



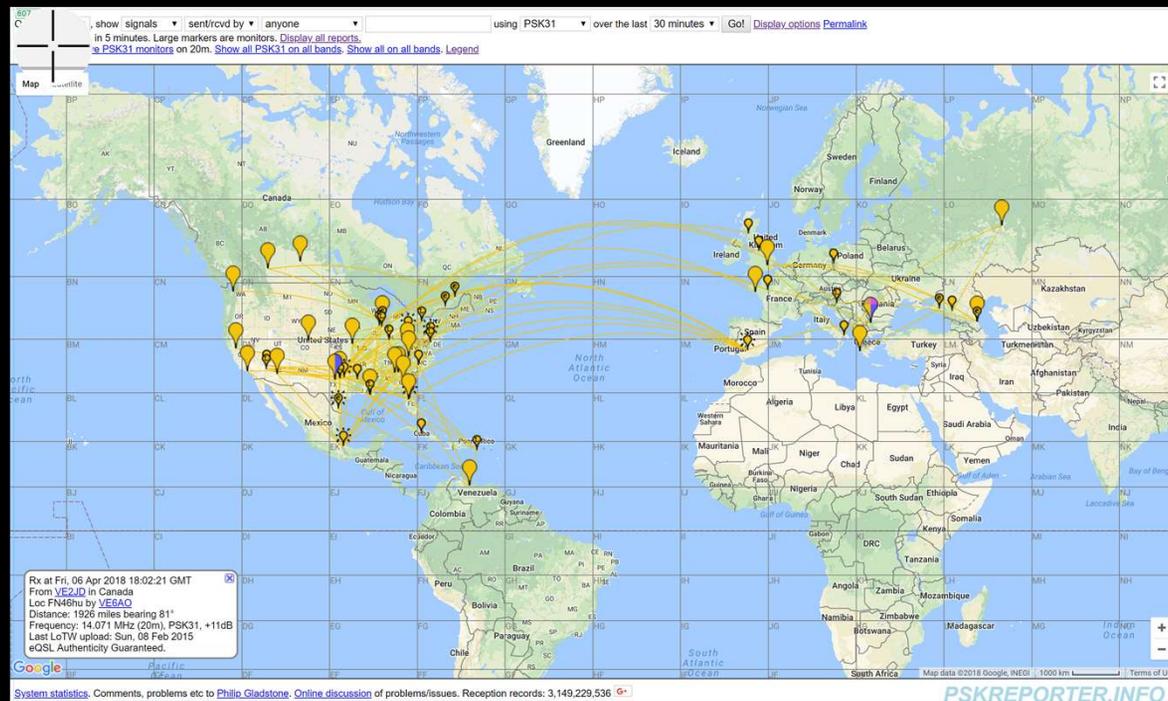
PSKREPORTER.INFO

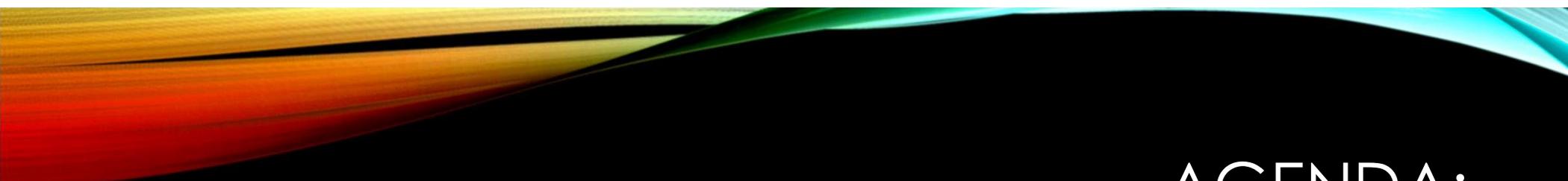
A walk-thru

CLALLAM COUNTY AMATEUR RADIO CLUB

BILL PETERSON – K7WWP APRIL 11, 2018

PSK REPORTER IS A MAP VIEW OF PROPAGATION USING DIGITAL RADIO MODES





AGENDA:

- An overview of Digital Modes
- A Slide Presentation walk-through of PSK-Reporter
- A Live Demo



AN OVERVIEW OF DIGITAL MODES

- Conversational Modes
- Packet Modes
 - Information Exchange
 - Contacts
 - Fast Modes
 - Slow Modes

DIGITAL MODES

- Conversational Mode:
 - Messages are not structured
 - Conversational content
 - Receiver sees the message decode while it is being transmitted

- CW
- RTTY
- PSK31
- MFSK16
- Olivia

DIGITAL MODES (CONTINUED)

- Packet Radio
 - Data transmission in blocks of data
 - Error correction, often thru detection of errors and retransmission
 - Common Protocols
 - PACTOR
 - WINMOR
 - WINLINK
 - Navigation Data
 - Slow Scan TV

DIGITAL MODES (CONTINUED)

- Packet Radio for establishing Contacts (QSO's)
 - Minimal information is exchanged
 - Call typically consist of:
 - CQ
 - Call-Sign
 - Location
 - Response to call typically consist of:
 - Signal Report
 - Response to Response
 - Signal Report
 - End
 - 73

DIGITAL MODES (CONTINUED)

- Contacts:
 - Fast Modes
 - Slow Modes
- Fast Modes
 - Message and modulation is optimized to be quick. (+/- 1 second)
 - Message repeated many times over transmission window
 - Hopefully one of the many transmissions will be received
 - Optimized for short term propagation phenomena such as meteor scatter
- MSK114
- JT9 E-H
- ISCAT

DIGITAL MODES (CONTINUED)

- Contacts
- Slow Modes
 - Message transmitted once over transmission window
 - Message contains a great deal of redundancy to facilitate FEC
- FT8
- JT4
- JT9
- JT65
- ARA64



DIGITAL MODES (CONTINUED)

- Other
 - EME – Moon Bounce
 - WSPR
 - Echo



WALK-THRU PREPARATION

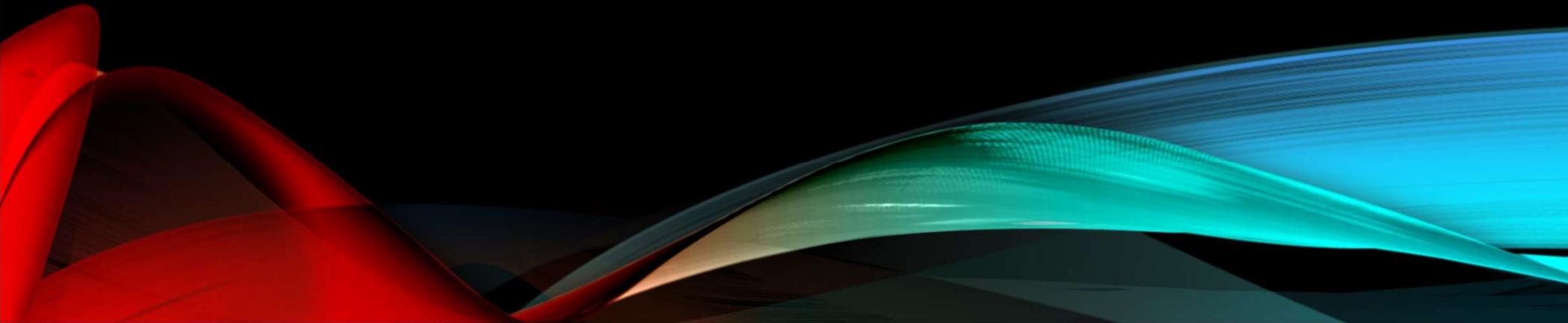
- Installed WSJT-X on computer.
- Configured WSJT-X to interface to radio
- Set radio output to 5 watts
- Walked through about 4 transmission cycles on each band.

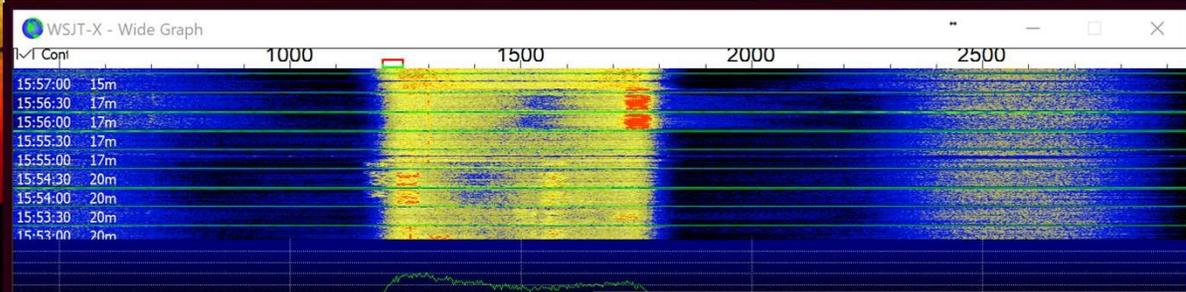
REPORTING TO PSK REPORTER

- Programs monitor of data transmission and PSK-Reporter displays the information on a map
- Software used:
 - WSJT-X
 - Digital Master 780
 - Fldigi 3.1
 - Airlink Express
 - JT65-HF
 - ROS
 - UR5EQF Logger

START RADIO HERE

This will start accumulation of data to look at during live demo.





WSJT-X v1.8.0 by K1JT

File Configurations View Mode Decode Save Tools Help

Bins/Pixel 2 Start 400 Hz Palette Adjust...
 JT65 2500 JT9 N Avg 2 Default

Band Activity					Rx Frequency				
UTC	dB	DT	Freq	Message	UTC	dB	DT	Freq	Message
155100	9	0.1	1573	YO4BVZ K9IZT EN53	154845	Tx	1200	~	CQ K7WWP CN88
155130	6	0.1	1573	YO4BVZ K9IZT EN53	154915	Tx	1200	~	CQ K7WWP CN88
155200	8	0.7	1268	HK2PMU K5WBT 73	154955	Tx	1200	~	CQ K7WWP CN88
155200	3	0.4	1234	GM0VGI NG4C -24	155015	Tx	1200	~	CQ K7WWP CN88
155200	7	0.2	1305	YO9DY NA6AF DM42	155045	Tx	1200	~	CQ K7WWP CN88
155230	-1	0.4	1234	GM0VGI NG4C RRR	155115	Tx	1200	~	CQ K7WWP CN88
155230	8	0.2	1305	YO9DY NA6AF DM42	155145	Tx	1200	~	CQ K7WWP CN88
155230	-8	0.1	1487	VA7ALZ WF2F DM83	155215	Tx	1200	~	CQ K7WWP CN88
155230	2	-0.8	1551	PA7TT G8APB -24	155245	Tx	1200	~	CQ K7WWP CN88
155300	-7	0.1	1487	VA7ALZ WF2F R-16	155315	Tx	1200	~	CQ K7WWP CN88
155300	1	-0.8	1549	PA7TT G8APB -24	155345	Tx	1200	~	CQ K7WWP CN88
155330	0	0.1	1487	VA7ALZ WF2F 73	155415	Tx	1200	~	CQ K7WWP CN88
155330	-1	-0.8	1549	PA7TT G8APB -24	155445	Tx	1200	~	CQ K7WWP CN88
155330	3	0.1	1705	PD7RF K7JLF DM43	155515	Tx	1200	~	CQ K7WWP CN88
155400	6	0.4	1233	UA3QJJ NG4C -11	155545	Tx	1200	~	CQ K7WWP CN88
155400	3	-0.8	1549	PA7TT G8APB RRR	155615	Tx	1200	~	CQ K7WWP CN88
155430	6	0.4	1233	UA3QJJ NG4C RRR	155645	Tx	1200	~	CQ K7WWP CN88
155430	3	-0.8	1550	PA7TT G8APB 73	155715	Tx	1200	~	CQ K7WWP CN88
155600	13	0.1	1733	CQ WI8L EN74					
155630	13	0.2	1732	CQ WI8L EN74					

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune Menus

15m **21.074 000** Tx even/1st

DX Call: N7IFG DX Grid: DN24 Tx 1200 Hz Tx ← Rx

Az: 119 752 km Rx 1200 Hz Rx ← Tx

Lookup Add Hold Tx Freq

2018 Mar 14 15:57:34 Report -15 Auto Seq Call 1st NA VHF Contest

Generate Std Msgs

Next	Now
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input checked="" type="radio"/>

Receiving FT8 Last Tx: CQ K7WWP CN88 4/15 WD:6m

PSK REPORTER ON WEB

- <https://pskreporter.info>
- Selected “map display”

Callsign: Find

PSK Automatic Propagation Reporter

This started out as a project to automatically gather reception records of PSK activity and then make those records available in near realtime to interested parties — typically the amateur who initiated the communication. The way that it works is that many amateurs will run a client that will monitor received traffic for callsigns (the pattern 'de callsign callsign') and, when seen, will report this fact. This is of interest to the amateur who transmitted and they will be able to see where their signal was received. The pattern chosen is typically part of a standard CQ call. The duplicate check is to make sure that the callsign is not corrupted. The rules for protocols like FT8 are different as the callsigns are protected by error correction. You do still need to call CQ in order for your signal to be reported.

The way that this would be used is that an amateur would call CQ and could then (within a few minutes) see where his signal was received. This can be useful in determining propagation conditions or in adjusting antenna and/or radio parameters. It will also provide an archive of reception records that can be used for research purposes.

There is a [map display](#) of this information.

There also a page of [statistics](#) about the project.

If this is interesting to you, then please contact me at the email address below to see if there is a client for your digital mode decoding application, or you can contact the author of your package directly, and point him at this page.

Note: This system does not transmit any signals over the air, it just makes use of existing signals that are being transmitted by people calling CQ. This approach is different to some other propagation reporting tools, and has the advantage that adding more monitoring stations provides better coverage *without* consuming any bandwidth. Also, you don't need to have an amateur radio license to participate. All that is needed is an antenna, a radio and a computer, and you can start monitoring. You will need to pick a 'callsign' to send in reports

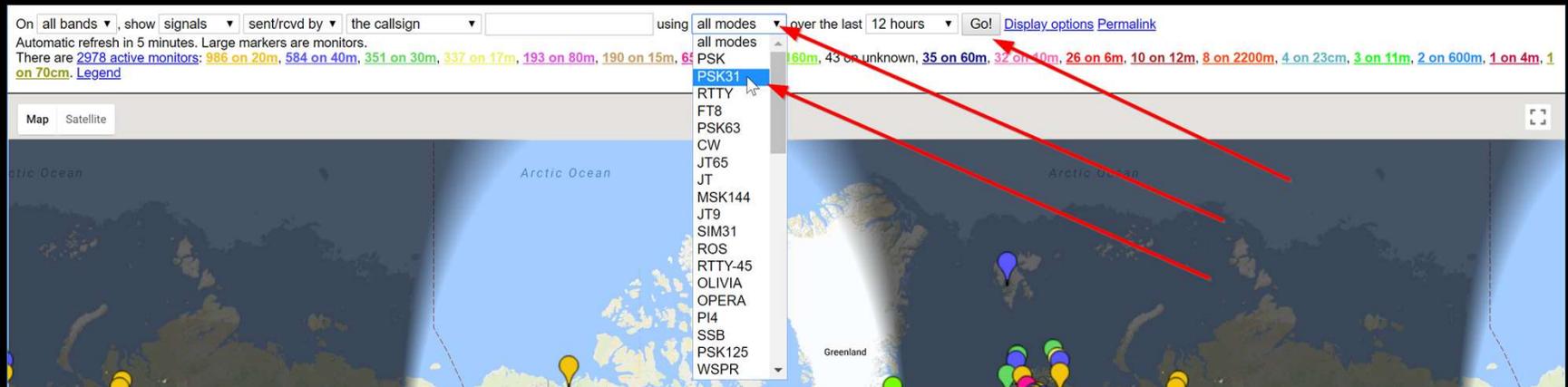
INITIAL MAP DISPLAY

- Displays Map
- Shows “Night Shadow”
- Shows “City Light”
- Shows “Map Pins”
at activity points



SELECT MODE "PSK31"

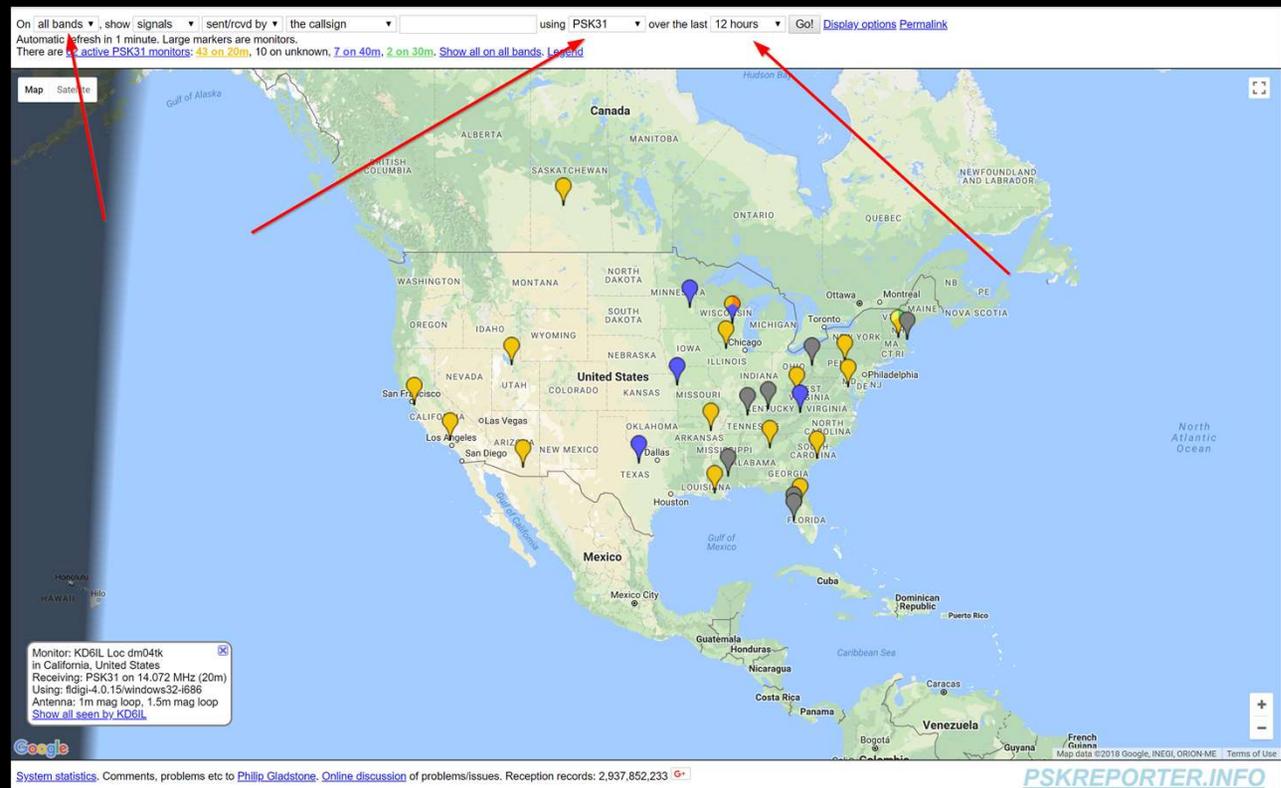
- PSK was recently a very popular mode
- Select Mode "PSK31"
- Click "Go!"



The screenshot shows a web interface for monitoring radio signals. At the top, there are several dropdown menus: "On all bands", "show signals", "sent/rcvd by the callsign", and "using all modes". To the right of these is a "Go!" button and a "Display options Permalink" link. Below the "using all modes" dropdown, a list of modes is displayed, with "PSK31" highlighted in blue. Other modes in the list include RTTY, FT8, PSK63, CW, JT65, JT, MSK144, JT9, SIM31, ROS, RTTY-45, OLIVIA, OPERA, P14, SSB, PSK125, and WSPR. A red arrow points from the "Go!" button to the "PSK31" option in the dropdown menu. Another red arrow points from the "PSK31" option to the "Go!" button. A third red arrow points from the "PSK31" option to the "all modes" dropdown menu. Below the mode list, there is a map of the Arctic region with several colored markers indicating signal locations. The map is labeled "Map" and "Satellite".

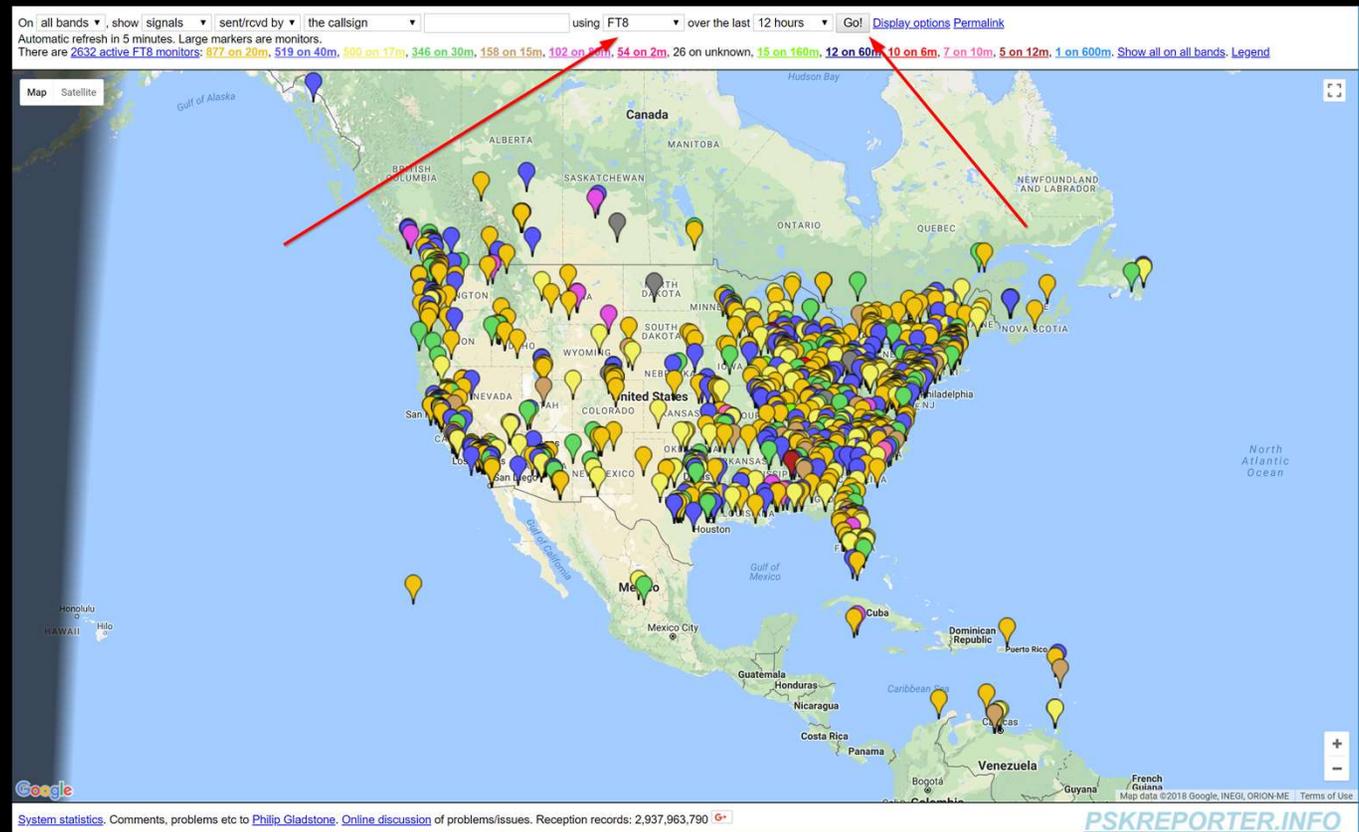
“PSK31” ACTIVITY

- Zoom in to USA
- You see all “PSK31” activity on all bands for past 12 hours



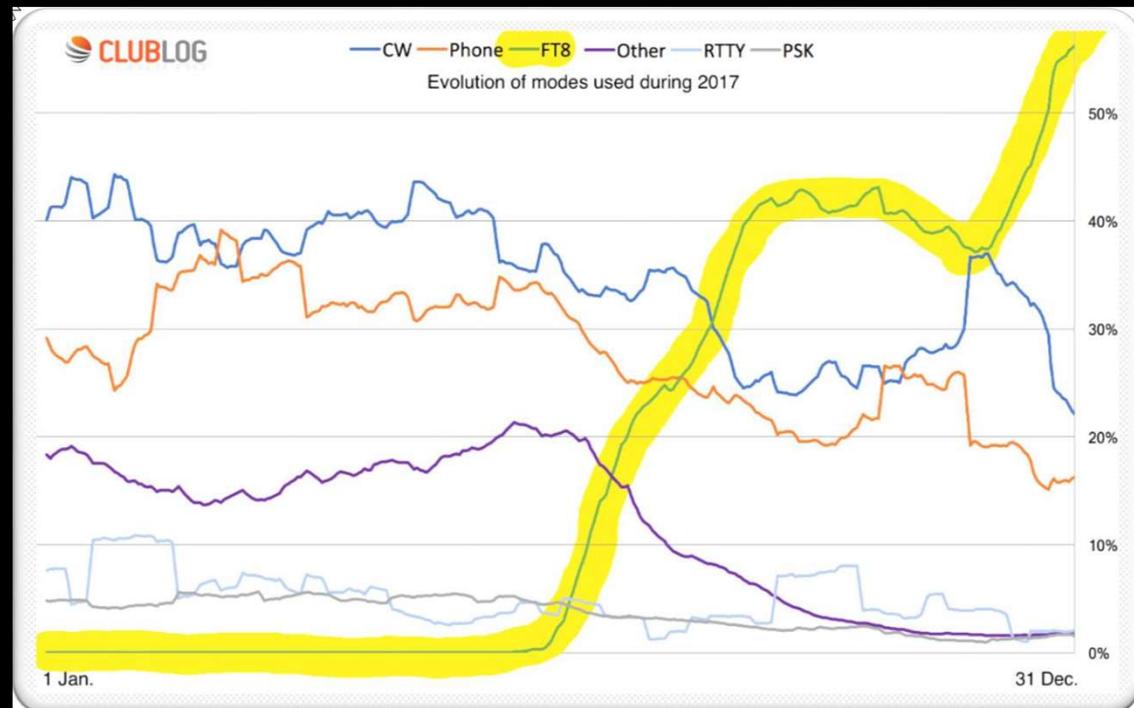
FT8 HAS TAKEN OVER IN POPULARITY

- Select mode “FT8”
- Click “Go!”



DIGITAL MODES (REVISITED)

- And the winner is:
 - 32 M QSO's in 2017
 - 5 M QSO's were FT8



HOVER OVER MAP PIN

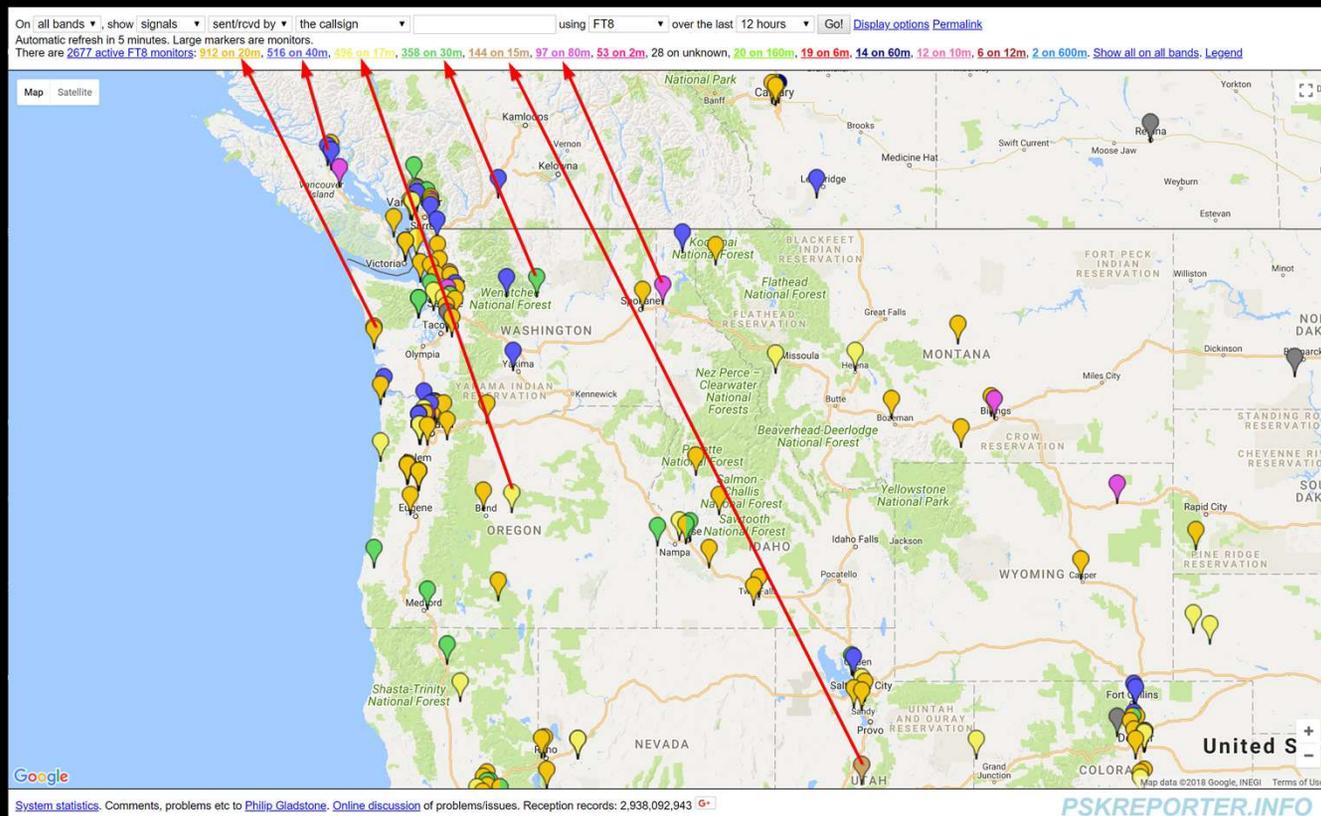
- Hovering over a “map pin” gives you information regarding the specific station.
 - Call-Sign
 - Location
 - Mode & Band
 - Software
 - Rig information

The screenshot shows a web interface for PSK Reporter. At the top, there are navigation menus for 'On all bands', 'show signals', 'sent/rcvd by', 'the callsign', 'using FT8', 'over the last 12 hours', and 'Go!'. Below these are statistics: 'Automatic refresh in 5 minutes. Large markers are monitors. There are 2638 active FT8 monitors: 498 on 30m, 511 on 40m, 483 on 17m, 351 on 30m, 154 on 15m, 103 on 80m, 54 on 2m, 27 on unknown, 18 on 160m, 12 on 60m, 12 on 6m, 9 on 10m, 4 on 12m, 1 on 600m. Show all on all bands. Legend'. The main area is a map of the United States with numerous colored map pins. A red circle highlights a pin in Oregon, and a red arrow points from it to a tooltip box. The tooltip contains the following information: 'Monitor: K7LLC Loc CN94hd in Oregon, United States', 'Receiving: FT8 on 14.075 MHz (20m)', 'Using: WSJT-X v1.8.0 r8193', 'Antenna: steppir 4 ele', and a link 'Show all seen by K7LLC'. At the bottom of the map, there are links for 'System statistics', 'Comments, problems etc to Philip Gladstone', 'Online discussion of problems/issues', and 'Reception records: 2,938,008,861'. The PSK Reporter logo and 'United States' are also visible.

STATION INFORMATION

Monitor: K7LLC Loc CN94hd 
in Oregon, United States
Receiving: FT8 on 14.075 MHz (20m)
Using: WSJT-X v1.8.0 r8193
Antenna: steppir 4 ele
[Show all seen by K7LLC](#)

MAP PIN COLORS SHOW BANDS



UN-CLUTTER DISPLAY

- Click “Display options”
- Check:
 - Hide faint monitors
 - Hide night shadow
 - Hide city lights
- Close “Display Options”
- Click “Go!”

On all bands, show signals, sent/rcvd by, the callsign, using F18, over the last 12 hours, Go! [Display options](#) [Permalink](#)
Automatic refresh in 2 minutes. Large markers are monitors.
There are 2681 active F18 monitors: 825 on 20m, 511 on 40m, 491 on 17m, 358 on 30m, 142 on 15m, 98 on 80m, 55 on 2m, 29 on unknown, 21 on 160m, 20 on 6m, 14 on 30m, 11 on 10m, 6 on 12m. [Show all on all bands](#) [Legend](#)

Map Satellite
 Terrain

Display Options

- Hide faint monitors
- Hide pink blob
- Hide night shadow
- Hide city lights
- Show clouds
- Show unseen tx
- Show grid
- Show snr
- Monitors in frequency order
- Hide statistics
- Hide everything but the map
- Hide connecting lines
- Hide seen times
- Minutes for Sparkly markers
- Show all
- timeout for worked markers
- as distance units

Monitor: 7S2G Loc JP94bs
in Västerbotten, Sweden
Receiving: F18 on 10.138 MHz (30m)
Using: WSJT-X v1.9.0-rc2 r6533
[Show all seen by 7S2G](#)

Google
System statistics Comments, problems etc to [Philip Gladstone](#) [Online discussion](#) of problems/issues. Reception records: 2,938,160,900 [G+](#)
Map data ©2018 Terms of Use
PSKREPORTER.INFO

ZOOM INTO LOCAL AREA

- Zoom map into local area
- Click on a map pin.
- Station information is displayed
- Click on “Show all seen...” link

On all bands, show signals, sent/rcvd by, the callsign, using FT8, over the last 12 hours, Go! [Display options](#) [Permalink](#)

Automatic refresh in 1 minute. Large markers are monitors.
There are 2688 active FT8 monitors: 925 on 20m, 510 on 40m, 478 on 17m, 362 on 30m, 158 on 15m, 97 on 80m, 49 on 2m, 26 on unknown, 20 on 60m, 20 on 6m, 18 on 160m, 13 on 12m, 12 on 10m. [Show all on all bands](#) [Legend](#)

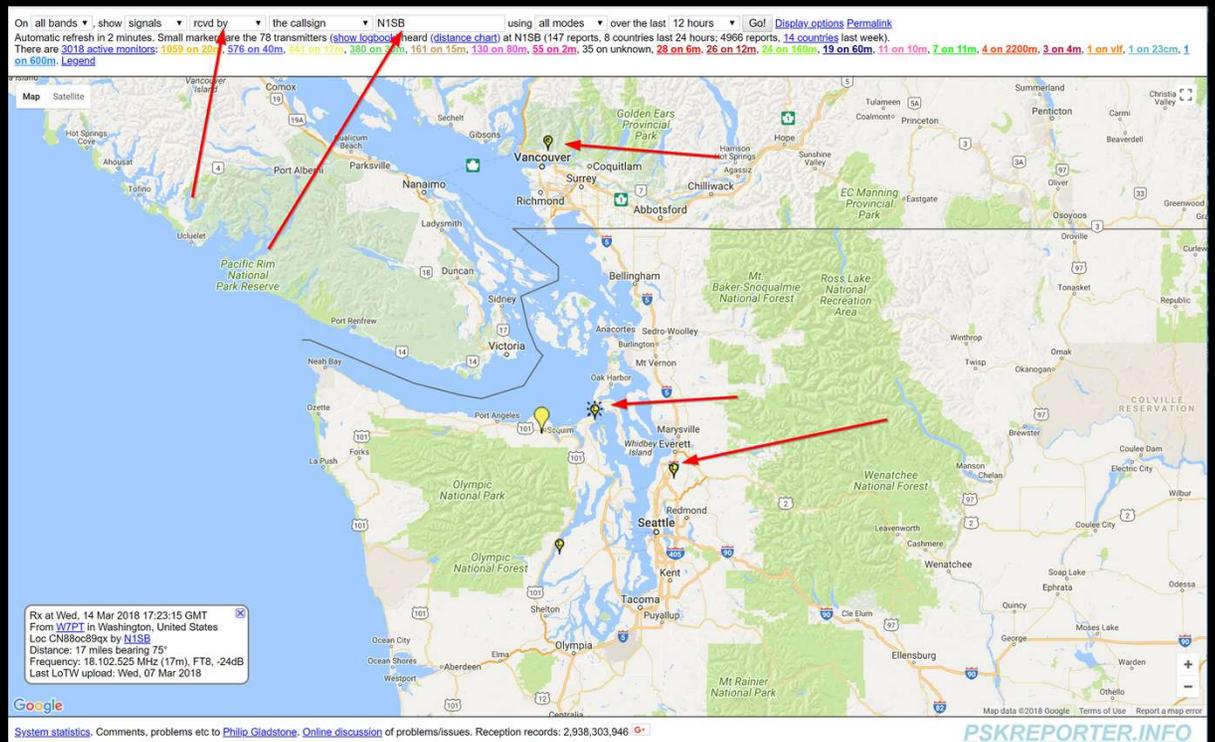
Map Satellite Imagery Topographic
Clioose Walbran Provincial Park
Port Renfrew Jordan River Sooke Neah Bay Sekiu Old Royal Ozette Quillayute La Push Oil City Clearwater Queets
Swartz Bay Sidney North Saanich Saanich Victoria
Eastsound Lummi Island Orcas Island Lopez Island San Juan Island
Anacortes Fidalgo Island La Conner Mt Vernon Sedro-Woolley Burlington Concrete Marblemount Rockport Mansford Darrington Silverton Bedal
Coupeville Camano Island Arlington Granite Falls Verlot Silvertown Bellingham
Port Townsend Port Hadlock/Hoodland Whidbey Island Marysville Shroton Monroe Gold Bar Index Baring Skykomish Scenic
Port Ludlow Quilcene Lynwood Bothell Redmond Snohomish North Bend
Bainbridge Island Poulsbo Bremerton Seattle Renton Kent Tacoma
Lillwaup Hoodsport Belfair Vashon Island Union Allyn-Grapeview
Tacoma
Olympic National Park Olympic National Forest
Baker-Snoqualmie National Forest
Ross Lake National Recreation Area
Map data ©2018 Google, Terms of Use Report a map error

System statistics. Comments, problems etc to [Philip Gladstone](#). Online discussion of problems/issues. Reception records: 2,938,207,923

PSKREPORTER.INFO

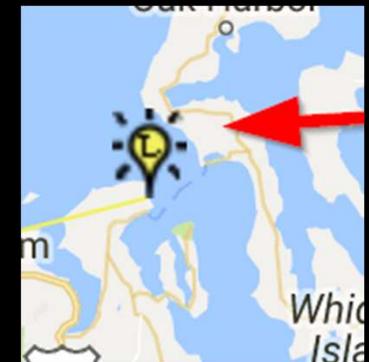
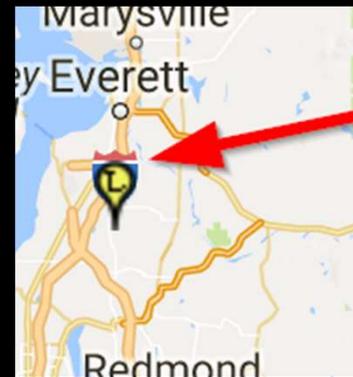
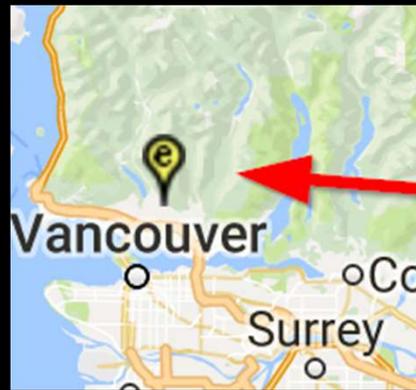
STATIONS RECEIVE BY :

- Big “Pin” is receiving
- Little “Pins” are transmitting
- “e”, “L”, and “Sparkles”,
Oh, my.



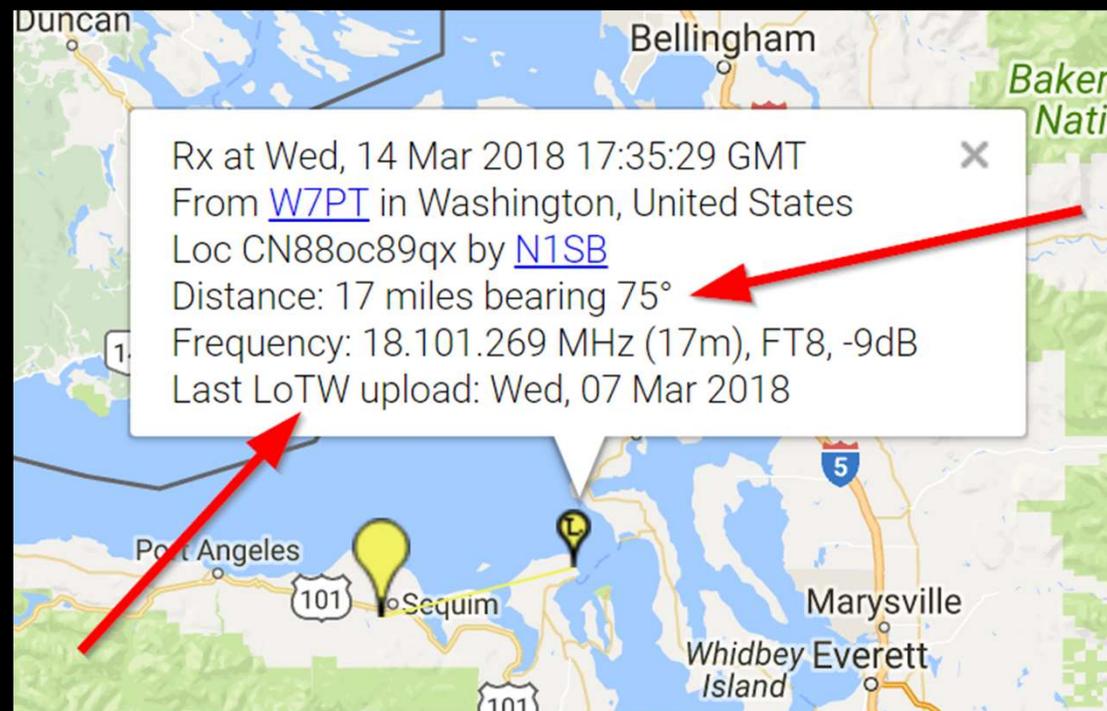
“E”, “L”, AND “SPARKLES”, OH, MY.

- e = eQSL
- L = LoTW
- Sparkle = recent activity



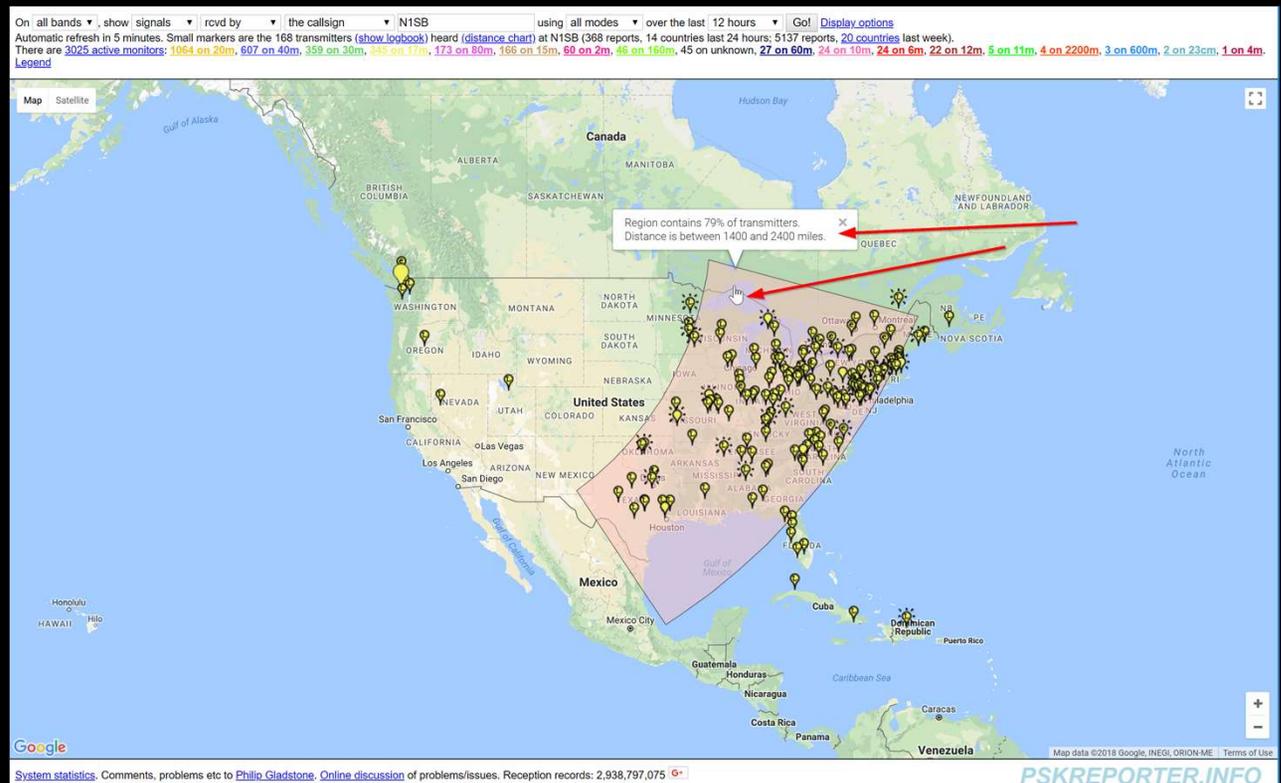
DISTANCE AND BEARING:

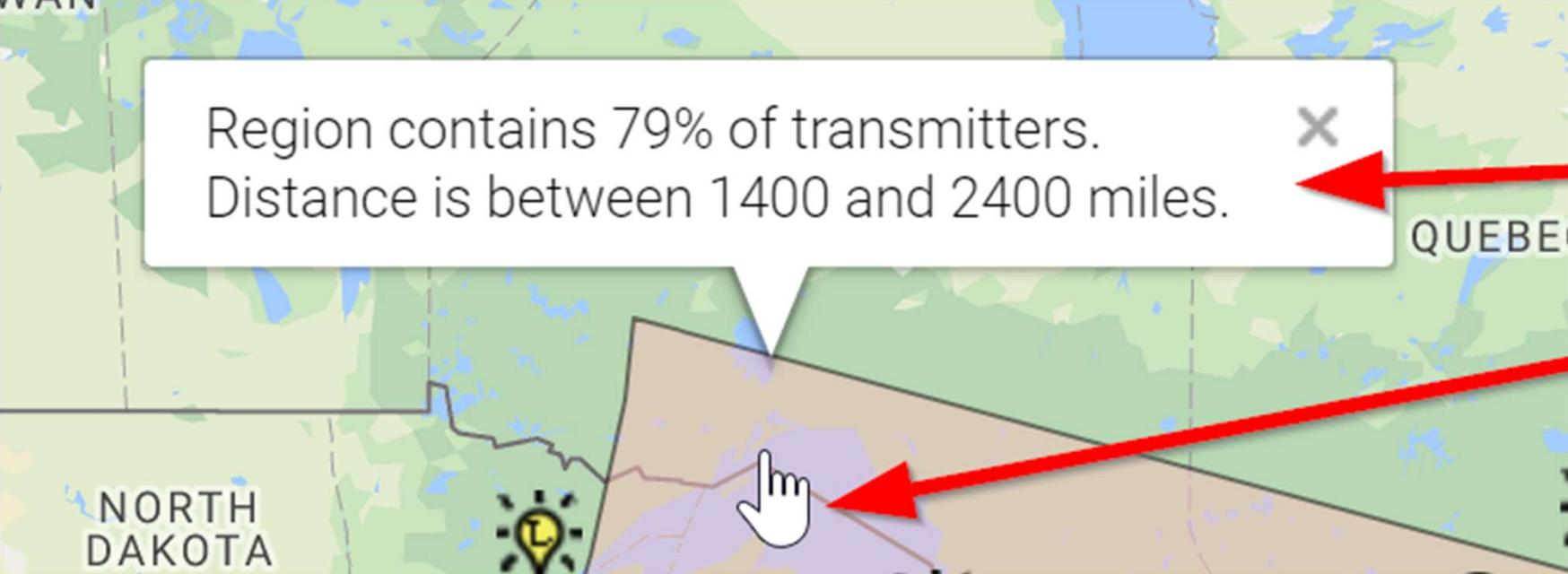
- Click on small map pin
 - Distance and bearing
 - Last LoTW upload



THE PINK BLOB

- Zoom out
- Click in “Pink Blob”
Shows majority of transmissions received





Region contains 79% of transmitters.
Distance is between 1400 and 2400 miles.

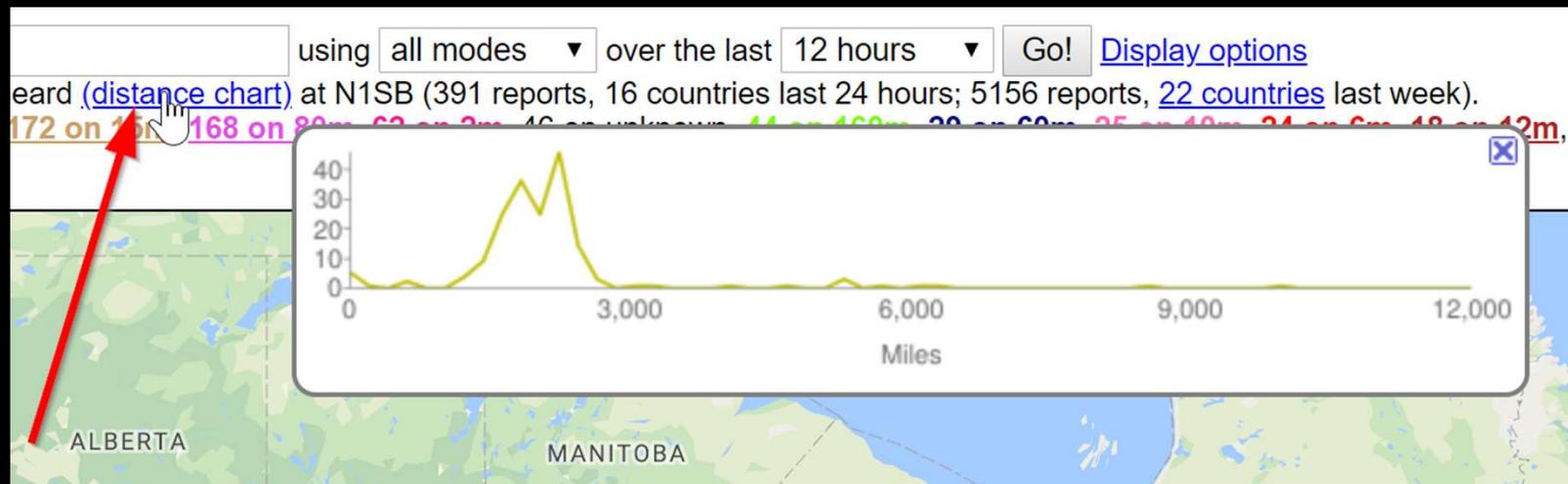
The image shows a map of North Dakota with a specific region highlighted in purple. A white tooltip box with a grey 'X' in the top right corner is positioned over the highlighted region. The tooltip contains the text: 'Region contains 79% of transmitters. Distance is between 1400 and 2400 miles.' A white hand cursor is pointing at the highlighted region. Two red arrows point from the right side of the image towards the tooltip and the highlighted region. The map also shows the state boundary of North Dakota and the label 'NORTH DAKOTA' in the bottom left corner. A yellow location pin icon is visible on the map. The word 'QUEBE' is partially visible on the right side of the map.

NORTH
DAKOTA

QUEBE

DISTANCE CHART

- Click on “Distance Chart”



LOGBOOK

Download (ADIF) [last 24 hours](#), [last week](#)

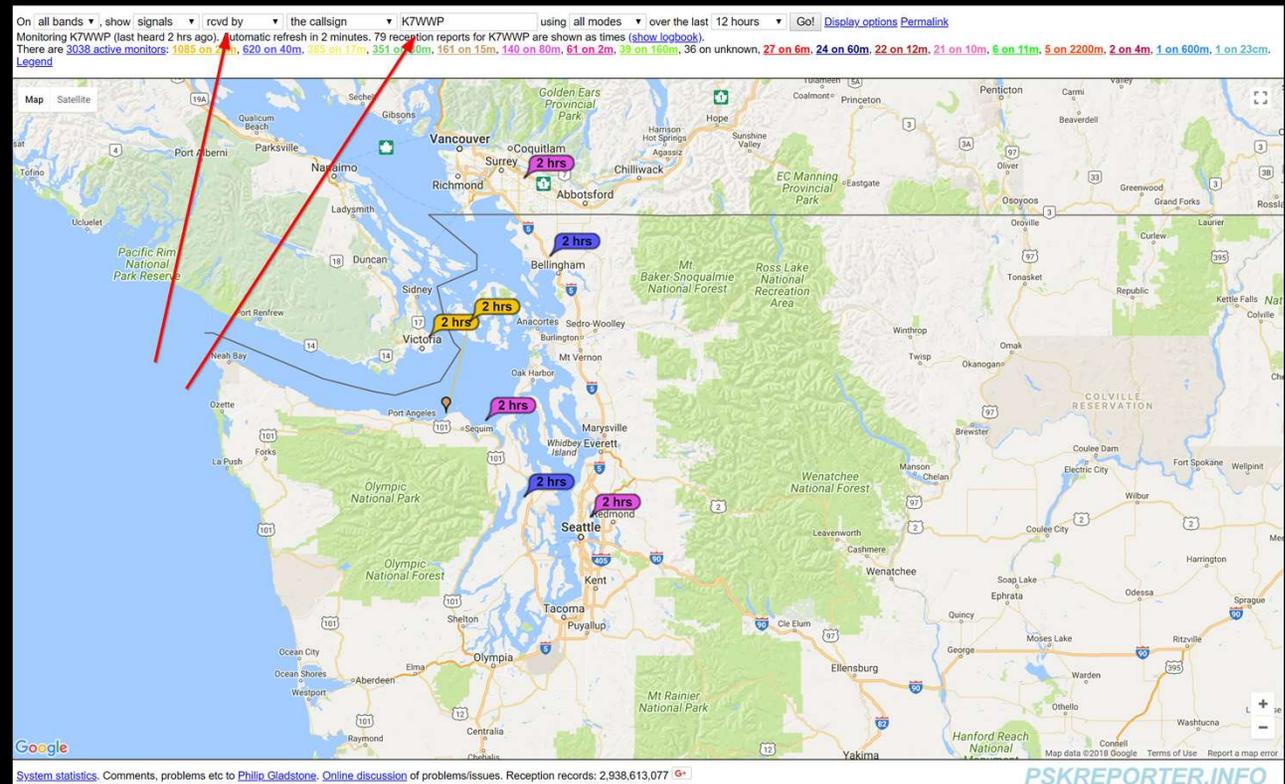
<u>Txmtr</u>	<u>Band</u>	<u>Mode</u>	<u>Distance</u>	<u>Time (UTC)</u>
W6GMT	17m	FT8	1359 miles	18:24:59
KE5TD	17m	FT8	1762 miles	18:24:45
W8PHB	17m	FT8	1988 miles	18:24:30
W8MSC	17m	FT8	1936 miles	18:24:29
KQ40A	17m	FT8	2161 miles	18:24:14
W7OM	17m	FT8	49 miles	18:23:45
K3UTJ	17m	FT8	2360 miles	18:23:30
K4TZ	17m	FT8	2024 miles	18:23:29
K8QWY	17m	FT8	2022 miles	18:23:29



AND NOW TO LOOK
AT MY EARLIER
RADIO TRANSMISSIONS
ON WSJT-X

SIGNALS RECEIVED BY K7WWP

- Stations received by K7WWP and how long ago (2 hours ago)



SHOW SNR

- Click "Display Options"
- Check "SNR"
- Click "Go!"

On all bands ▾ show signals ▾ sent/rcvd by ▾ the callsign ▾ k7wvp using all modes ▾ over the last 12 hours ▾ Go! [Display options](#) [Permalink](#)

Monitoring K7WVP (last heard 2 hrs ago). Automatic refresh in 4 minutes. Small markers are the 6 transmitters (show logbook) heard (distance chart) at K7WVP (183 reports, 6 countries last 24 hours; 186 reports, 6 countries last week). There are 3025 active monitors: 1069 on 20m, 596 on 40m, 358 on 30m, 341 on 15m, 189 on 15m, 168 on 80m, 61 on 2m, 45 on 15m, 41 on unknown, 32 on 60m, 22 on 10m, 22 on 6m, 18 on 12m, 4 on 2200m, 4 on 11m, 4 on 23cm, 3 on 600m, 1 on 4m, 1 on 70cm. [Legend](#)

Display Options

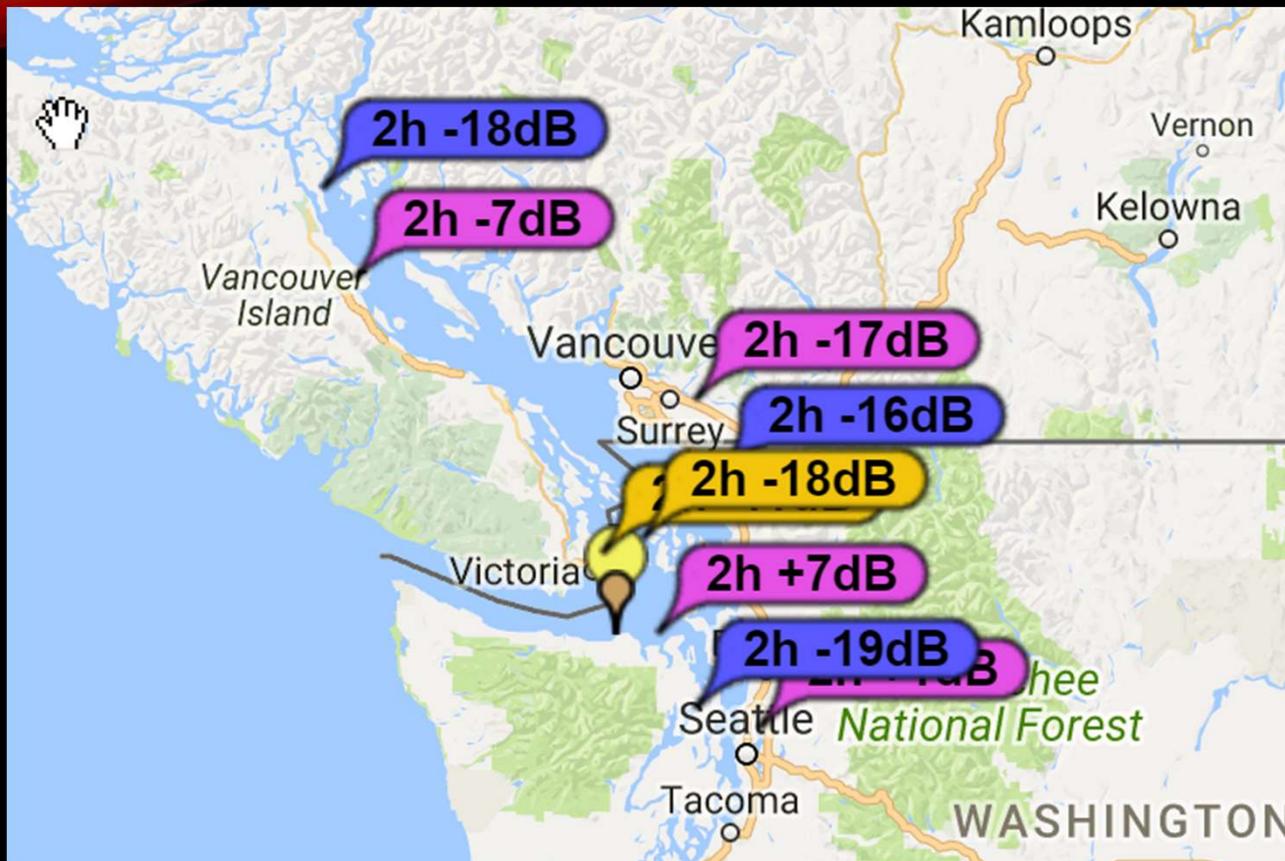
<input checked="" type="checkbox"/>	Hide faint monitors
<input type="checkbox"/>	Hide pink blob
<input checked="" type="checkbox"/>	Hide night shadow
<input checked="" type="checkbox"/>	Hide city lights
<input type="checkbox"/>	Show clouds
<input type="checkbox"/>	Show unseen tx
<input type="checkbox"/>	Show grid
<input checked="" type="checkbox"/>	Show snr
<input type="checkbox"/>	Monitors in frequency order
<input type="checkbox"/>	Hide statistics
<input type="checkbox"/>	Hide everything but the map
<input type="checkbox"/>	Hide connecting lines
<input type="checkbox"/>	Hide seen times
<input type="checkbox"/>	Minutes for Sparkly markers
10	
Show all	transmitters
no	timeout for worked markers
miles	as distance units

Rx at Wed, 14 Mar 2018 15:52:30 GMT
From K7WVP by WB6CXC, Loc CN88lm27
Frequency: 14.075210 MHz (20m), FT8, -18dB
Distance: 27 miles bearing 14°
Using: WSJT-X v1.8.0.r6193

System statistics. Comments, problems etc to [Philip Gladstone](#). [Online discussion](#) of problems/issues. Reception records: 2,938,946,517

Map data ©2018 Google, INEGI [Terms of Use](#)

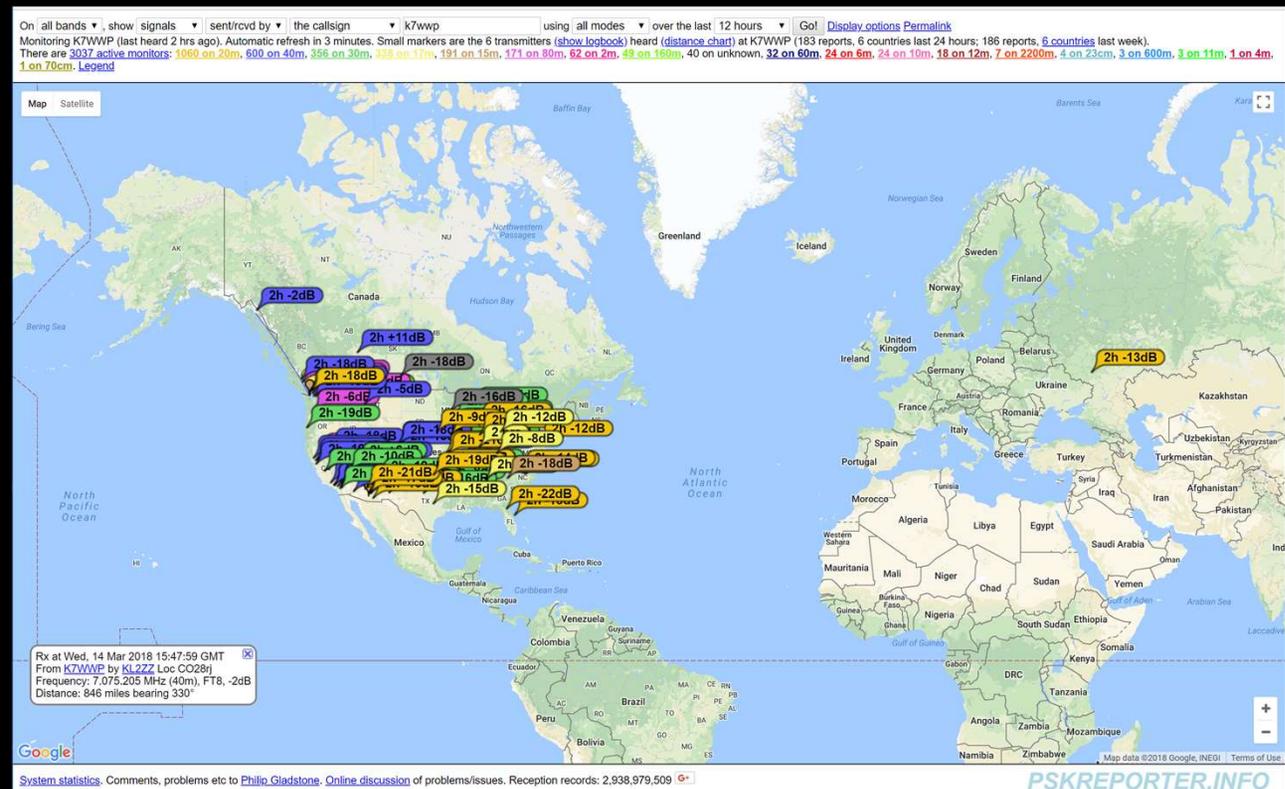
PSKREPORTER.INFO



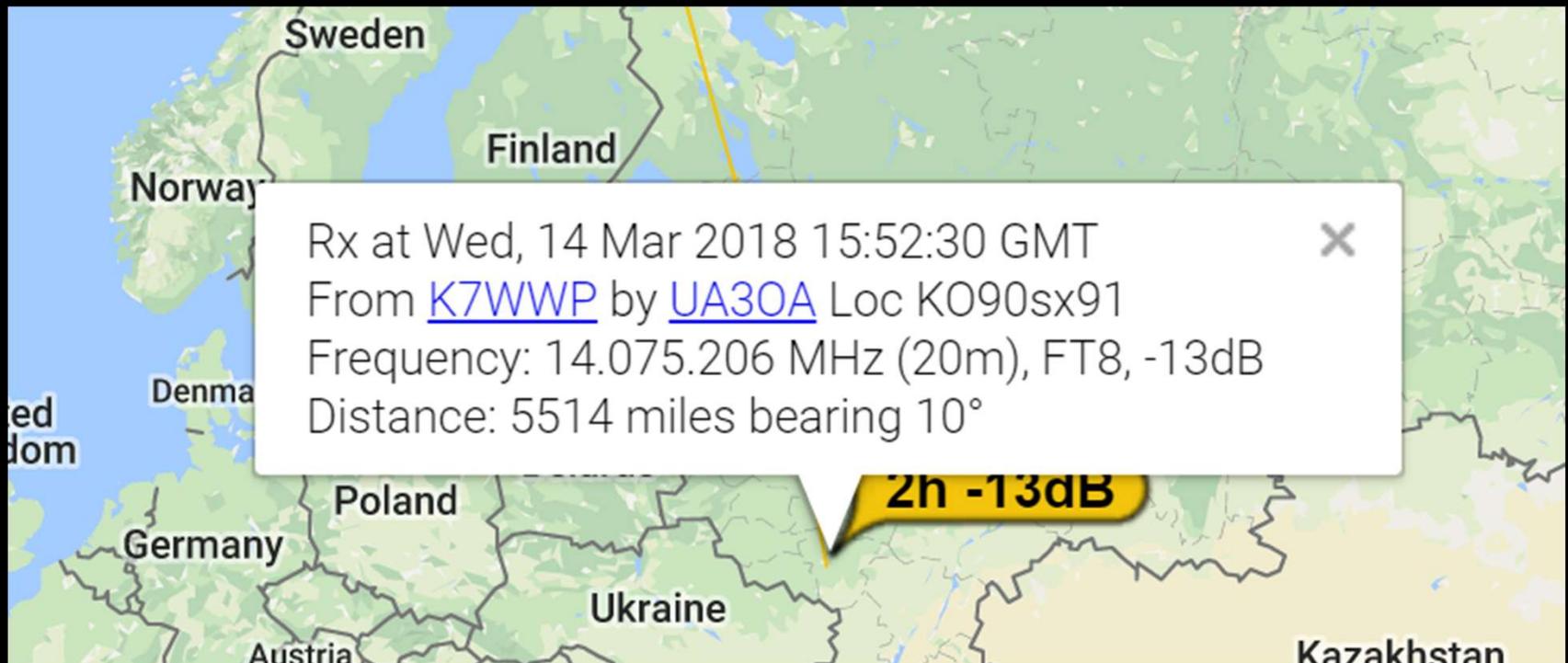
SNR

ZOOM OUT

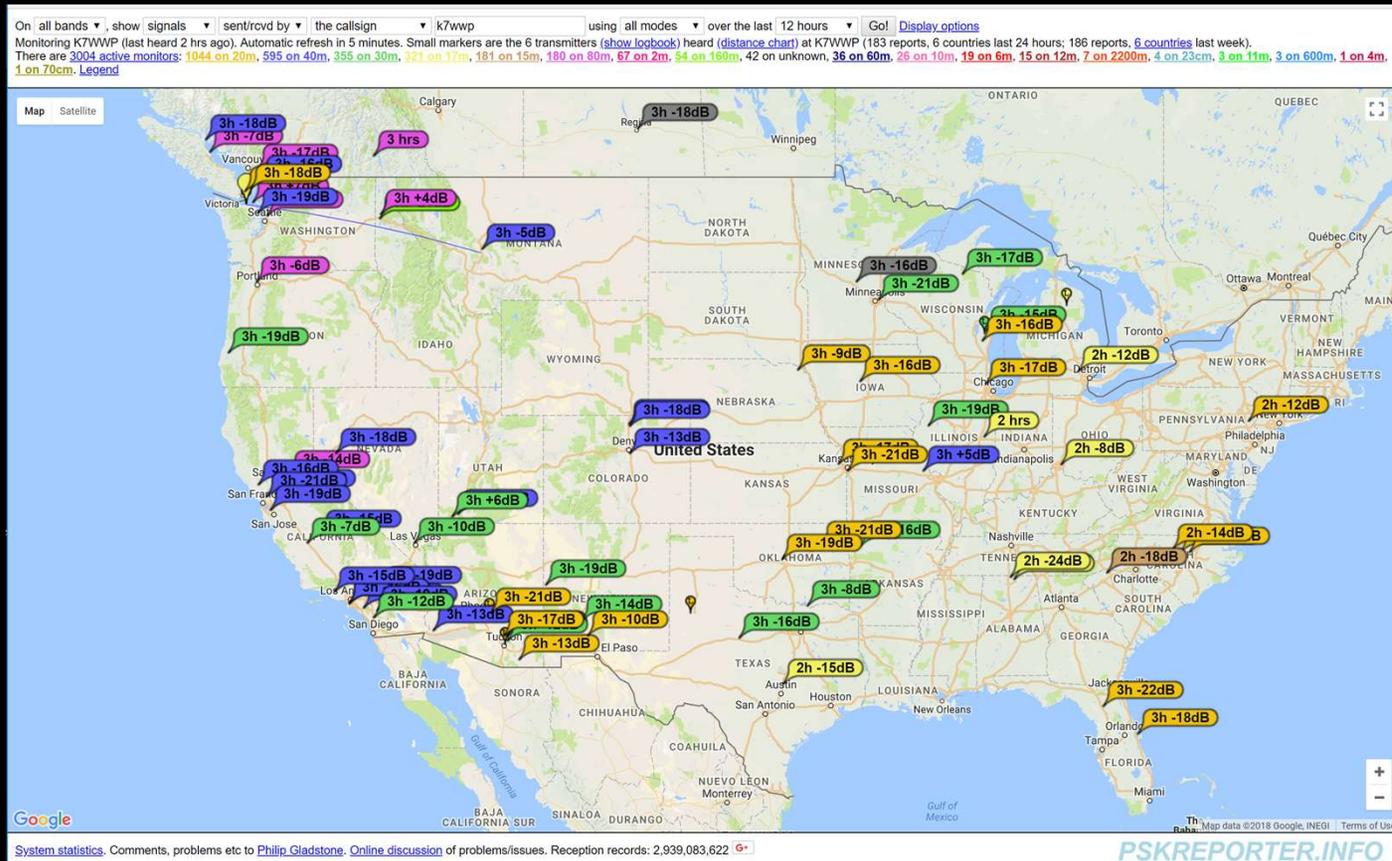
- Different bands,
Different distances
You can see
propagation
- Is that Russia?



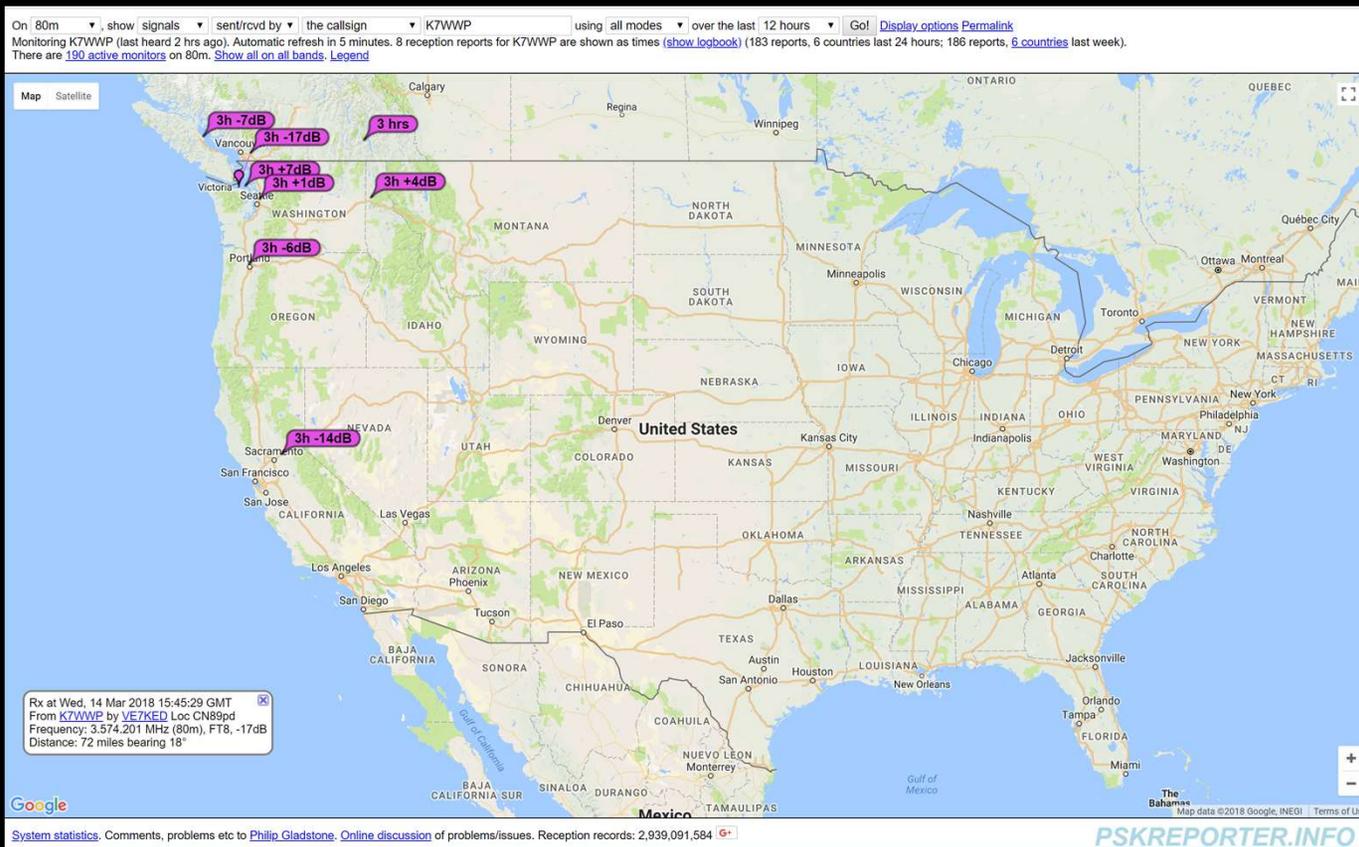
UA30A, YES IT IS RUSSIA



A PRETTY GOOD PICTURE OF PROPAGATION



80M ISN'T GOING VERY FAR





PKSREPORTER.INFO

- Gives you a good picture of your signal:
 - Under current conditions
 - At the current time of day
 - Using your radio
 - Using your antenna
 - Using selected bands



BACK TO THE LIVE RADIO

- Start transmitting CQ's
- Look at map
 - Receiving
 - Sending
 - Propagation

Q & A

- Reference Web Sites

- <https://pskreporter.info/>
- <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>
- <https://physics.princeton.edu/pulsar/k1jt/wsjt-doc/wsjt-main-1.8.0.html>
- <https://en.wikipedia.org/wiki/Modulation>
- <http://www.kb9ukd.com/digital/>

Bill Peterson – K7WWP

k7wwp@outlook.com