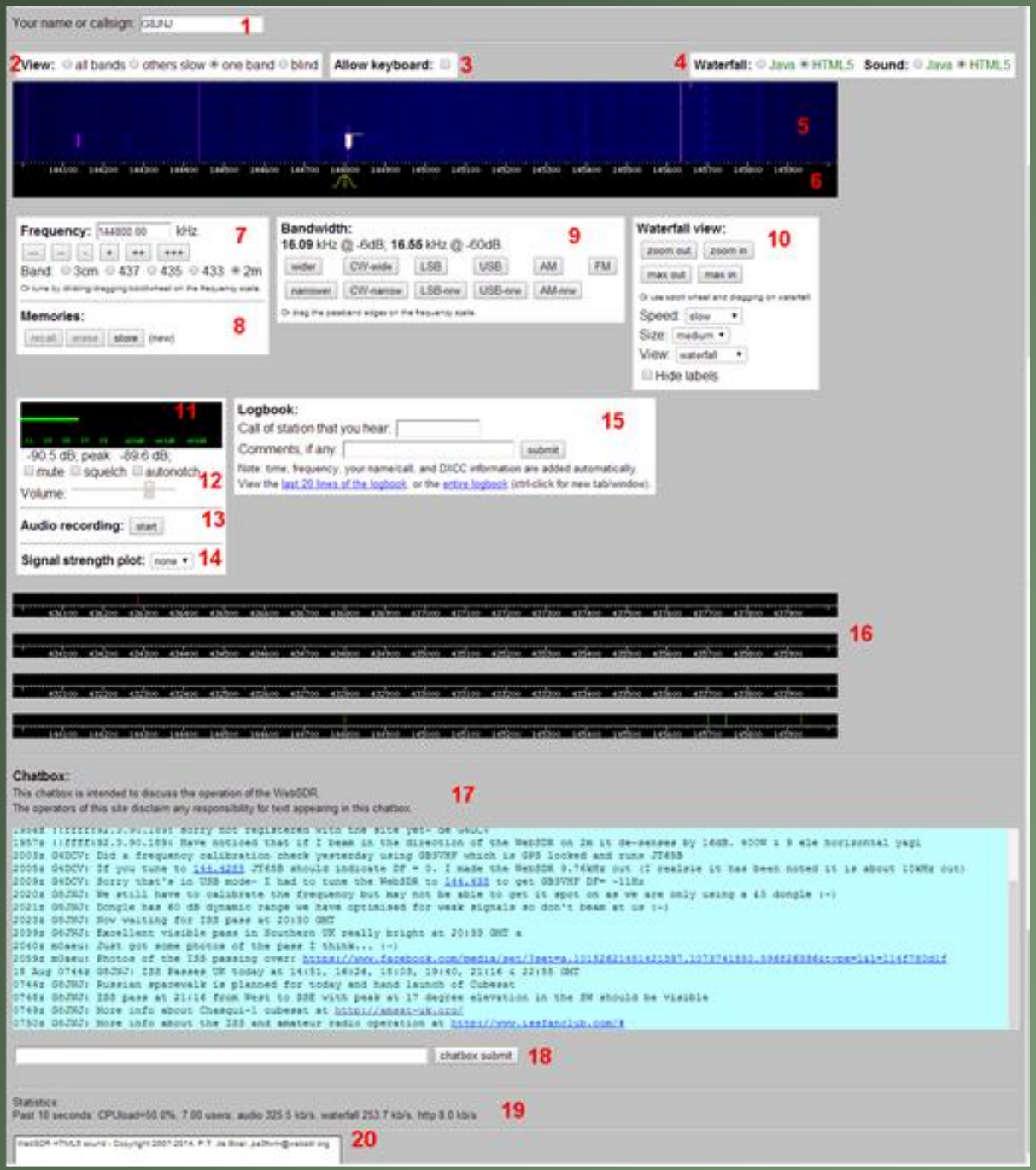
So can I use it?

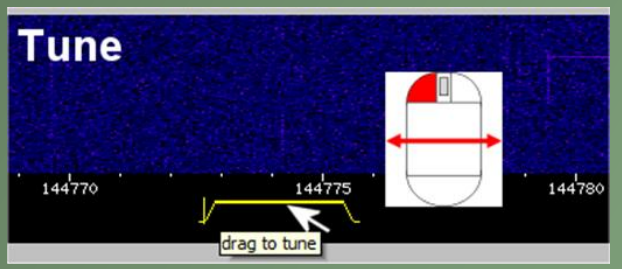
- YES!
- Go to **http://websdr.suws.org.uk**
- **You will instantly hear APRS on 144.800 MHz**
  - **The default start frequency**
- **But what if someone else is using it?**
  - **No problem – it can support 25+ simultaneous users all tuned to different (or the same) frequencies and modes!**

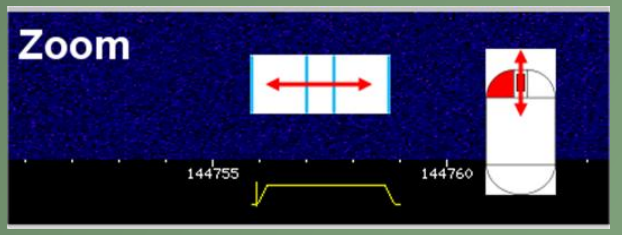
And then....

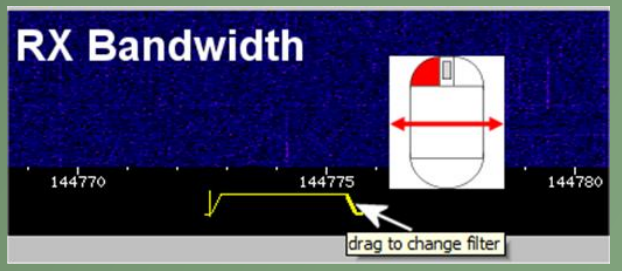
- Log in with your call sign or name
  - You do not need to be licensed to use it
  - You will then appear on the scale and others can see what frequency you are listening to
- What will I hear?
  - Anything on VHF / UHF that you would expect to hear on a 90ft mast on Farnham hill!
- Why can I hear GB3FN everywhere?
  - Because it is VERY strong and the rxs are cheap but...
  - We do have a big notch filter inline but...

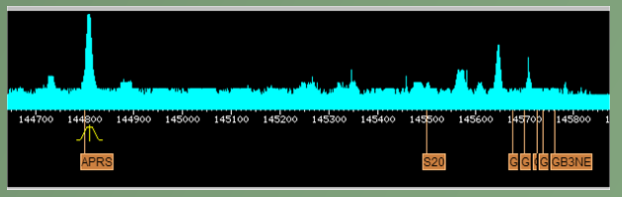
WEB GUI

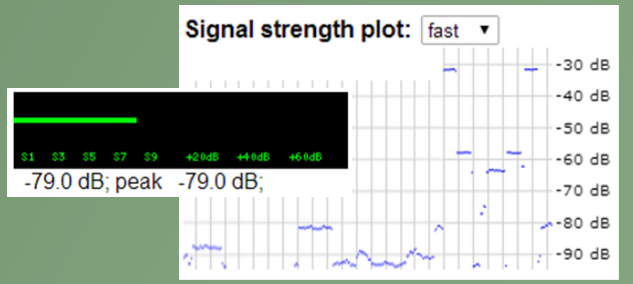

Your name or callsign:
1
2 View: all bands others slow one band blind
Allow keyboard:
3
4 Waterfall: Java HTML5 Sound: Java HTML5
5
6
Frequency:
7
Band 3cm 437 435 433 2m
Memories:
8
Bandwidth:
16.09 kHz @ -6dB, 16.55 kHz @ -60dB
9
Waterfall view:
10
Speed:
Size:
View:
Hide labels
11
-90.5 dB; peak -89.6 dB;
mute squelch autonotch
12
Volume:
Audio recording:
13
Signal strength plot:
14
Logbook:
Call of station that you hear:
15
Comments, if any:
submit
16
Chatbox:
This chatbox is intended to discuss the operation of the WebSDR
The operators of this site disclaim any responsibility for text appearing in this chatbox
17
chatbox submit
18
Statistics
19
20


Tune
144770
144775
144780
drag to tune

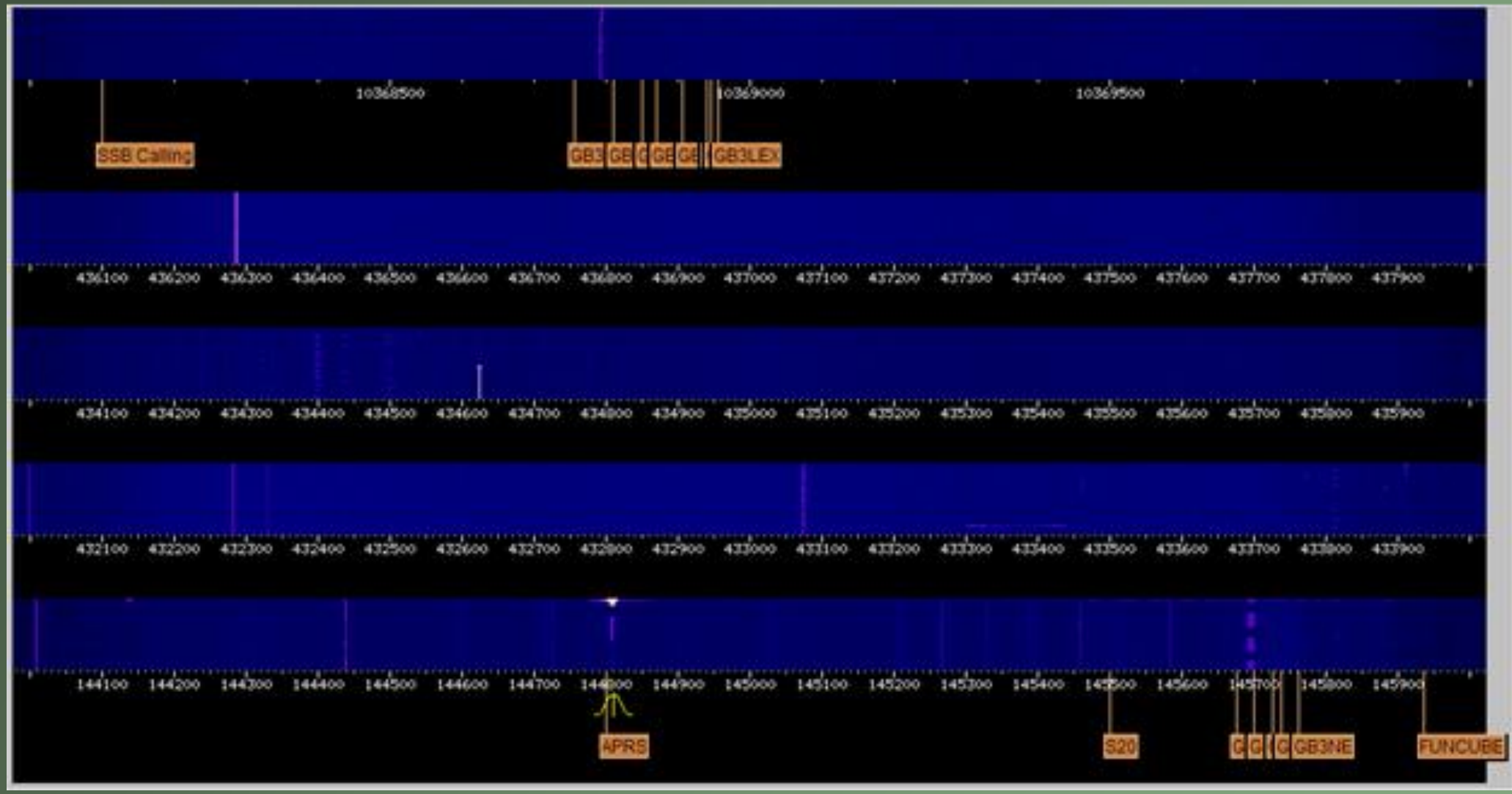

Zoom
144755
144760


RX Bandwidth
144770
144775
144780
drag to change filter

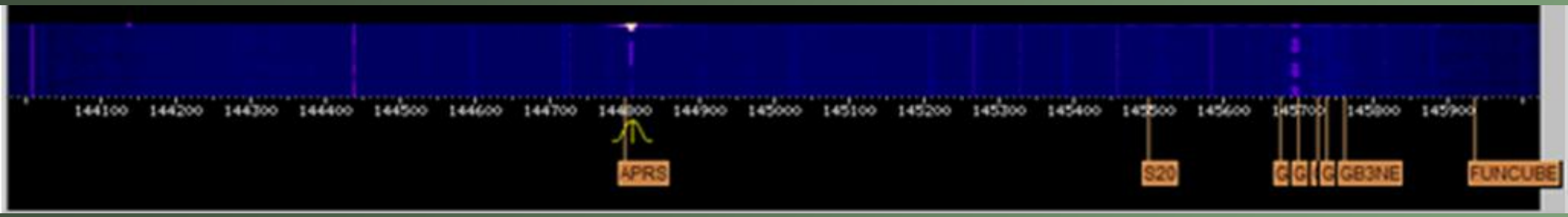

144700
144800
144900
145000
145100
145200
145300
145400
145500
145600
145700
145800
APRS
S20
GB3NE


Signal strength plot: fast
S1 S3 S5 S7 S9 +20dB +40dB +60dB
-79.0 dB; peak -79.0 dB;
-30 dB
-40 dB
-50 dB
-60 dB
-70 dB
-80 dB
-90 dB

Who is on the band ?

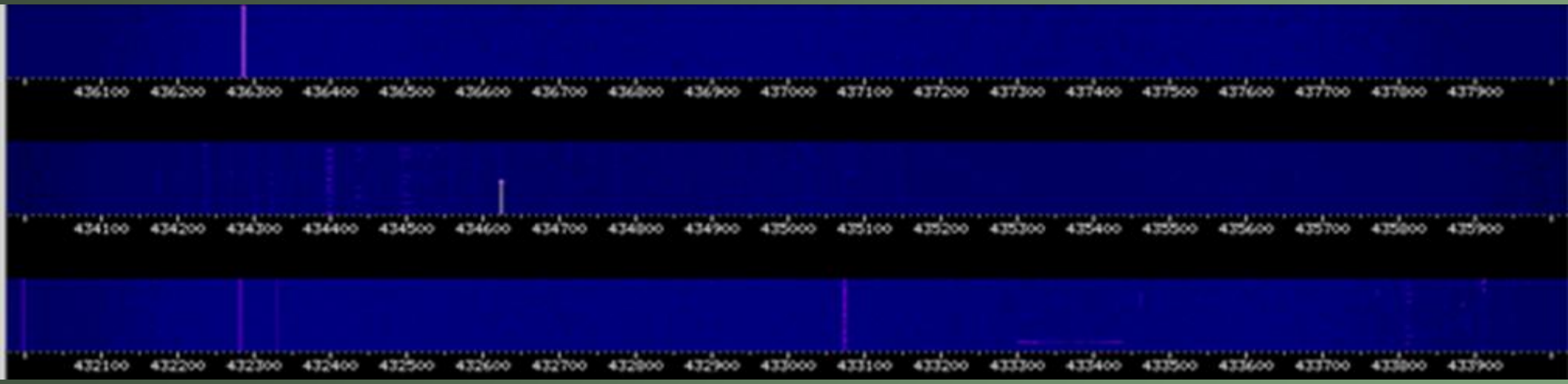


2 metres



- GB3VHF beacon = 144.430
- 2m FM simplex =145.500
- 2m repeater outputs = 145.600-145.7875
- International Space Station FM =145.800
- ISS Packet Digipeater = 145.825
- FunCube-2 = 145.930 – 145.950
- AO-73 (FUNCube-1) = 145.950 – 145.970
- AO-7 (Phase-2B) =145.975-145.925

70cms



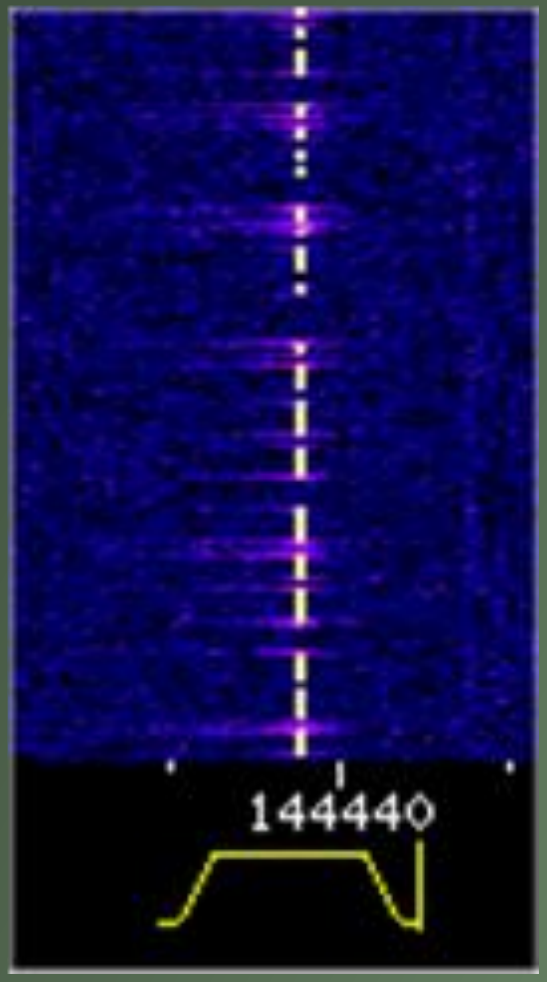
- 70cm SSB, CW & beacons = 432.000-433.000
- 70cm FM repeater = 433.000-433.400
- 70cm FM Simplex = 433.400-434.800
- Short range radio devices (Licence free) = 434.900
- High Altitude Balloon RTTY = 434.000-434.800
- FO-29 (JAS-2) =435.900-435.800
- Cubesat beacons (40+) 436.800 - 437.700

23cms and 10 GHz

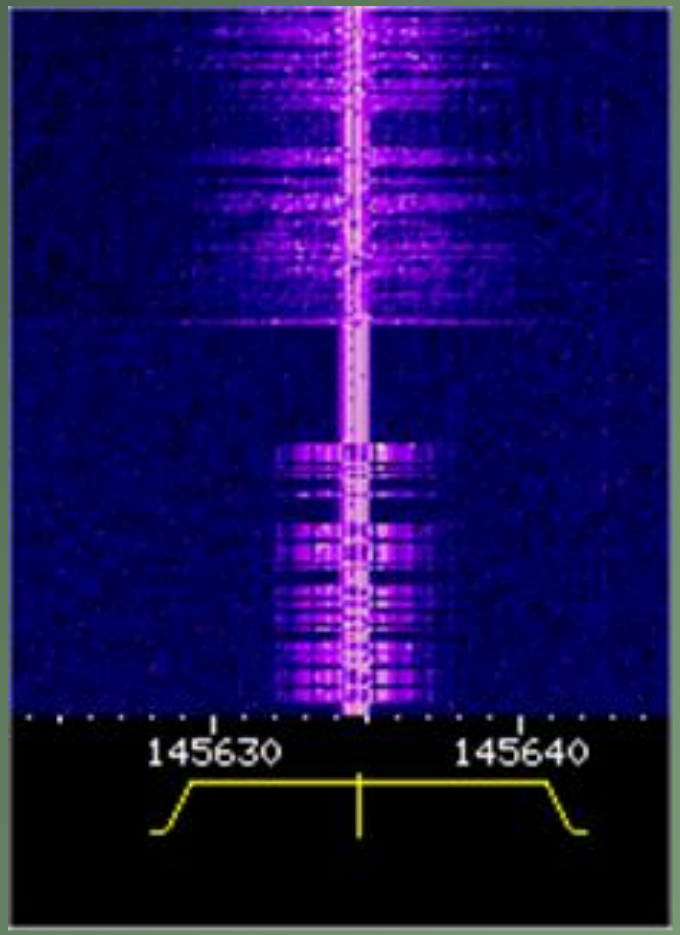
- 23cm NB & beacons = 1296.000-1297.000
- 23cm FM repeaters = 1297.000-1298.000

- 3cm NB modes = 10368.100-10368.250
- 3cm beacons = 10368.750-10369.000
- GB3SEE (visible at all times) = 10368.850
- Other beacons via Rain scatter!

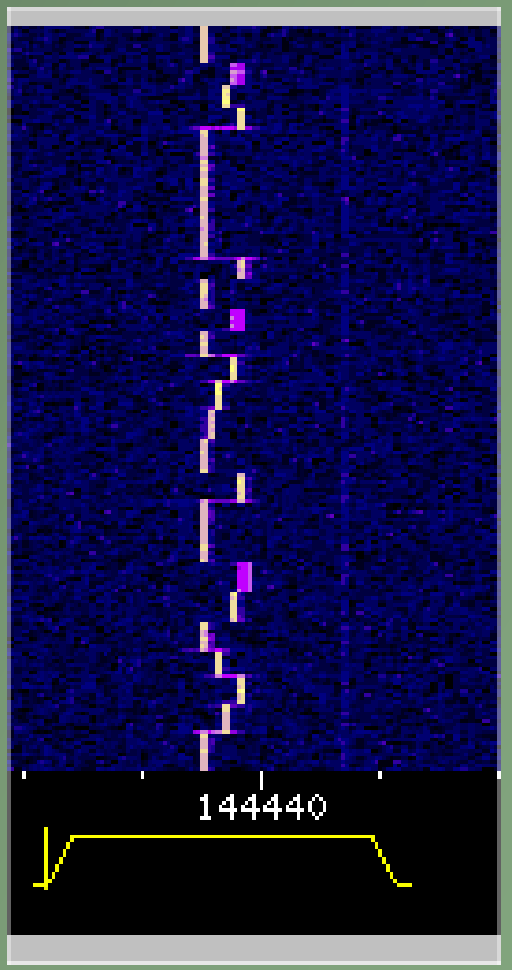
Different modes



CW

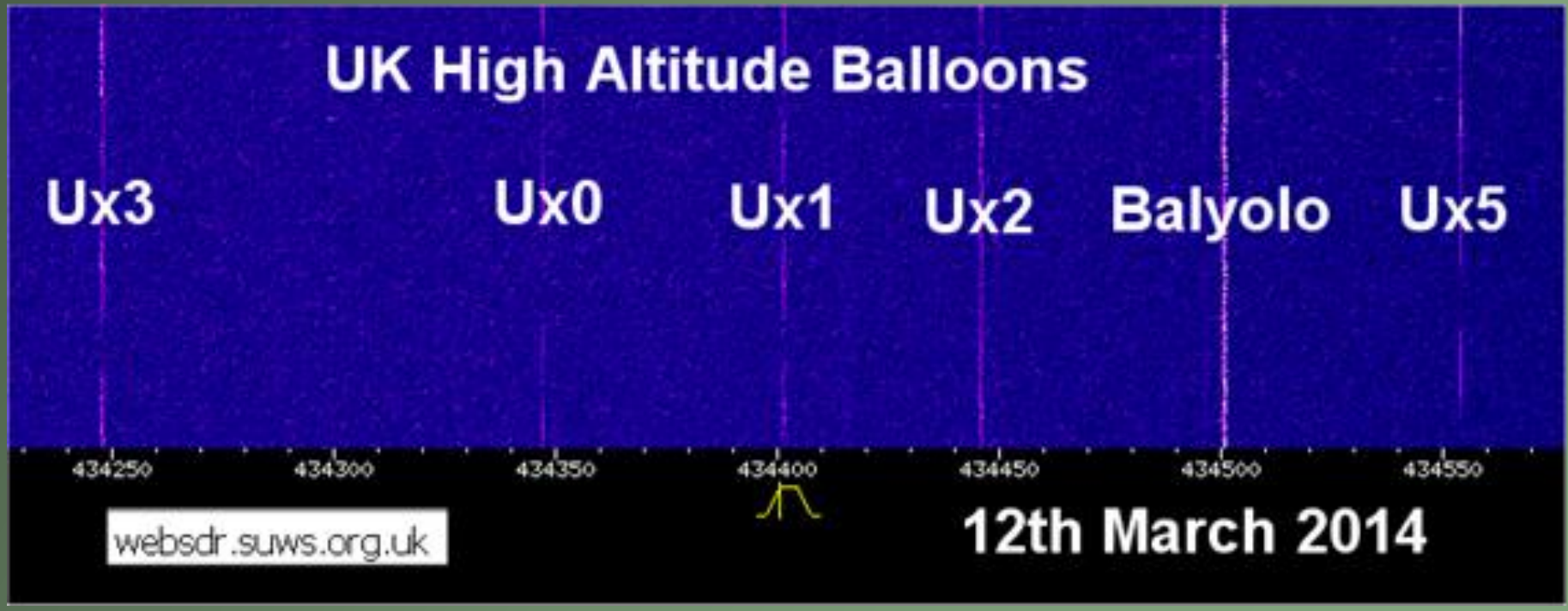


FM

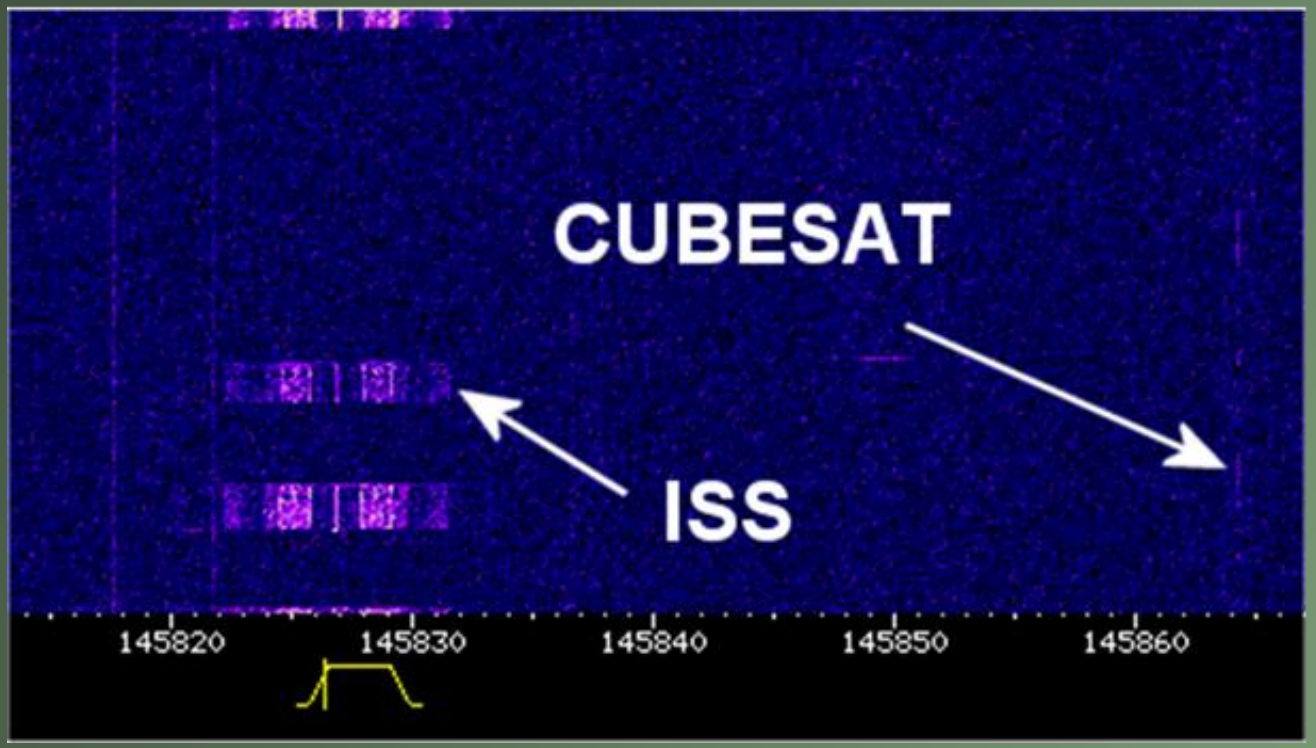


JT

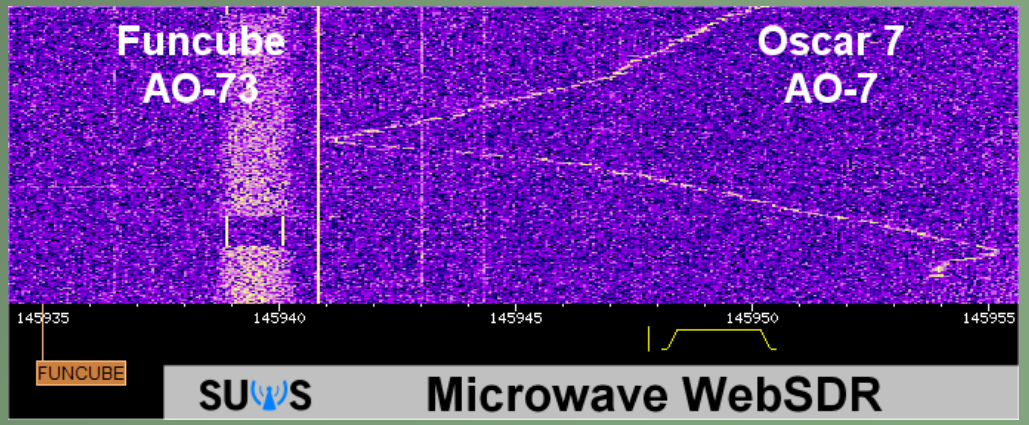
Receiving balloons - UKHAS



Satellite users




```
RS0ISS audio level = 41    [NONE]
[0] RS0ISS>CQ:>ARISS - International Space Station
Status Report, --no-symbol--
ARISS - International Space Station
```

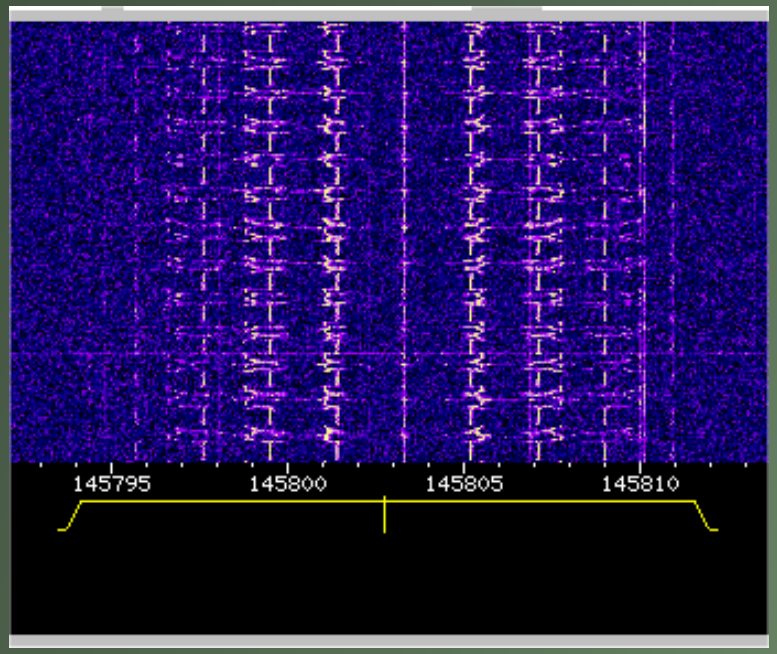


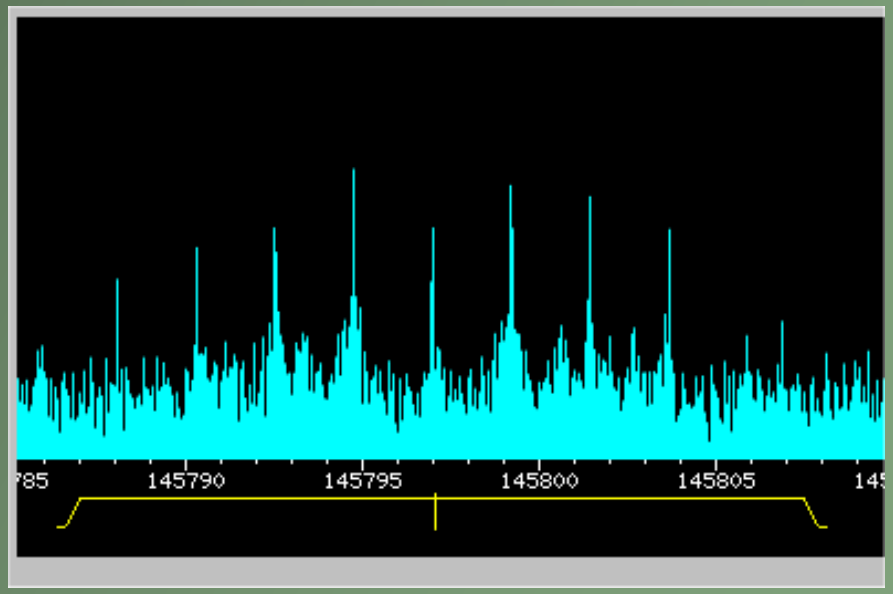
LitSat-1

"The Southampton University Wireless Society (SUWS) Web-based software defined radio (SDR) has been used to receive signals from the new amateur radio LitSat-1 satellite."

"The Lithuanian satellite LitSat-1 was deployed from the ISS on February 28 and the builders of the satellite have been able to use the SUWS WebSDR to receive the satellite when it is out of the range of Lithuania."

Different ways to see the signal





How do I decode signals?

- The SDR does not decode SSTV, RTTY etc signals
- You need to run the decode software on your PC
- Feed the audio out from your soundcard in to the input
  - Cable, VAC, Fbaudio
- Then you can decode what you hear
- You record and download the audio as a file!
- But remember the rx location is IO91OF!!!

ISS SSTV received at Farnham and decoded in Southampton!

Any Questions?