The Northern Utah WebSDR and the WebSDR Project

A free-to-use, web-accessible shared receiver resource

Northern Utah WebSDR: **sdrutah.org**

WebSDR Project: **websdr.org**

The Northern Utah WebSDR

Located west of Corrine, Utah, at what had been an abandoned HF research site.

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The Northern Utah WebSDR

About the site:

Two 80 foot towers with log-periodic beams installed in 1973, apparently for research in data transmission via HF.

- Site was abandoned in the 1980s.

The Northern Utah WebSDR
About the site:

- In 1993, the site was reactivated.
- A third antenna was installed – an omnidirectional log-periodic antenna.
- Used for ionospheric research – (*"Iononsonde" or "Chirsounder"*).

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The Northern Utah WebSDR
About the site:

- In about 2006, the west-most tower/beam fell in a wind storm after a guy wire deadman failure leaving only an east-pointing beam.

- Sometime around 2008 the funding for the chirpsounding research stopped and the site and its equipment was abandoned.

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The Northern Utah WebSDR
About the site:

- In 2017, Michael, KC0JRE, became aware of the site. Subsequent negotiations allowed its continued use as a shared resource.

- It was eventually decided that a receive-only configuration would offer the most benefit for the greatest number of people in the form of a WebSDR system.

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The Northern Utah WebSDR
About the site:

- In late February, 2018 – after negotiation with the utility and rework of the power system, commercial power was restored to the site.
- On February 28, 2018, a wireless Internet connection was established and the first phase of WebSDR equipment installation was completed.

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The Northern Utah WebSDR
Main Antenna

- At present, only one antenna is being used for HF reception:

The TCI 530 "omnidirectional" log-periodic antenna.

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The Northern Utah WebSDR
Main Antenna
TCI-530 Quick specs:

- 92' High with a 250' radius footprint

- Transmit coverage from 3.0 through 30 MHz (VSWR <=2.0:1)

- Usable on receive down to about 400 kHz

- Polarization: Mostly horizontal at higher angles, mostly circular at lower angles in its design range

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The Northern Utah WebSDR
Main Antenna
TCI-530 Quick specs:

- A complicated maze of wires.

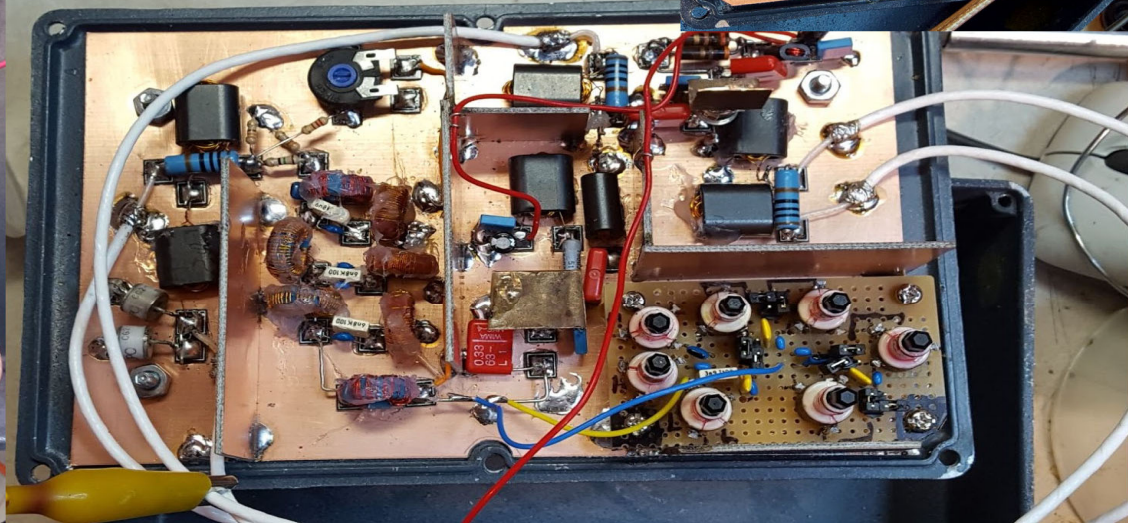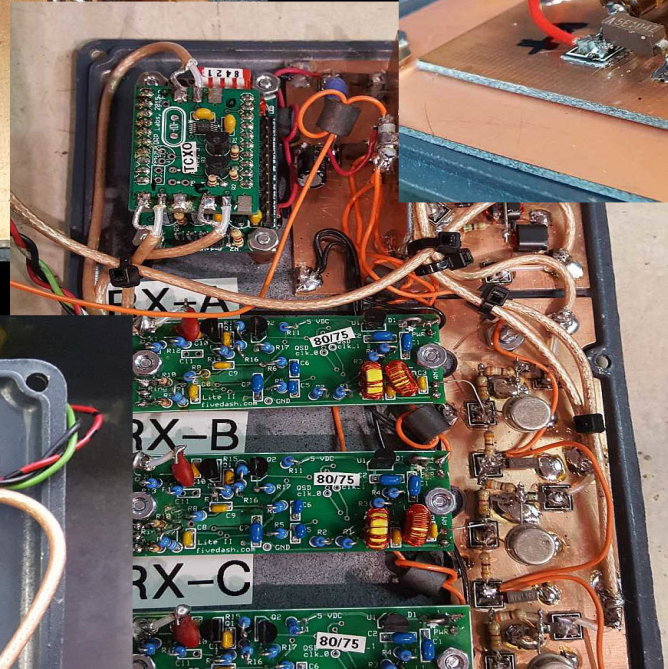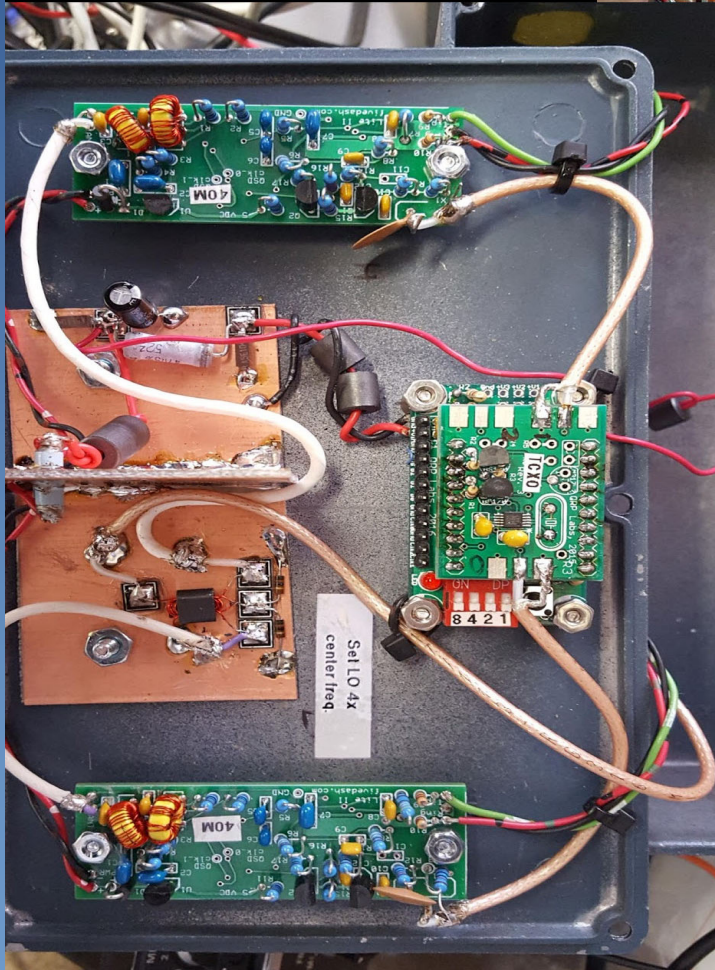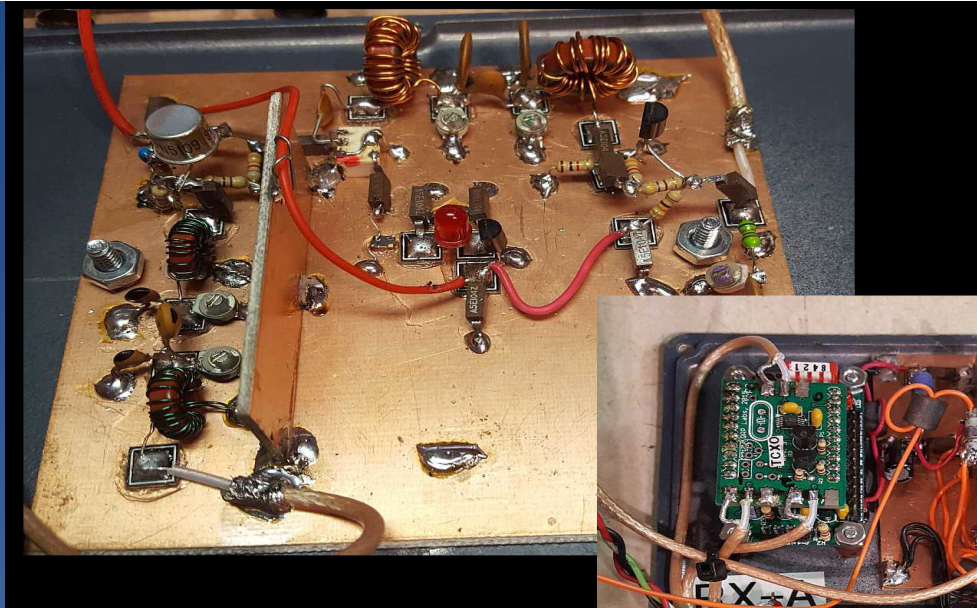 *Lots and lots of wires!*

The Northern Utah WebSDR

The Northern Utah WebSDR
How it all goes together: RF Distribution

One antenna, many receivers!

- At least 18 receiver modules for all covered LF/MF/HF "bands" *(plus some "wideband" receivers)*

15dB Amp
2018
KA70

RX-A

RX-B
80/75

RX-C
80/75

80/75

40M

Set LO 4x
center freq.

8 4 2 1

40M

2.5 MHz HPF Bus

7 MHz HPF Port

30M Notch

The Northern Utah WebSDR
How it all goes together: RF Distribution

- Complex array of RF modules required to accommodate both wideband and narrowband receivers

- Good filtering is required to attenuate the *(very strong!)* signals from some local AM broadcast stations.

The Northern Utah WebSDR

Northern Utah WebSDR
VLF/LF/MF/HF Signal Proc.

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The Northern Utah WebSDR
Evolving over time

Originally *(2/28/18)*:

- 1 Server

- 160, 75*, 60 and 40 meter amateur plus the AM broadcast, 120 and 60 meter Shortwave Broadcast bands

* Partial coverage

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The Northern Utah WebSDR
Evolving over time

Now :

- 3 Servers

- Coverage on 2200, 630, 160, 80/75, 60, 40, 30, 20, 17, 15, 12, 10, 6 and 2 meter amateur bands plus the AM broadcast and the 120, 90, 60, 49, 41, 31, 25, 19 and 13 meter SW bands
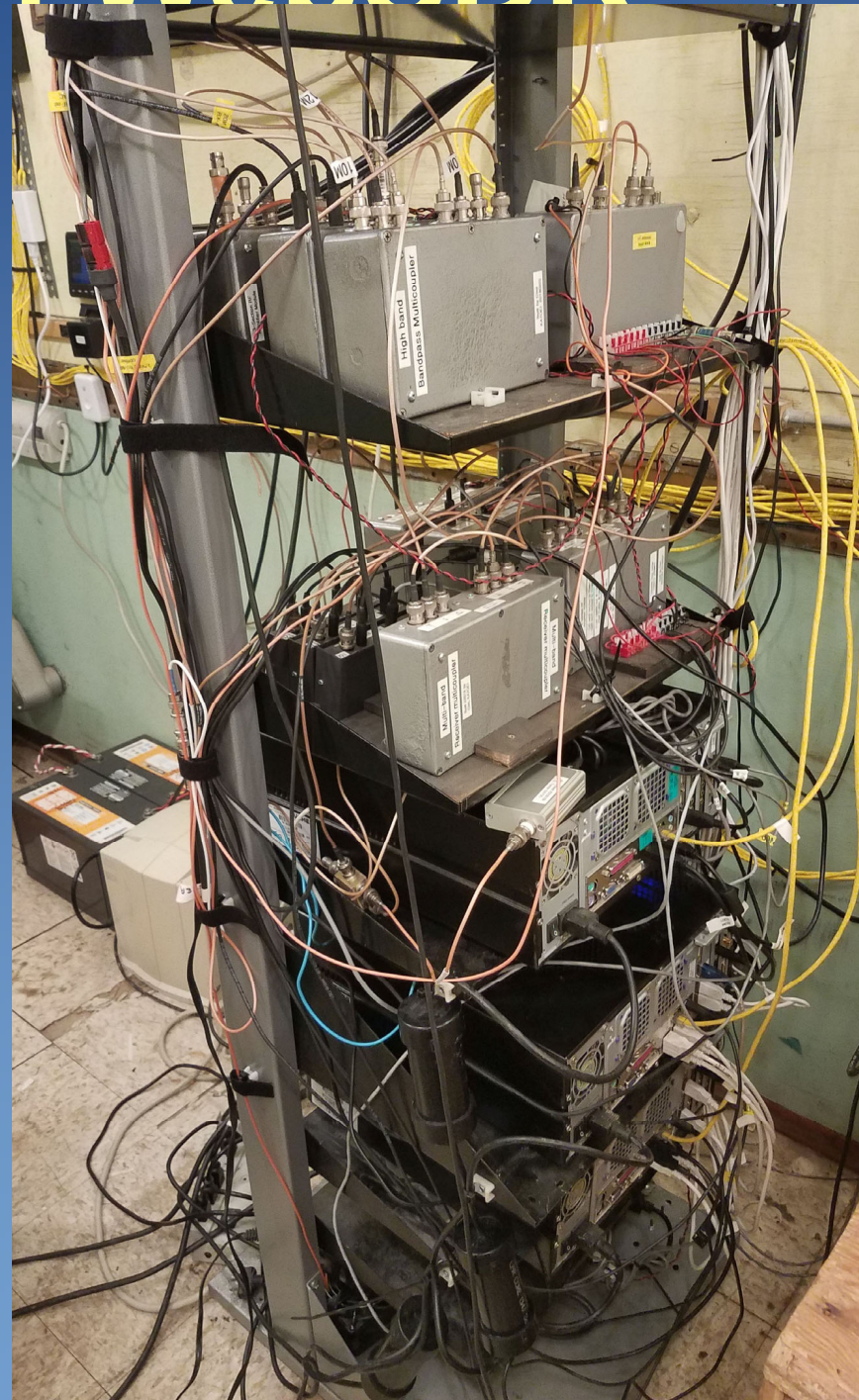
The Northern Utah WebSDR
Evolving over time

Now :

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- WSPRnet coverage on all LF, MF and HF bands

The WebSDR Project
Brief system overview:

- Linux-based: Typically Debian or Ubuntu

- Software is not open-source, but is free for anyone "serious" about putting together a decent system

- Hardware: Binaries for PC *(32 and 64 bit)* and Rasperry Pi

- **You need *only* a device with a modern web browser to listen** *(computer, phone, tablet)*

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The WebSDR Project
Brief system overview:

Acquisition hardware *(receivers)*:

- **High Performance:** Sound card + "SoftRock" type receiver
  - *16 Bits A/D, up to 192kHz of spectrum per device*

- **Low Performance:** RTL-SDR USB "dongle"
  - *8 bits AD, up to 2 MHz of spectrum per device*

The WebSDR Project
Origins

- Main web site: **websdr.org**

- List of active WebSDR servers around the world listed in approximate order of "busy-ness".

- There are WebSDRs that cover from *(practically)* DC to the 10 GHz band.

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The WebSDR Project

websdr.org

- Software written by Dr. P.T. de Boer of the University of Twente in the Netherlands.

- An outgrowth of a 2007 project to make the Dwingeloo 25 Meter radio telescope in the Netherlands available to other radio amateurs via the web.

- Announced in April 2008 with beta testing beginning in November 2008.
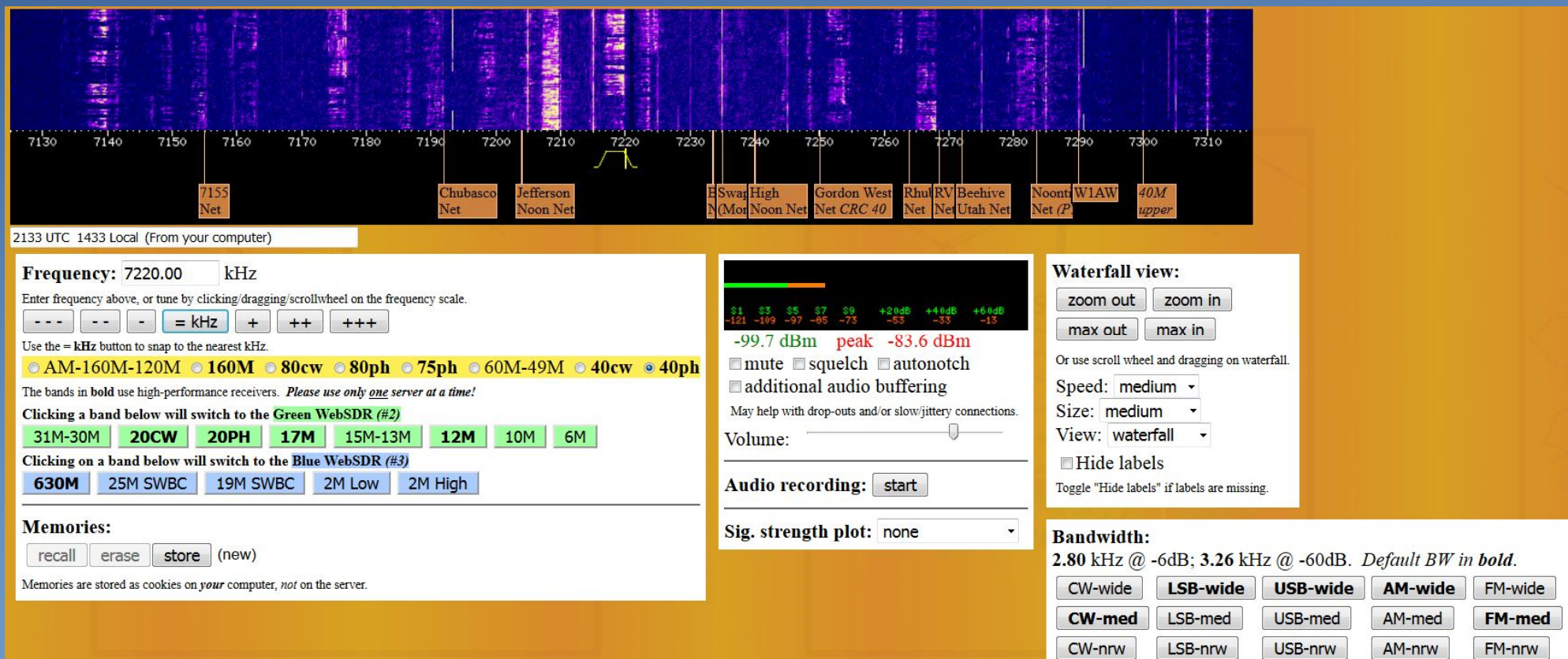
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The WebSDR Project

As of now, there are about 170 servers active worldwide.
Map: **websdr.org**

The Northern Utah WebSDR and the WebSDR Project

*Each user has their own **virtual** receiver, able to tune independently - frequency and mode.*

The Northern Utah WebSDR and the WebSDR Project

- A web-accessible remote receiver usable by many people at once.

- The number of users at the Northern Utah WebSDR occasionally exceeds 130 across the three servers!

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Most common reasons our users say that they use a WebSDR

1- As a general-purpose remote receiver

Easy to use – just a browser.

2- My QTH is too %#^* noisy!

Power line noise, noise from own/neigbors photovoltaic system, switcing supply noise.

3- I don't have my own HF receiver set up.

4- Spotting DX

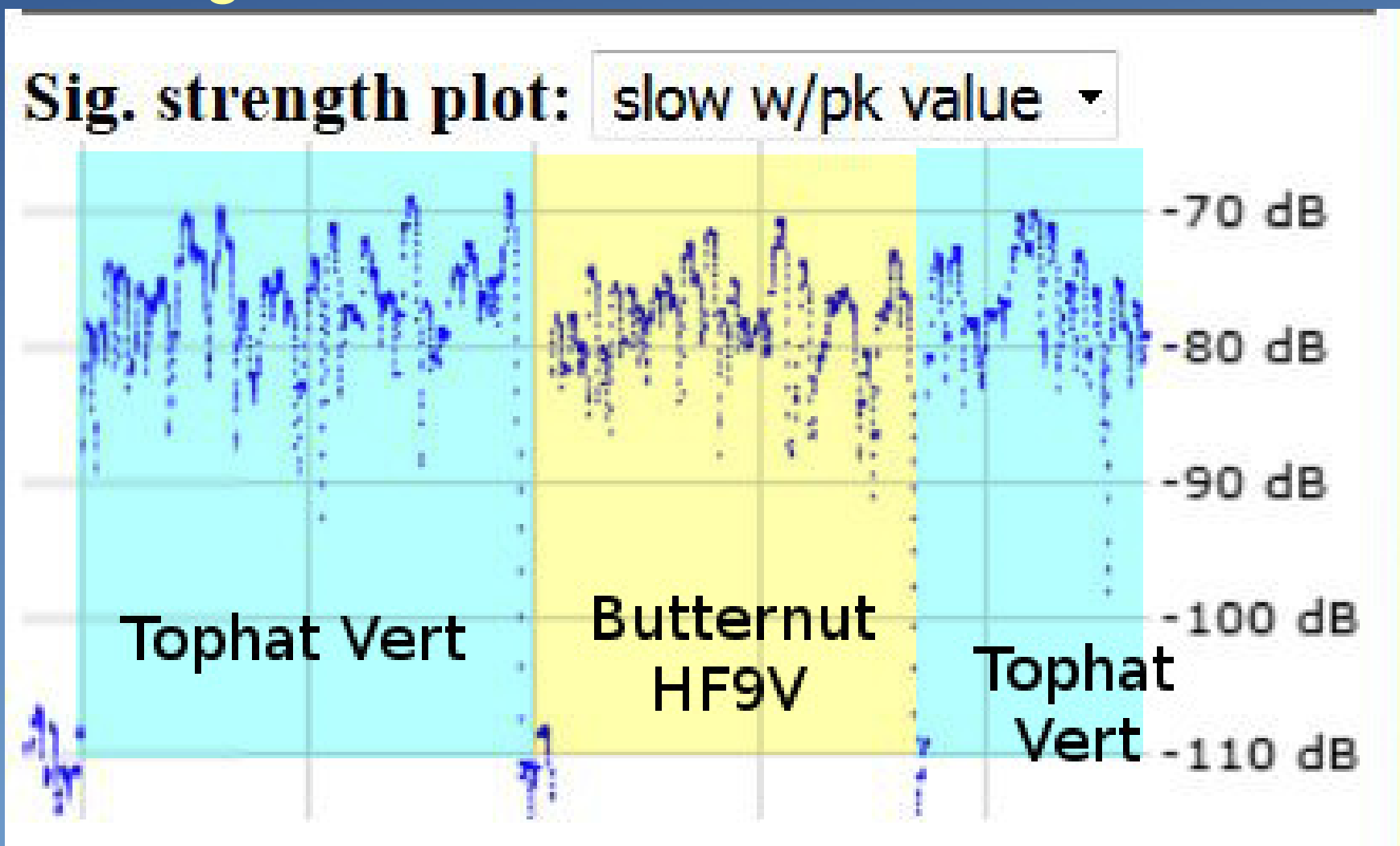# Other reasons one might use a WebSDR

- It can often hear stations that you can't.

  (Because of propagation, location, local noise, etc.)

- Learn about how the HF bands propagate

- Compare/test antennas

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Reasons that one might use a WebSDR

- Testing antennas!

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Other features of the WebSDR
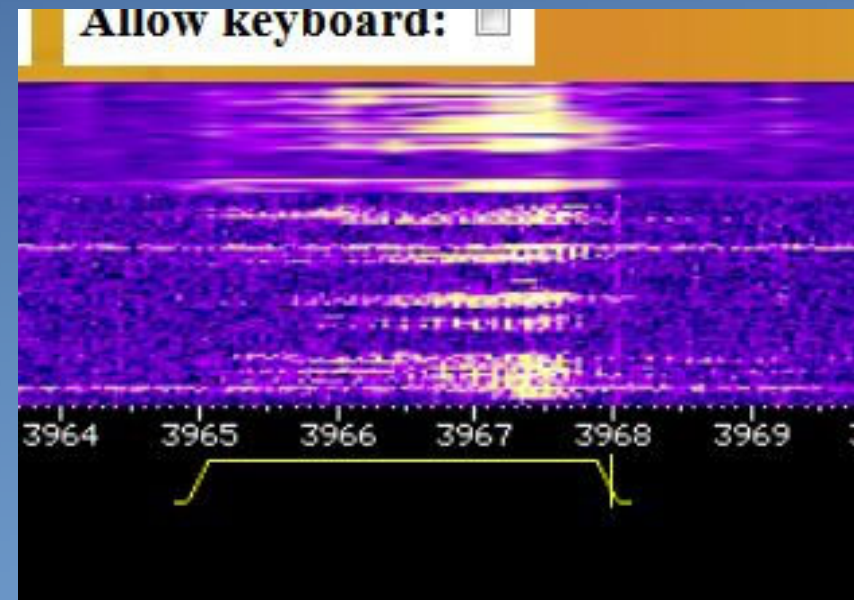
Adjustable-bandwidth receive filters

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Other features of the WebSDR

Record off the air signals

- Check your *own* transmit audio – see if it sounds right.

- Help diagnose others' signals.

- For "posterity"?

Volume:

Audio recording: start

Sig. strength plot: none

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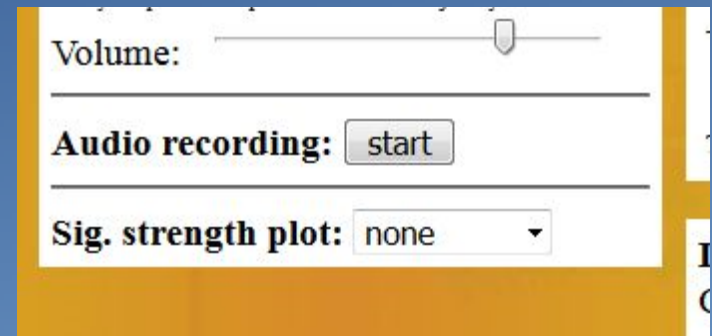
Other features of the WebSDR

On-screen tags – including custom

- Click on it to jump to that frequency and mode.

0257 UTC 1957 Local (From your computer)

- Many popular nets

- Radio stations, "interesting" frequencies

- Just 'cuz...

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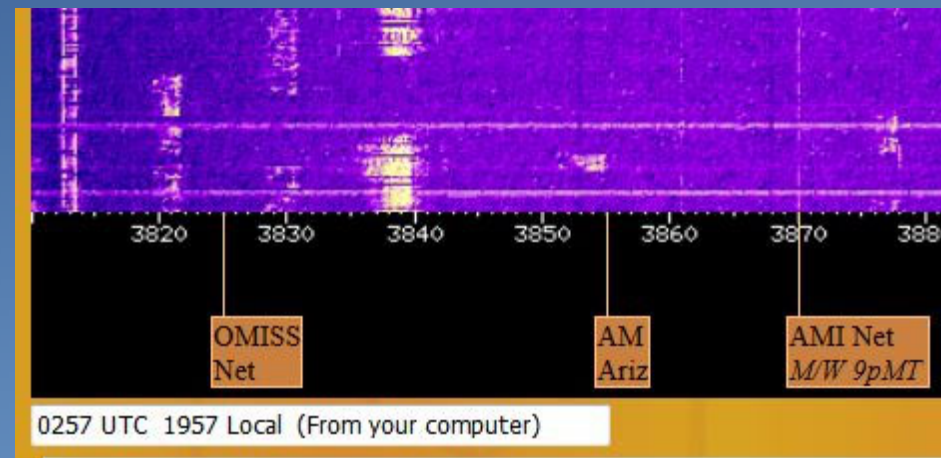
Other features of the WebSDR

Spectrum display

- Size and speed of the "waterfall" can be adjusted

  - Can be made more/less sensitive

- Can also select a flat "spectrum" display

Waterfall view:
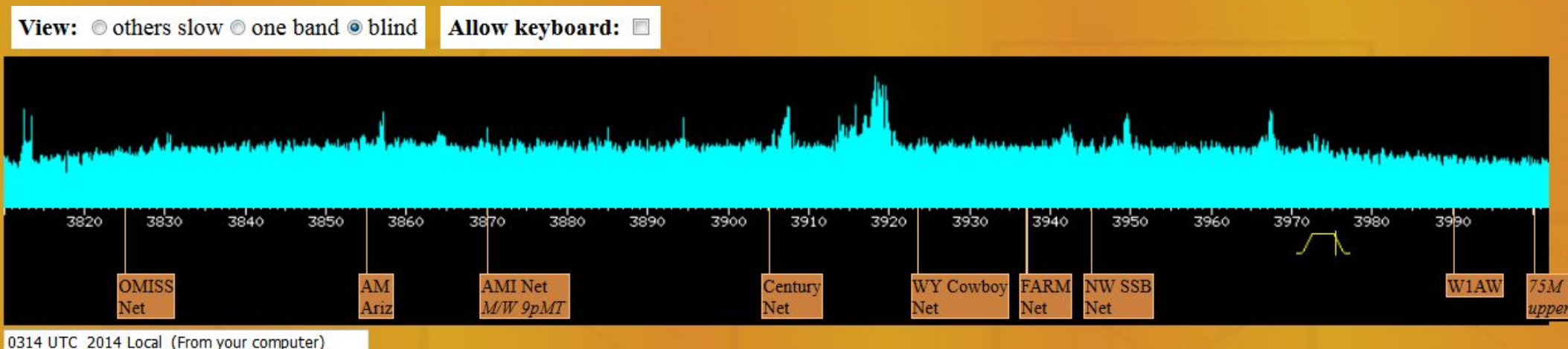
| zoom out | zoom in |
| max out | max in |

Or use scroll wheel and dragging on waterfall.

Speed: medium ▾
Size: medium ▾
View: waterfall ▾
☐ Hide labels

View: ○ others slow ○ one band ● blind   Allow keyboard: ☐

3820　3830　3840　3850　3860　3870　3880　3890　3900　3910　3920　3930　3940　3950　3960　3970　3980　3990

OMISS Net   AM Ariz   AMI Net M/W 9pMT   Century Net   WY Cowboy Net   FARM Net   NW SSB Net   W1AW   75M upper

0314 UTC 2014 Local (From your computer)
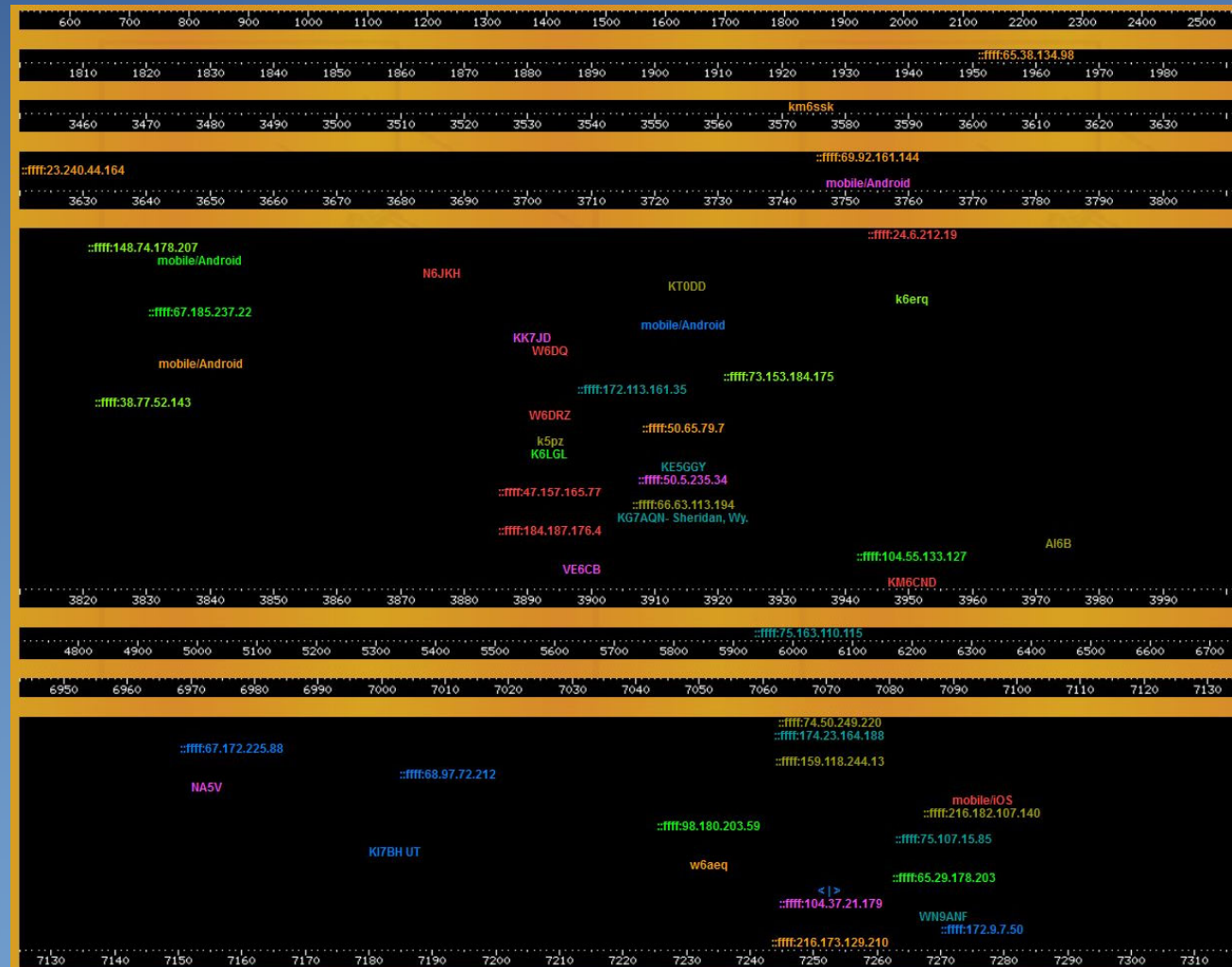
Other features of the WebSDR
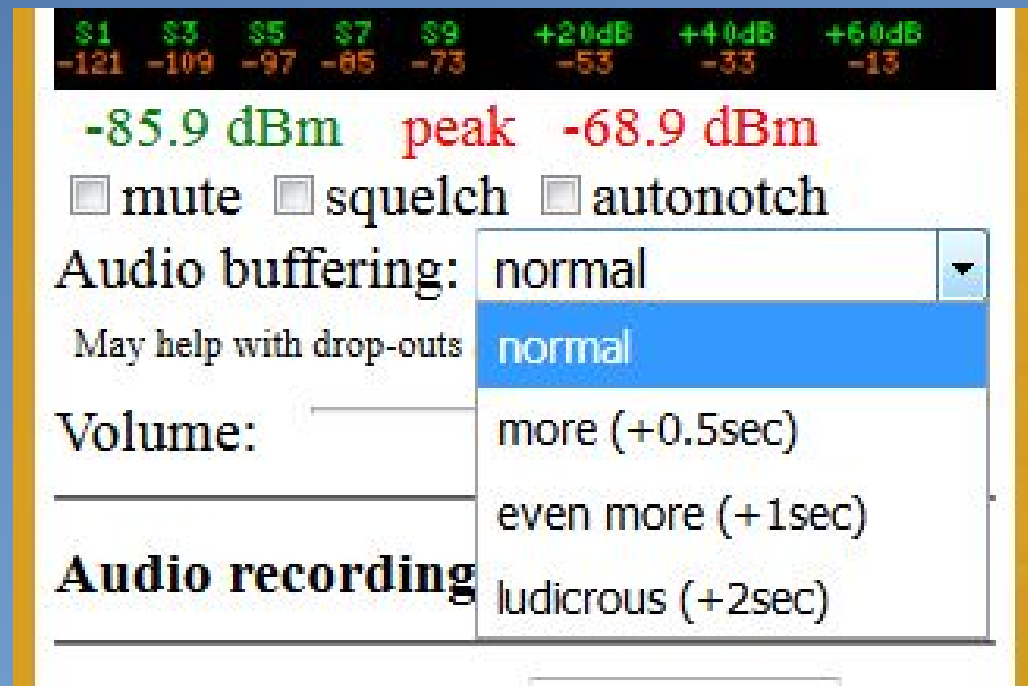
See other users:

- Name or call is *(optionally)* entered above waterfall – saved in a cookie for next time

Other features of the WebSDR

Dealing with slower network connections:

- Amount of audio buffering can be adjusted:

The WebSDR Project and The Northern Utah WebSDR

What else is up there?

- **KiwiSDR receivers**
  - Cover "0-30" MHz
  - Limited number of users
  - One of the more prolific WSPRNet spot reporters in the world – typically in the top 5 in the U.S., 15 in the world
  - Making HF noise measurements that contribute to
  - ionospheric research

The WebSDR Project and The Northern Utah WebSDR

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The WebSDR Project and The Northern Utah WebSDR

What else is up there?

- **That "other" antenna**

- **Weather Station**
  - *You, too, can see how nice it is to __not__ be there!*

The WebSDR Project and The Northern Utah WebSDR

A few commonly-asked questions:

- What browsers work?

- Will you make it so we can transmit?

- How about a rotatable antenna?

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The WebSDR Project and The Northern Utah WebSDR

A few commonly-asked questions:

- **How can you help support this system?**

  - PayPal, Check, Cash, Money order, gold bullion

  - The Northern Utah WebSDR is an IRS 501c(3) non-profit organization *(The Utah SDR Group)*

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The WebSDR Project

Other Questions?

sdrutah.org

Or search for

"Utah WebSDR"

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The WebSDR Project

Thank you!

sdrutah.org

Or search for

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