PROPAGATION INFO & TOOLS

OPTIMIZE YOUR OPERATING FOR SCHEDULED CONTACTS, CONTESTING, OR CHASING DX

LOREN ANDERSON, KEØHz

WHAT ARE WE GOING TO TALK ABOUT?

- This presentation is predominantly directed toward HF operations There's not much to be said about VHF and UHF repeater operations
  - Some of the tools that I'll be showing to have application at higher frequencies for those that are working digital, CW, or SSB on VHF
- This is not an exact science! Experience will be your best teacher.
  - If the tools or apps indicate that there is virtually no chance for a contact it may still be worth a try.

Note: In the interest of full disclosure some of the information in this presentation was obtained from ChatGPT-3.5.

Solar-Terrestrial Environment

GENERALITIES (YMMV!!!!)

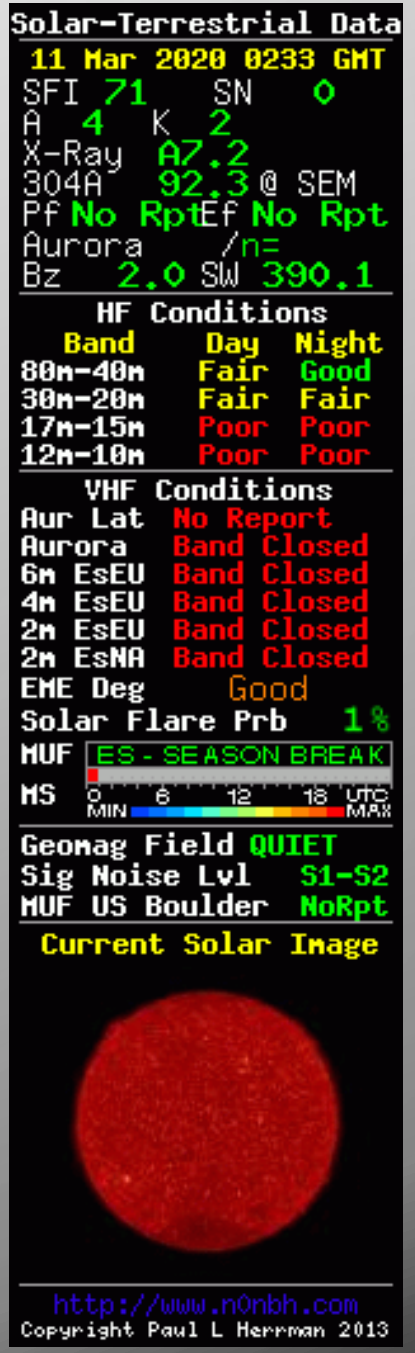
- Not considering distance, 20M tends to be the most reliable band being less dependent on time of day (TOD), time of year (TOY), and solar activity.
- D-layer absorption most pronounced during the day due to sun caused ionization most negatively affecting lower frequency bands (80 & 40M). Remember your AM radio listening at night?
- F2-layer ionization during the day greatly enhances “skip” (refraction) enhancing long distance contacts. Most pronounced at mid-day. The ionization is not consistent. Variations may be the cause of fading (QSB).
- Sporadic-E (Es) propagation can occur during daylight hours creating 10 & 6M openings. This is caused by a highly ionized patches in the E-layer.

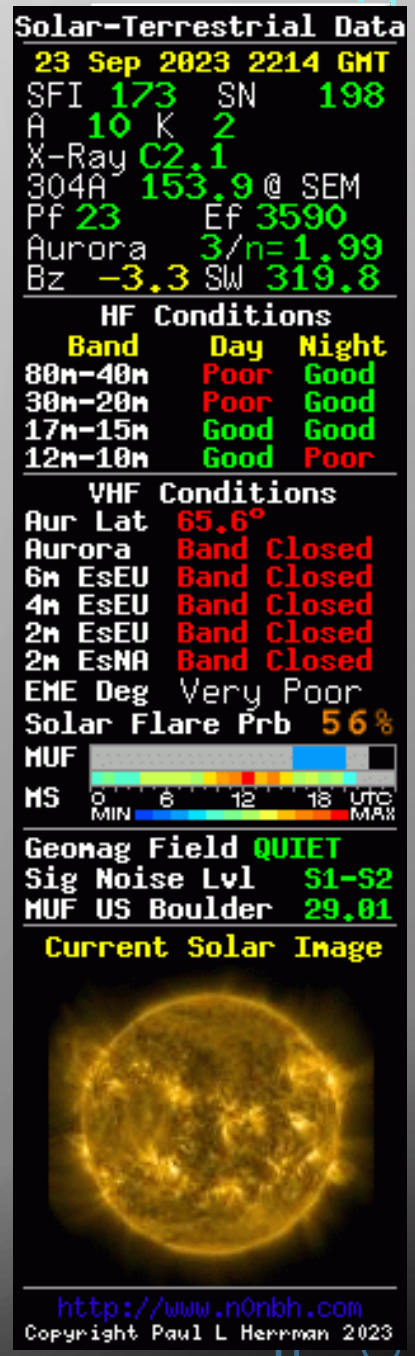
GENERALITIES, CONT'D

- There are daily and seasonal variations in propagation and atmospheric noise (QRN).
  - Propagation tends to be enhanced along the Gray-line
  - Lightning from thunderstorms especially in spring and summer months
  - Man-made noise sources (more local) frequently TOD, e.g., your neighbor's solar panel array of microinverters spewing harmonics ☹
- Pay attention to the Planetary K-index (Kp), a 0 – 9 measure of geomagnetic activity caused by solar activity.
  - Kp 0-1: Quiet geomagnetic conditions and minimal impact
  - Kp 2-3: Slight geomagnetic activity not causing significant issues
  - Kp 4-5: Active geomagnetic conditions that may lead to minor disruptions
  - Kp 6-7: Moderate geomagnetic storms with potential for noticeable affects
  - Kp 8-9: Severe geomagnetic storms that can lead to significant disruptions

SPACE WEATHER - SO WHAT?

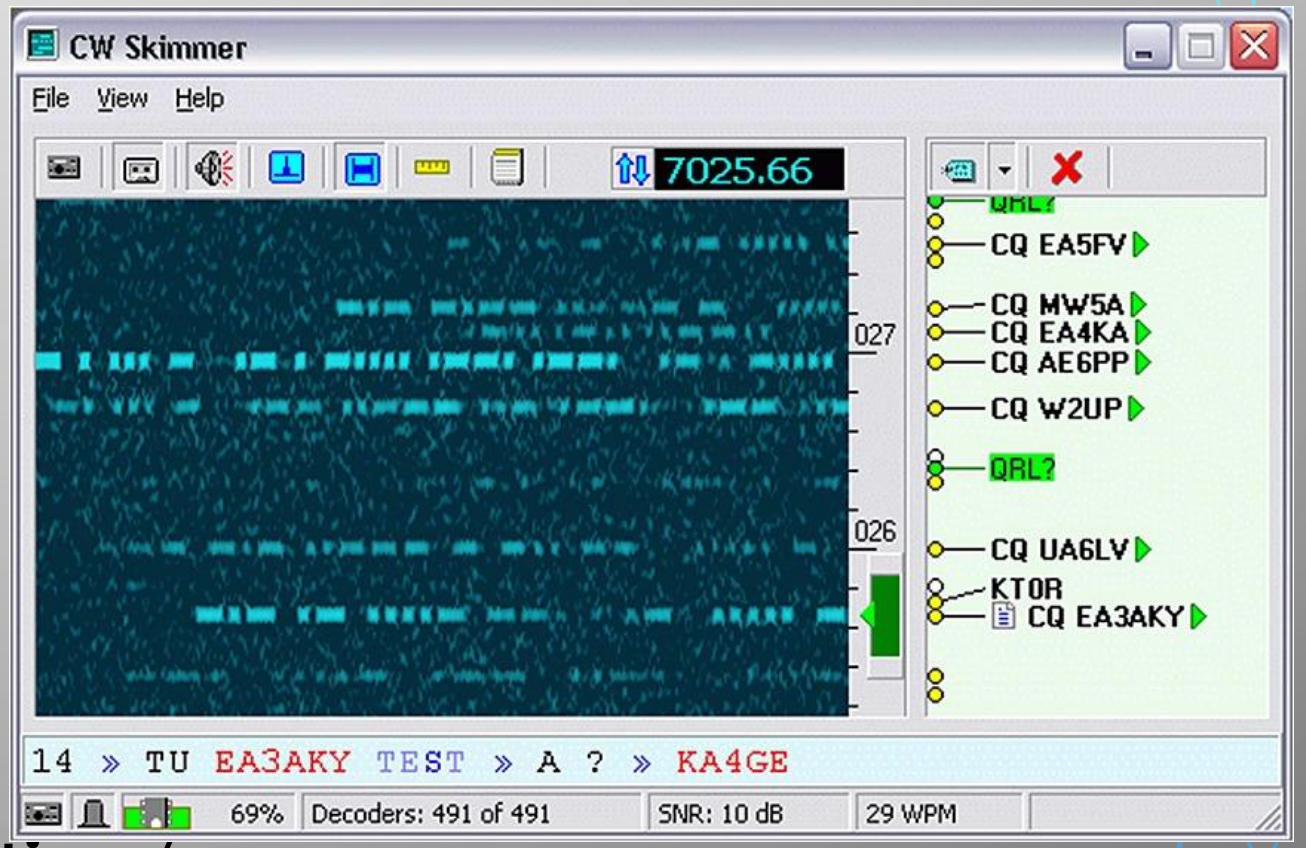
- HF Communications Impacts
  - Maximum Usable Frequency (MUF)
  - Modify Propagation Paths
  - Block Communications
  - Noise
- VHF
  - Es - Sporadic E Propagation
  - Aurorae Propagation (HF may be blocked)





NUMEROUS ONLINE TOOLS

- VOACAP
- PSK Reporter
- Reverse Beacon Network
- DX Watch
- WSPR & WSPRnet
- https://dx.qsl.net/propagation/
- Others



WHAT ARE YOUR OBJECTIVES?

- Reliable scheduled QSOs?
  - VOACAP provides propagation predictions
- DX or Awards (WAS, DXCC, etc.)?
  - PSK Reporter can provide a comprehensive picture of who can hear whom
  - DX Watch
- Contesting?
  - Reverse Beacon Network (RBN) skimmers identify, and post signals heard transmitting CQ, DX, BCN, /B, & NCDXF

CYCLE 25 SOLAR MAX IS LOOMING!

- So how do we take advantage of this?
- In general, propagation is very good right now, BUT,
- Time of day and bands have dramatically different effects on that propagation
- Experience helps but there is a tool to assist

VOACAP Online

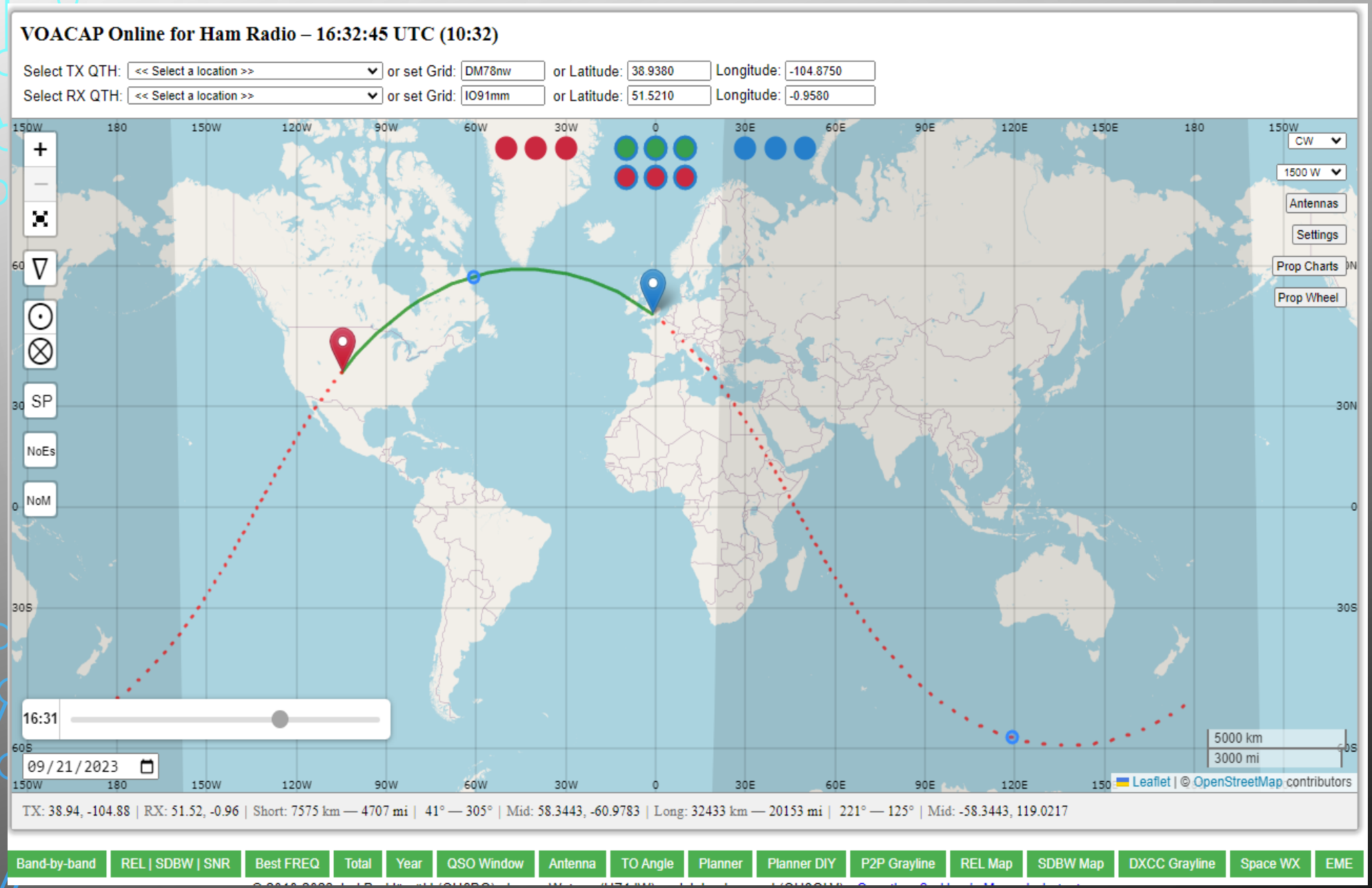
VOICE OF AMERICA COVERAGE ANALYSIS PROGRAM (VOACAP)

- As the name suggests, it was developed for VOA to assist targeting their broadcasts in the 3 – 30 MHz HF bands
- The US Department of Commerce has made this software available free of charge (as is).

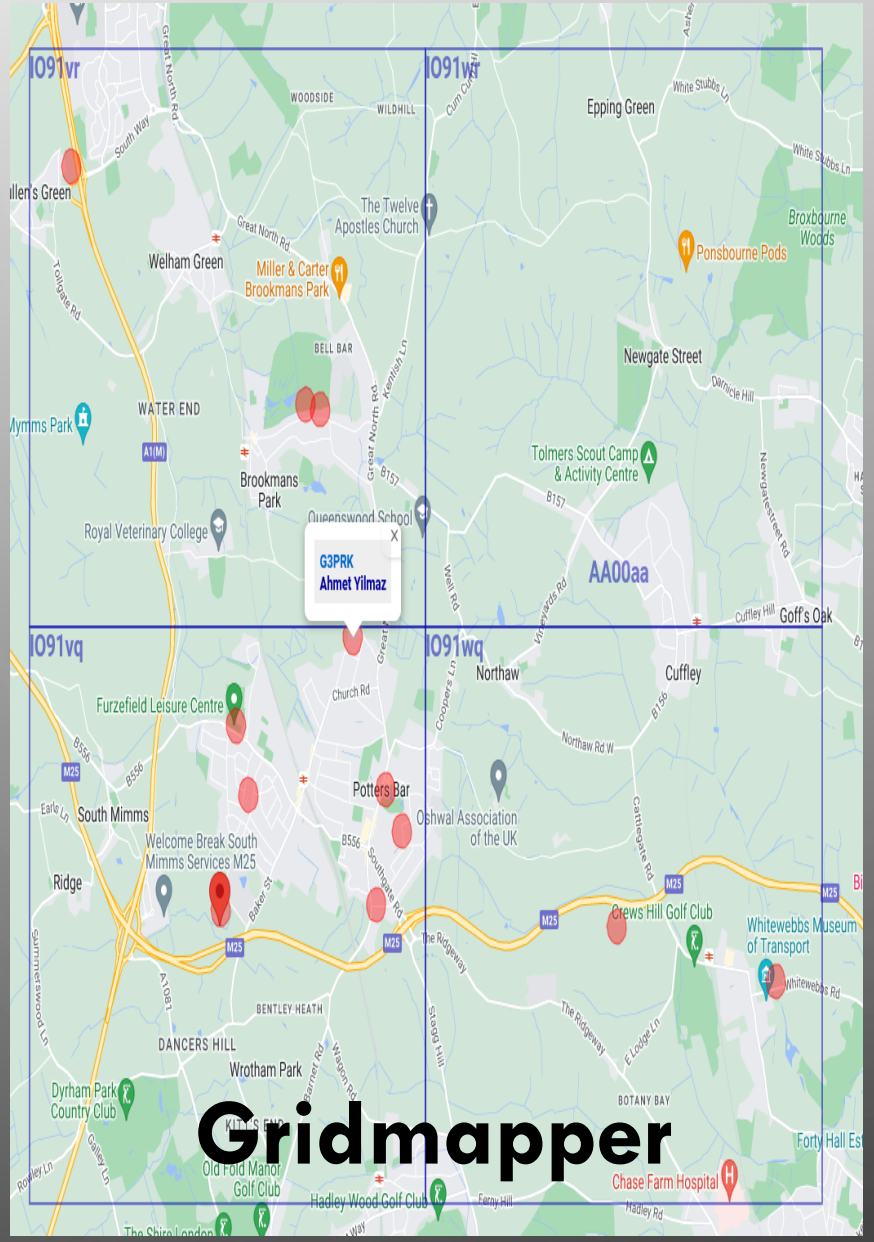
  https://voacap.com/hf/

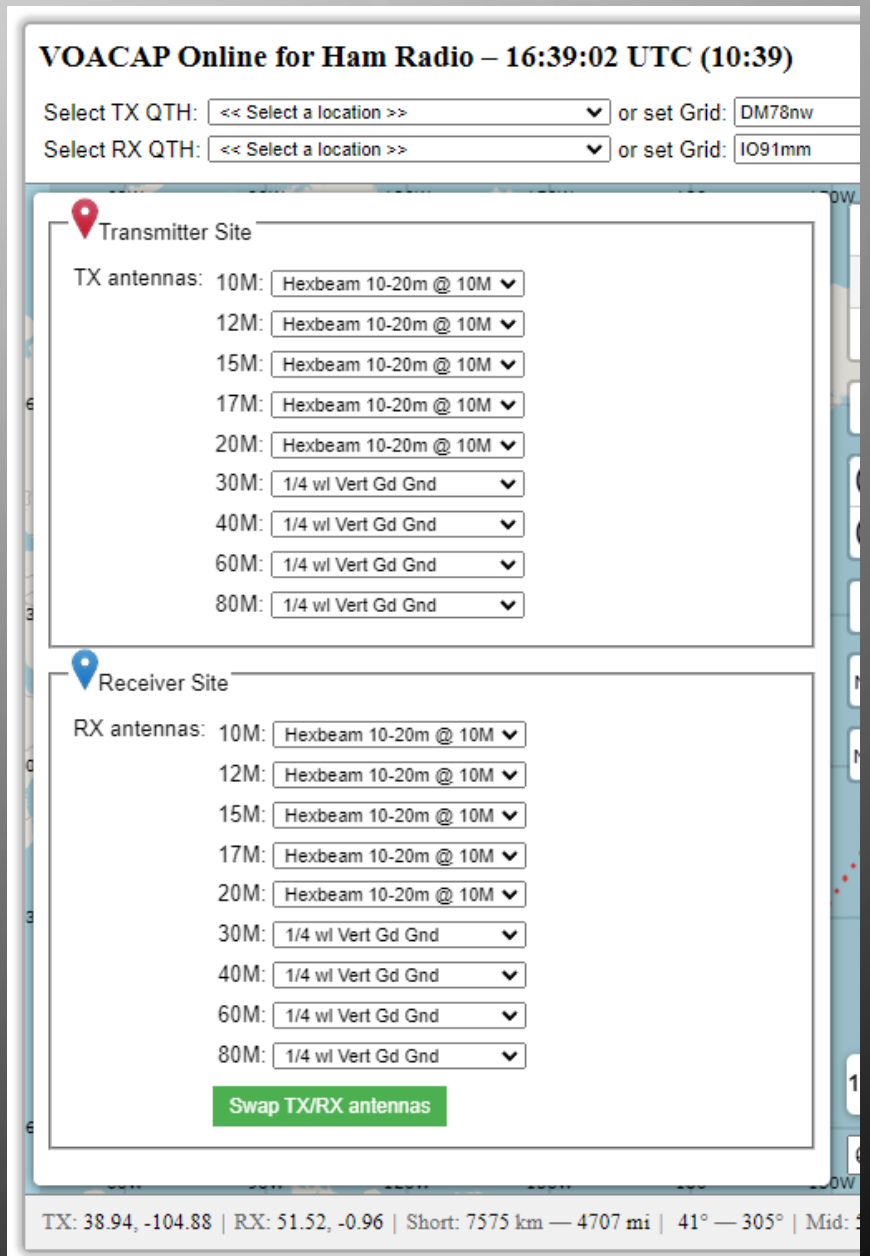
- Caveat – the online app may or may not work with you browser. If not working try an alternate browser – Edge, Firefox, Chrome.

VOACAP ONLINE

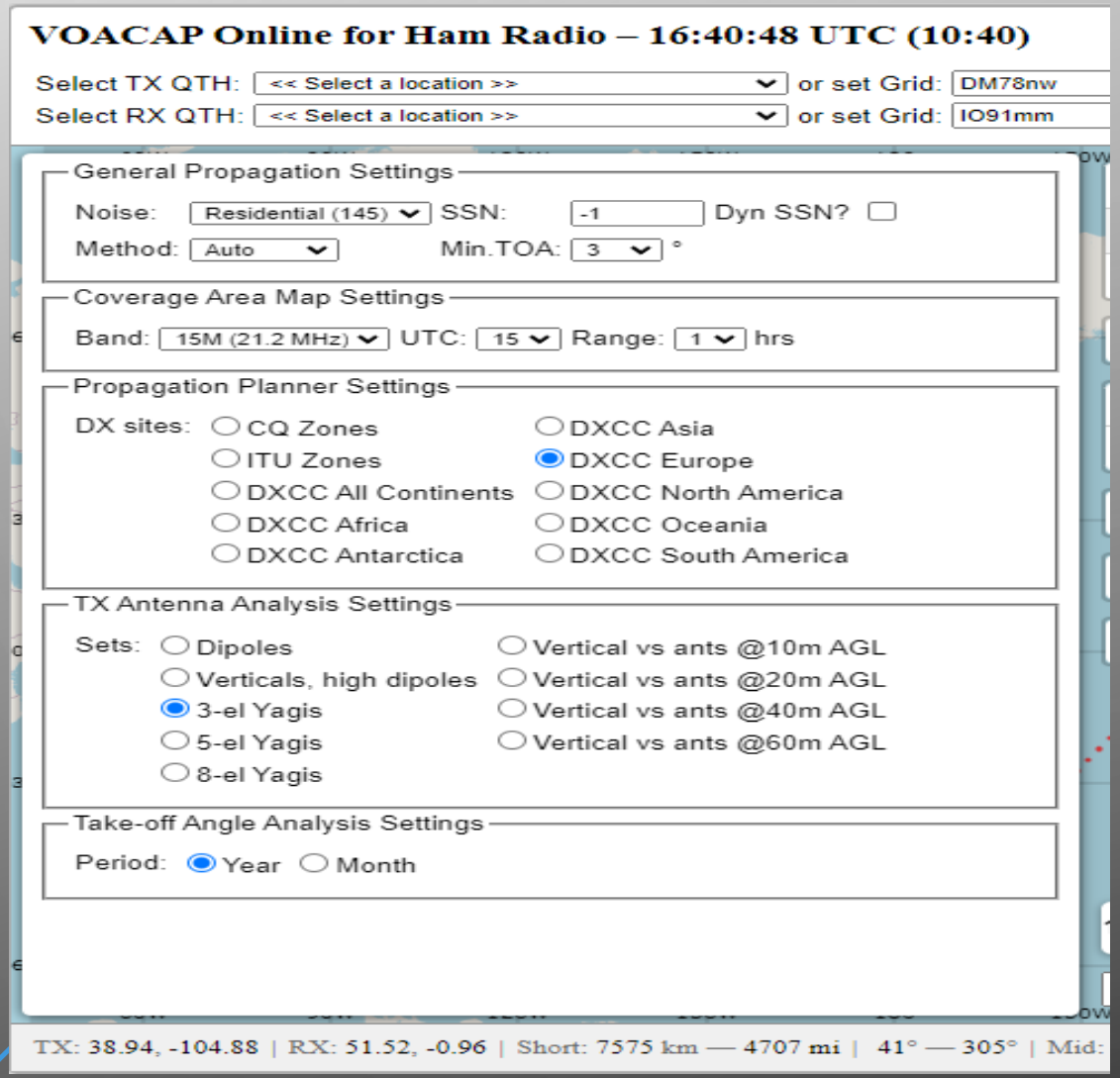


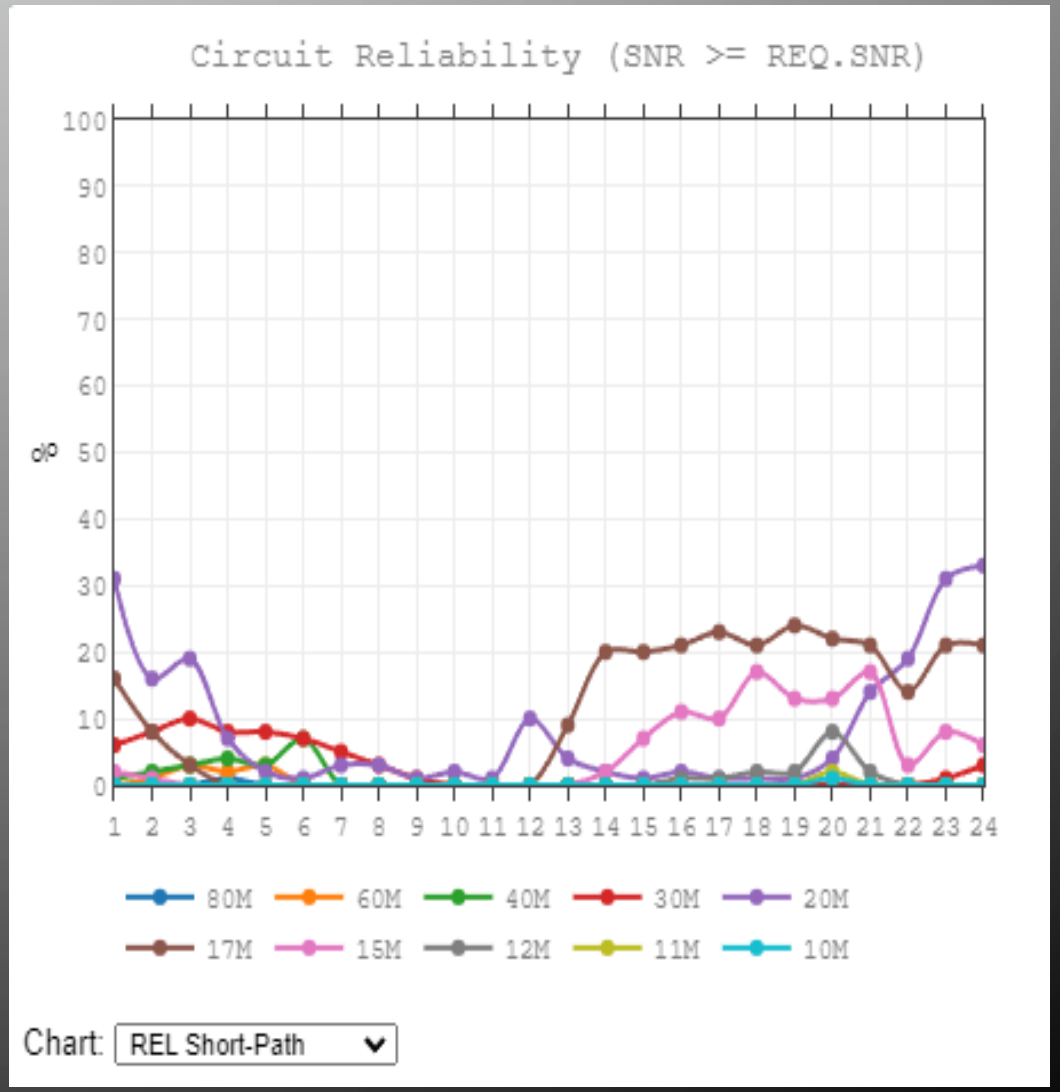
VOACAP SETTINGS



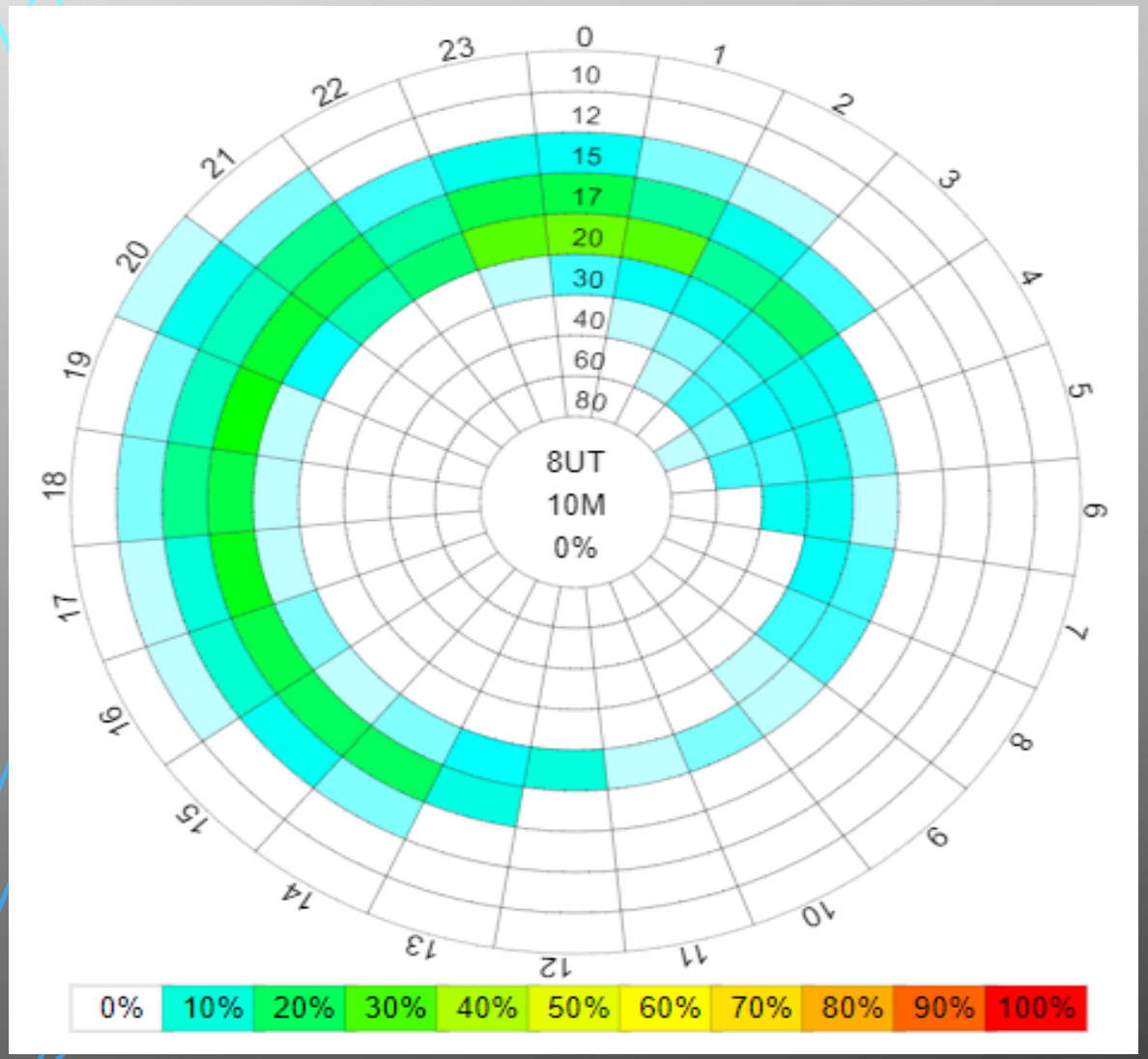


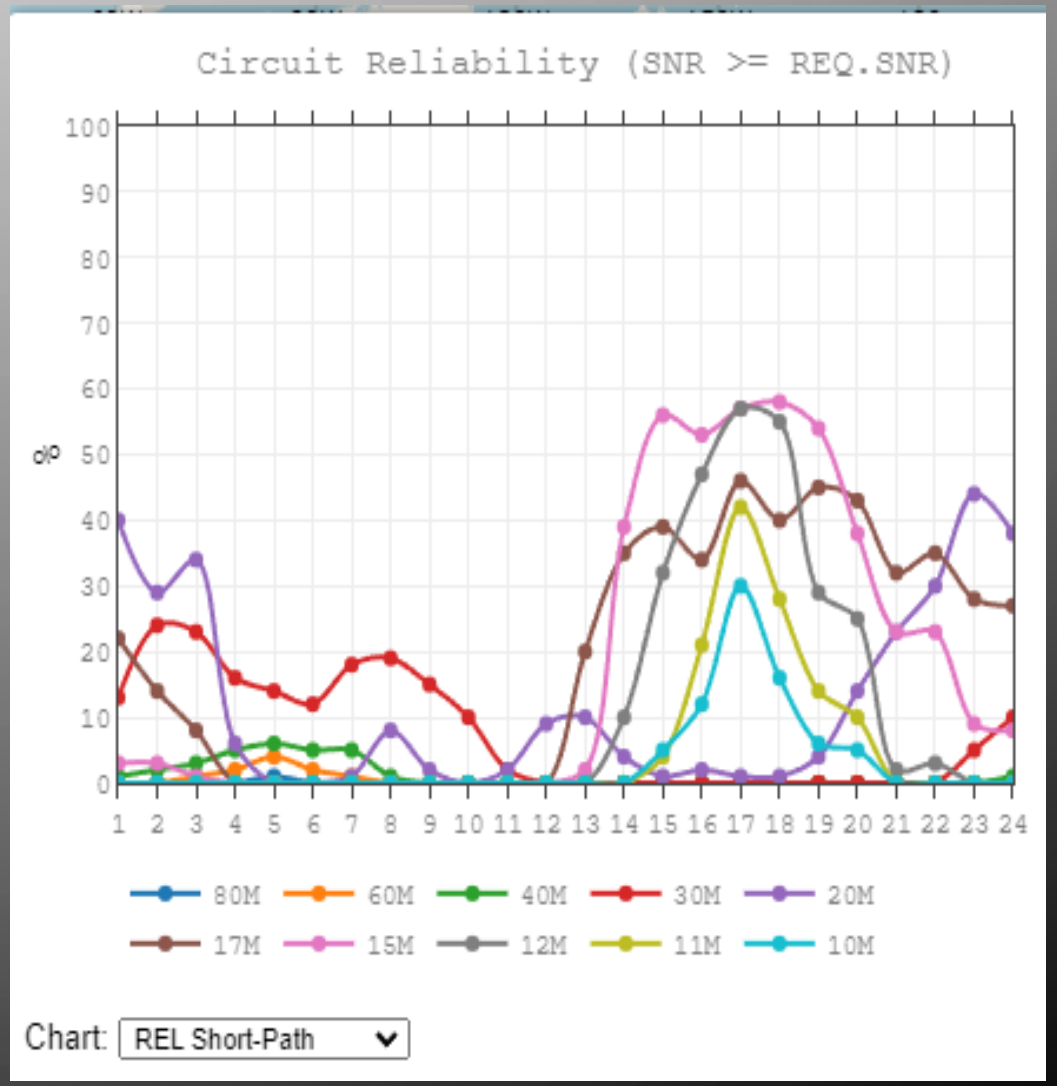
VOACAP PREDICTION FROM COLORADO TO LONDON, UK (9/21/2023)



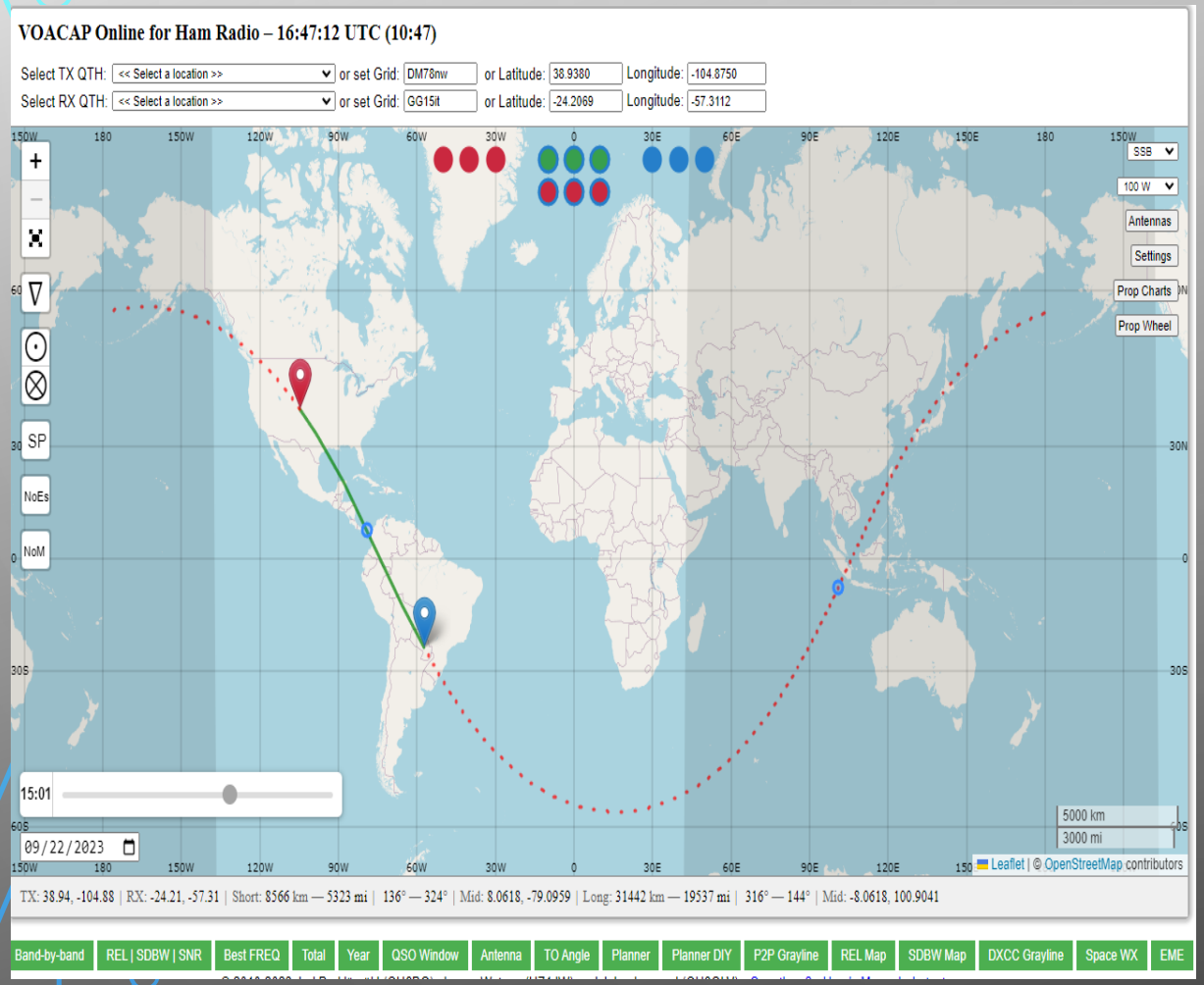


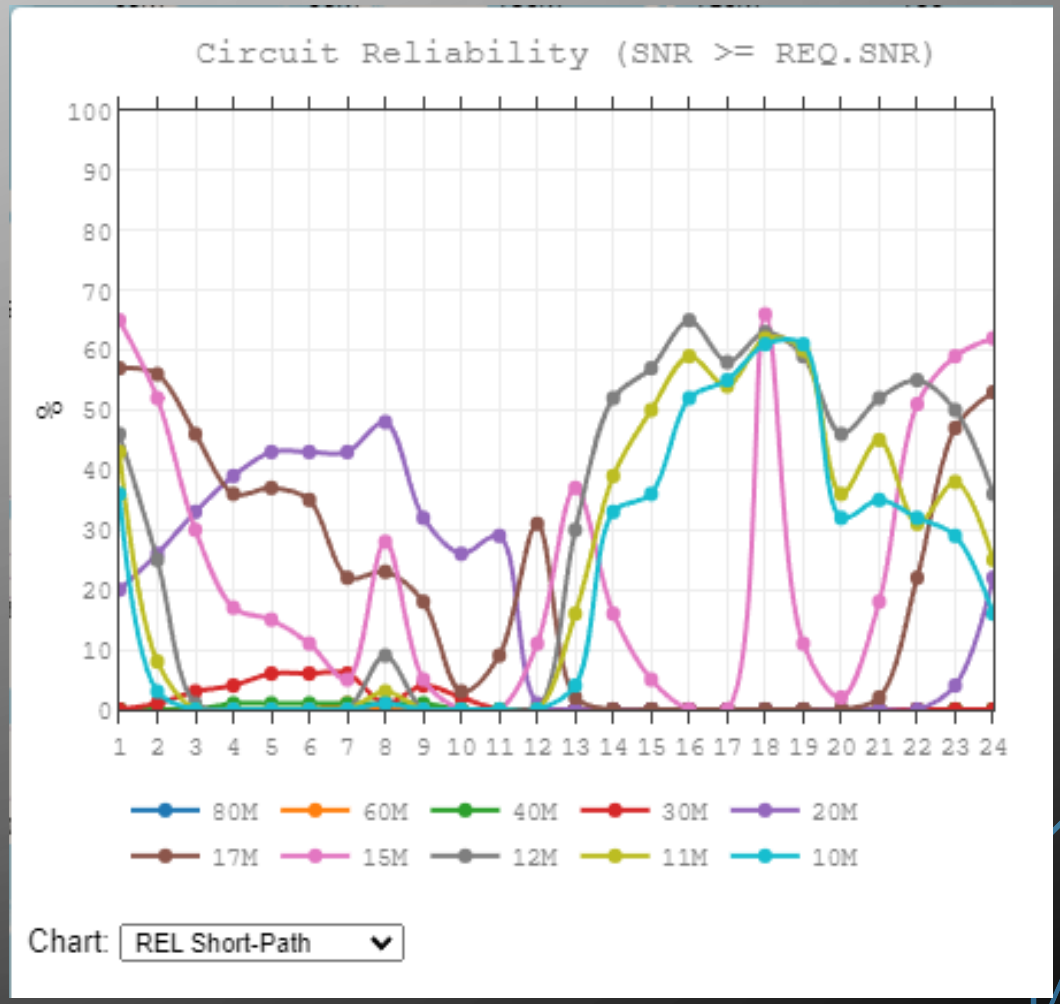
VOACAP PREDICTION FROM COLORADO TO LONDON, UK (10/7/23)



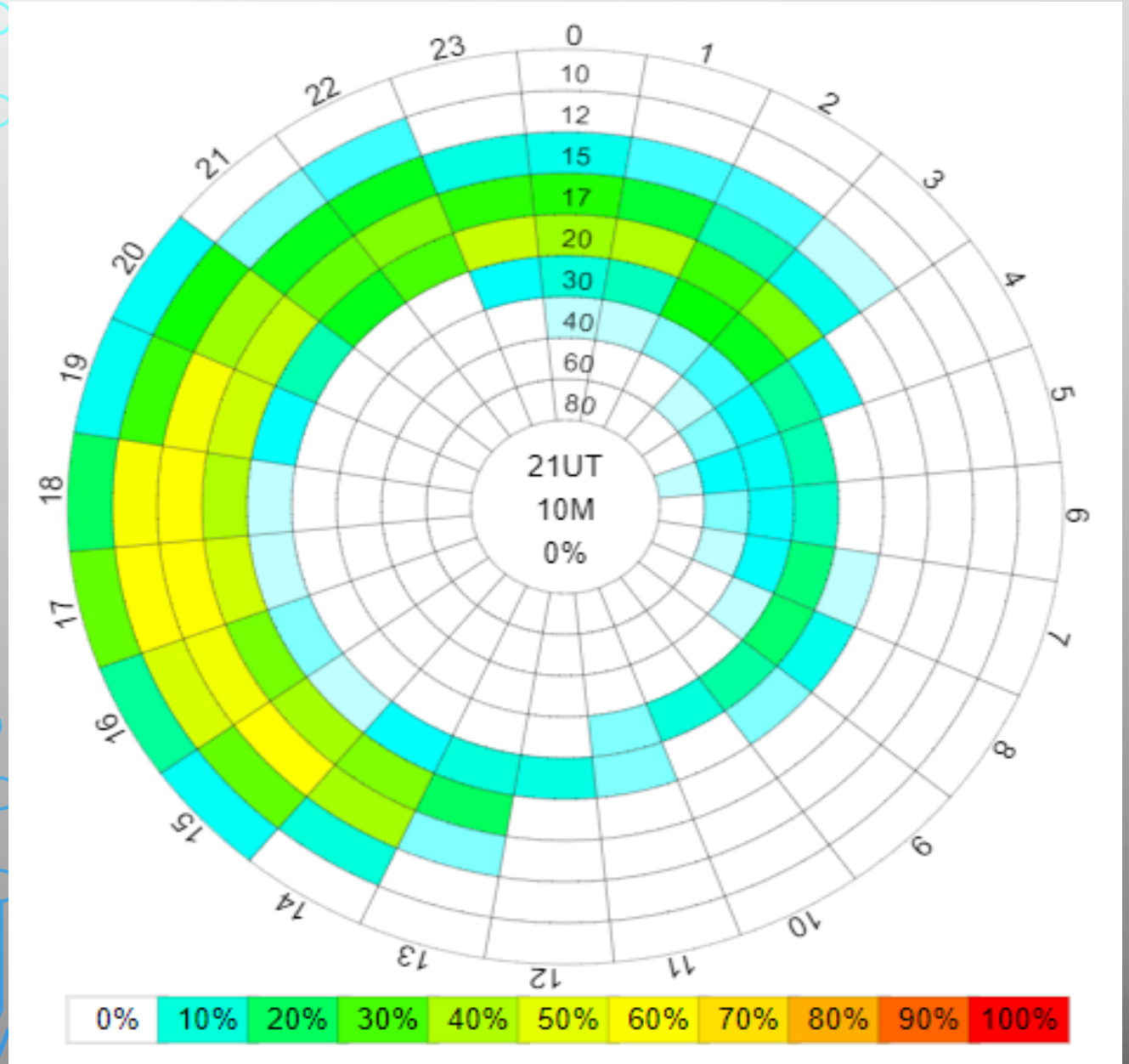


VOACAP PREDICTION FOR COLORADO TO PARAGUAY 9/21/2023





VOACAP ONLINE



PSK REPORTER

- Reporting Stations: Amateur radio operators often configure their stations to upload information about their received and decoded signals to the PSK Reporter website. This information includes details like the frequency used, the mode, signal strength, and location.

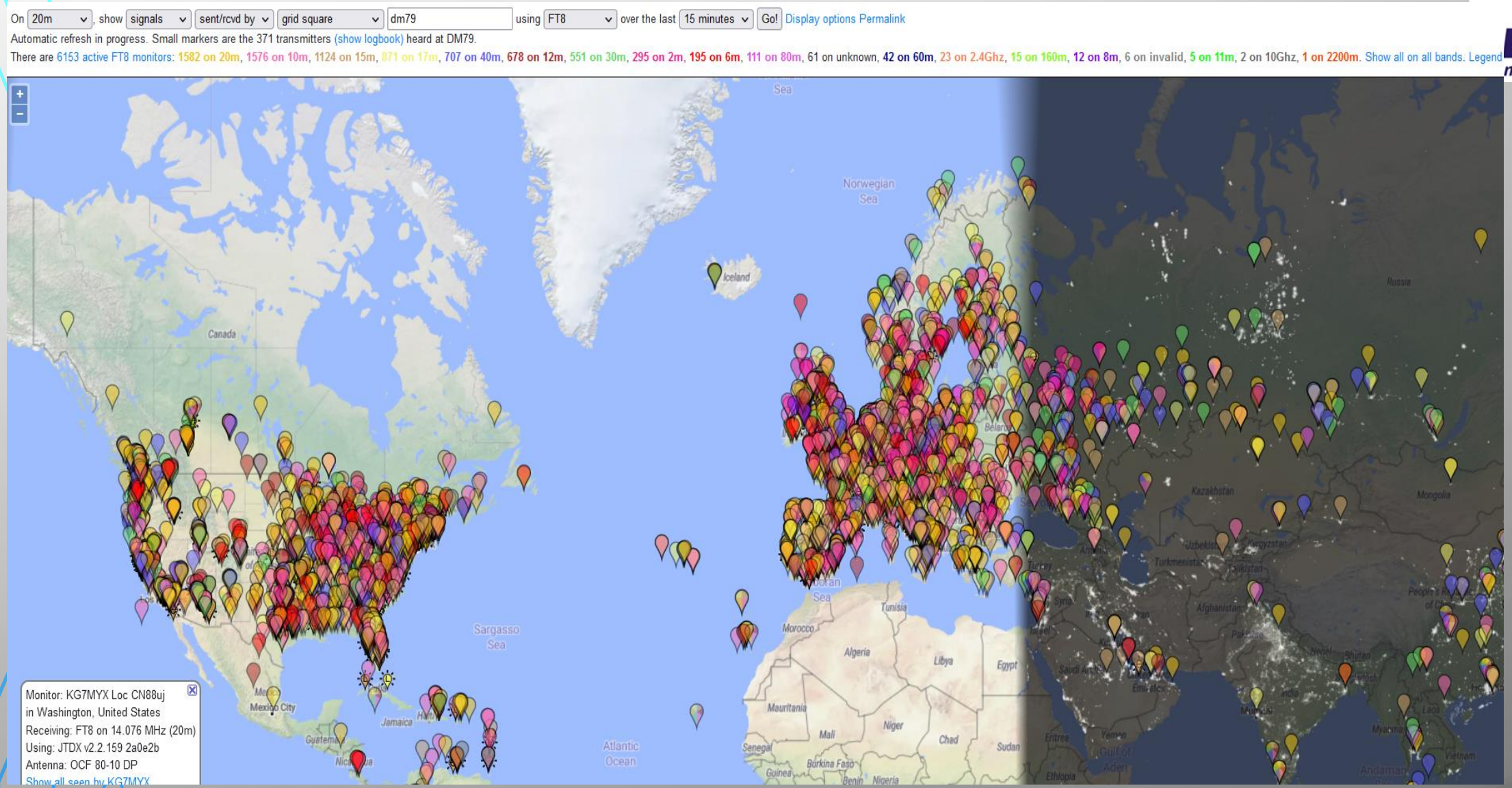
PSK REPORTER, CONT'D

- PSK Reporter collects all the incoming reports from participating stations and stores this data in a central database. It also records the transmitting station's location and other relevant information.
- Using the information from the database, PSK Reporter generates maps and graphs that show which stations can hear or communicate with each other. It provides valuable insights into propagation conditions and helps operators determine the effectiveness of their equipment and antenna setups.

PSK REPORTER, CONT'D

- PSK Reporter can provide propagation analysis, showing which parts of the world can hear a particular station at a given time. This information is valuable for making informed decisions about when and where to transmit.
- Displays real-time information about active stations and their reception reports. This feature is useful for operators who want to monitor current propagation conditions.

PSK REPORTER FILTERED MAP



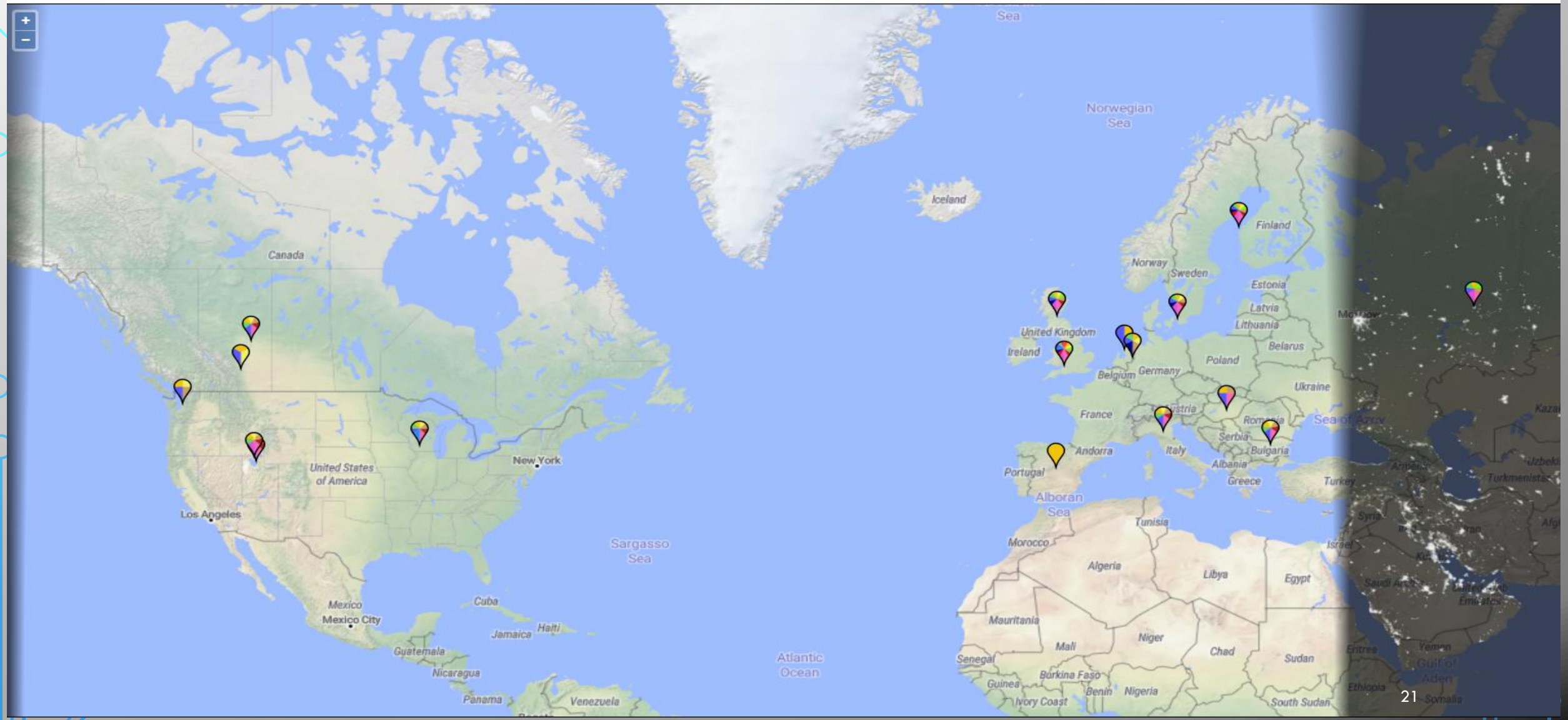
Filter: From DM79 all FT8 signals sent/rcvd over last 15 minutes

PSK REPORTER – FILTERED FOR CW ON 20M

On 20m, show signals, sent/rcvd by, grid square, dm79 using CW over the last 15 minutes Go! Display options Permalink

Automatic refresh in 4 minutes. Large markers are monitors.

There are 19 active CW monitors: 19 on 20m, 17 on 40m, 16 on 15m, 14 on 17m, 14 on 30m, 13 on 10m, 10 on 12m, 6 on 80m, 5 on 60m, 4 on 160m, 2 on 600m, 2 on 6m, 1 on 2200m, 1 on 2m. Show all on all bands. Legend

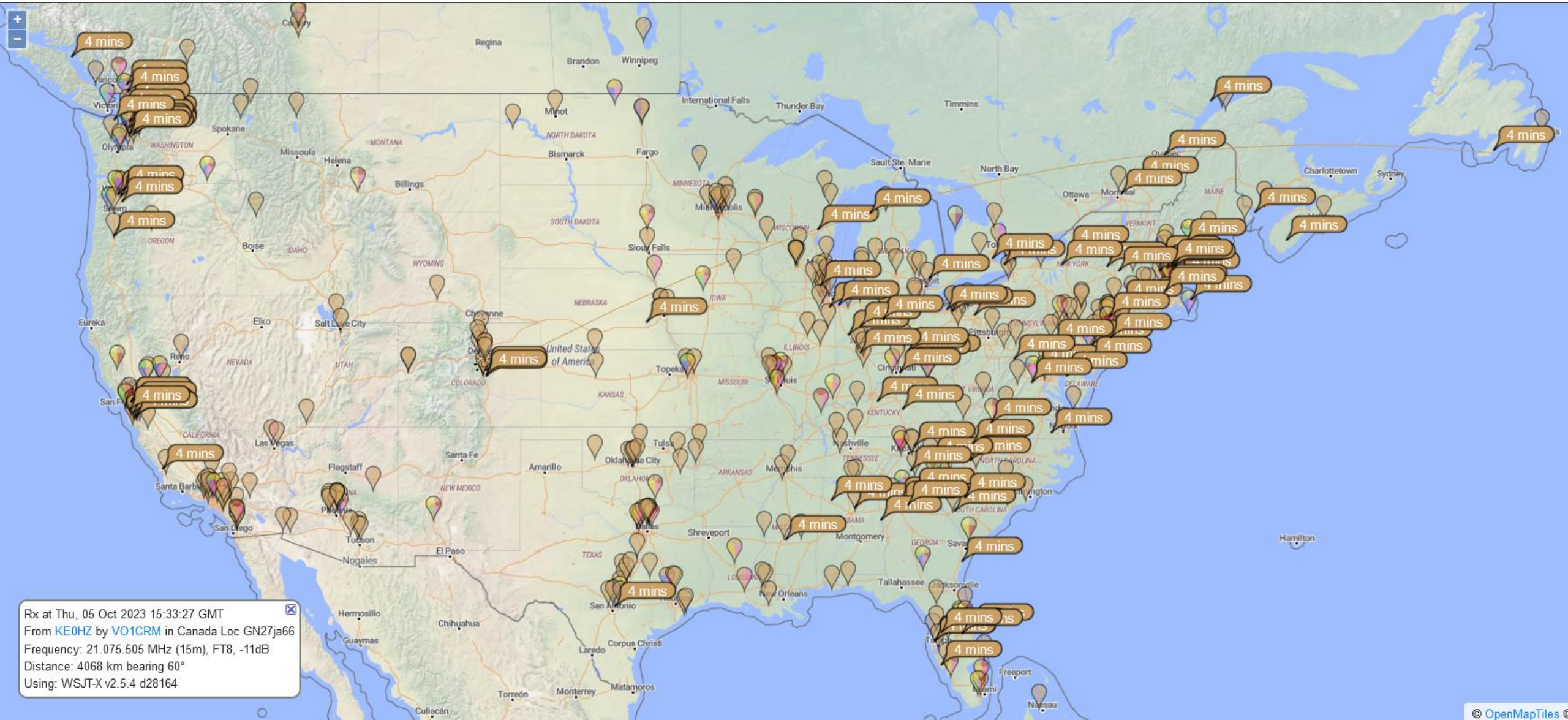


PSK REPORTER – MONITOR YOUR SIGNAL

On 15m, show signals sent by the callsign ke0hz using FT8 over the last 30 minutes Go! Display options Permalink

Monitoring KE0HZ (last heard 4 mins ago). Automatic refresh in 4 minutes. 114 reception reports for KE0HZ are shown as times (show logbook).

There are 1623 active FT8 monitors: 1604 on 15m, 236 on 20m, 230 on 10m, 216 on 17m, 203 on 12m, 171 on 40m, 170 on 30m, 46 on 80m, 26 on 2m, 24 on 6m, 19 on 60m, 13 on 160m, 2 on 600m, 1 on 11m, 1 on 10Ghz, 1 on 8m, 1 on 4m. Show all on all bands. Legend

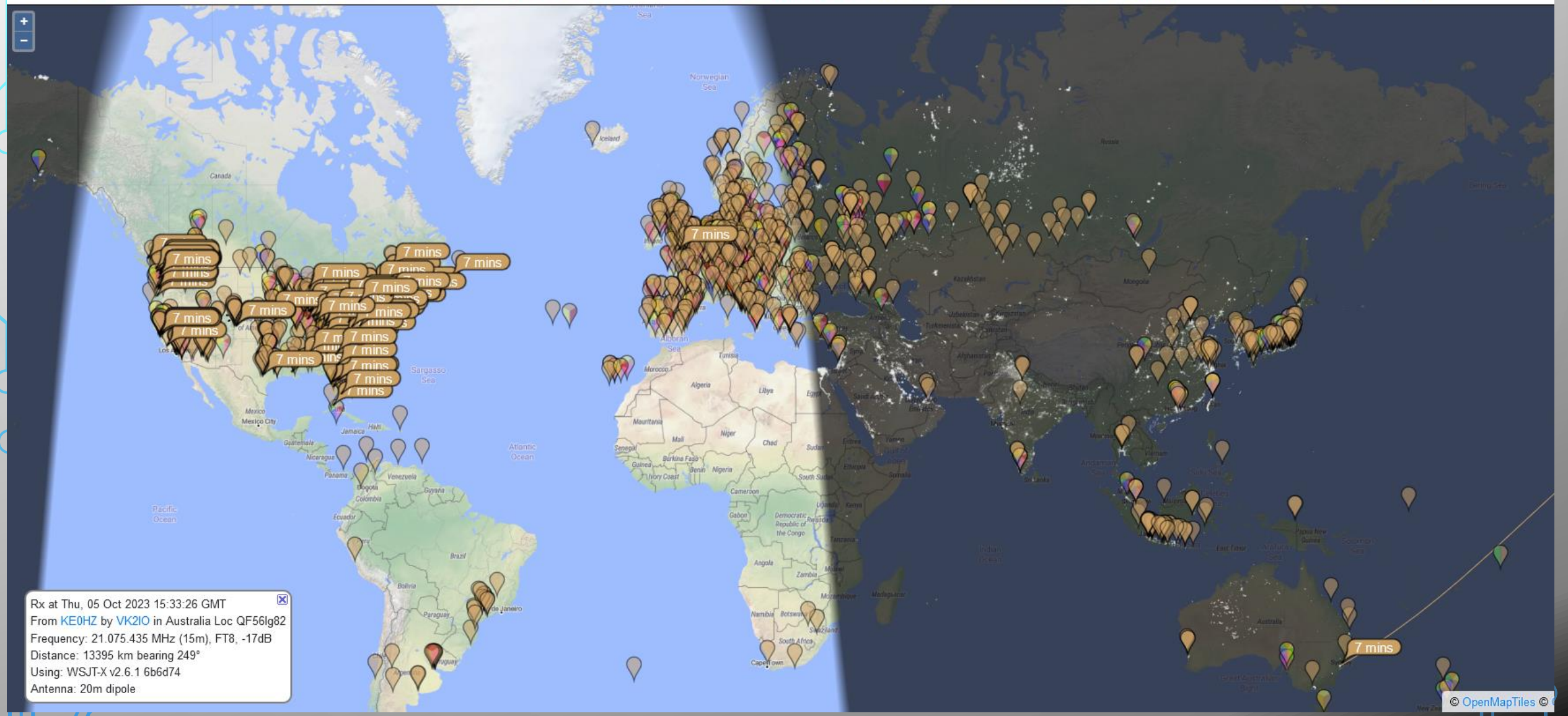


PSK REPORTER – MONITOR YOUR SIGNAL

On 15m, show signals sent by the callsign ke0hz using FT8 over the last 15 minutes Go! Display options Permalink

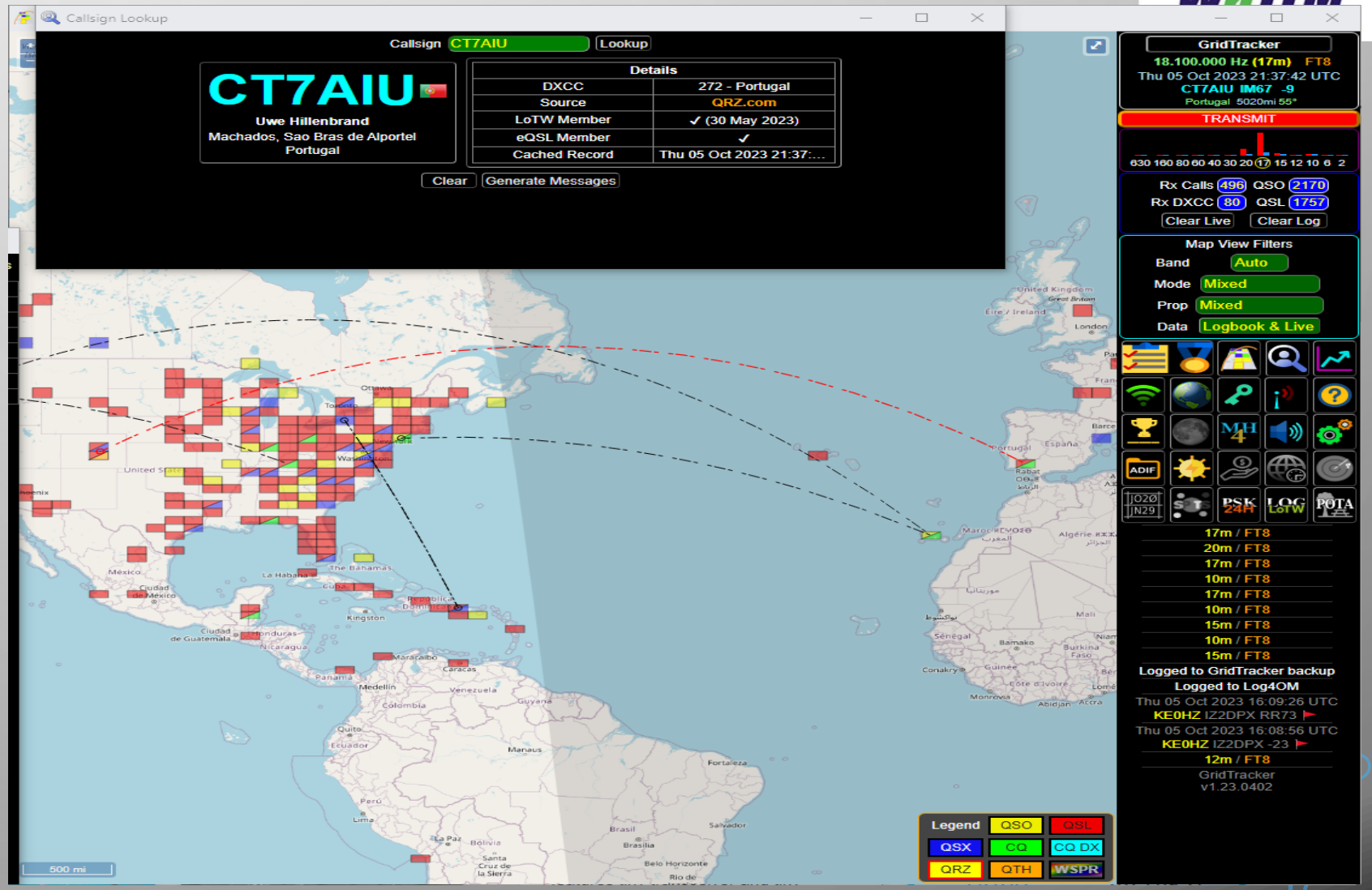
Monitoring KE0HZ (last heard 7 mins ago). Automatic refresh in 4 minutes. 126 reception reports for KE0HZ are shown as times (show logbook).

There are 1631 active FT8 monitors: 1613 on 15m, 246 on 20m, 236 on 10m, 224 on 17m, 210 on 12m, 178 on 40m, 177 on 30m, 49 on 80m, 26 on 2m, 23 on 6m, 21 on 60m, 14 on 160m, 2 on 600m, 1 on 8m, 1 on 11m, 1 on 10Ghz, 1 on 4m. Show all on all bands. Legend

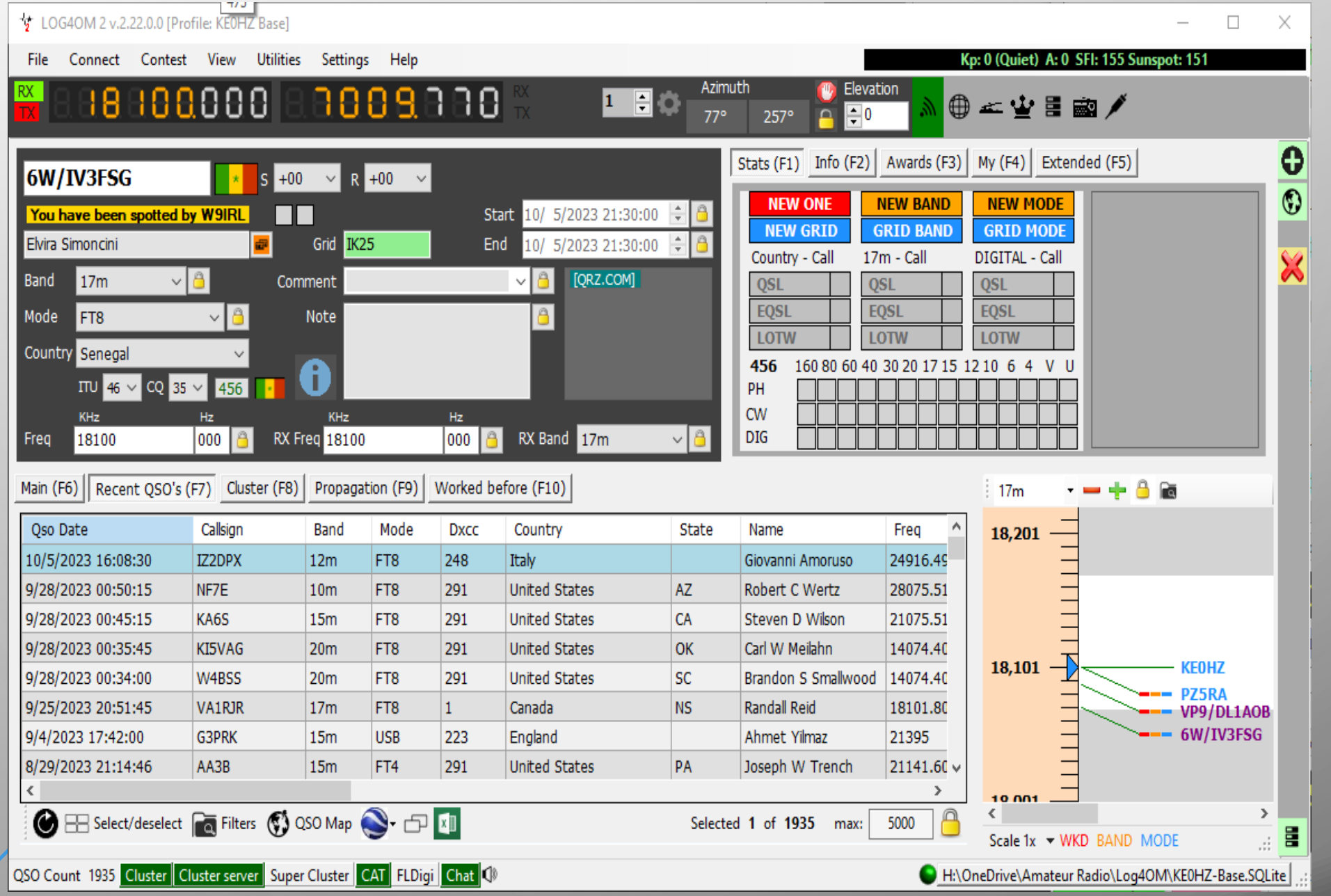


FT-8 & GRIDTRACKER

- See band activity in real time on a world map
- Red line on map is my 17M QSO with CT7AIU in Portugal
- Filter for view most helpful to you



GET SPOTTED WITH YOUR LOGGING APP



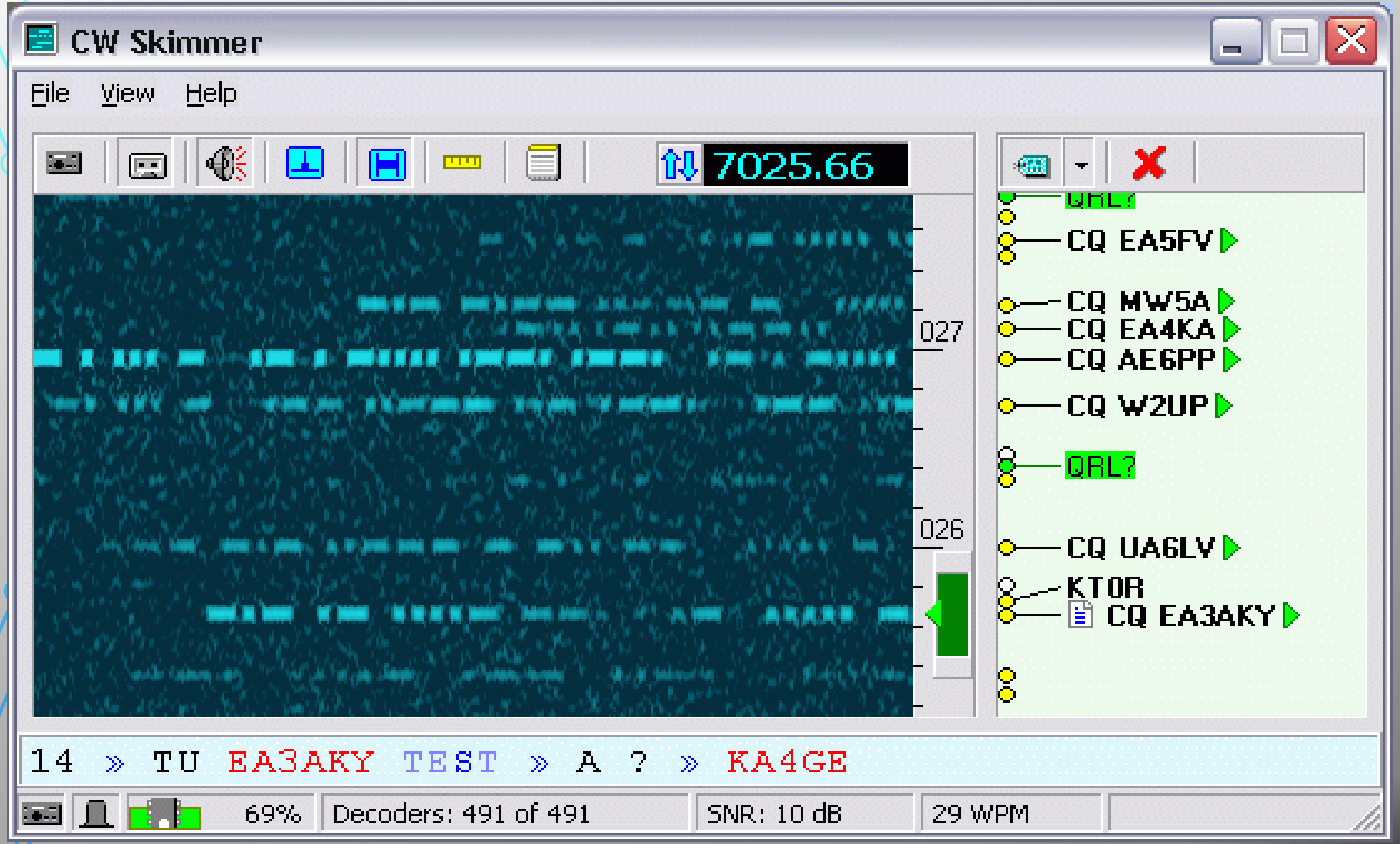
REVERSE BEACON NETWORK (RBN)

- The Reverse Beacon Network consists of a distributed network of receiving stations typically using SDRs. These receiving stations are located in different parts of the world and are often operated by volunteers who are part of the ham radio community.
- When a ham radio operator transmits a signal, the RBN receiving stations in the vicinity of the transmission frequency pick up the signal.

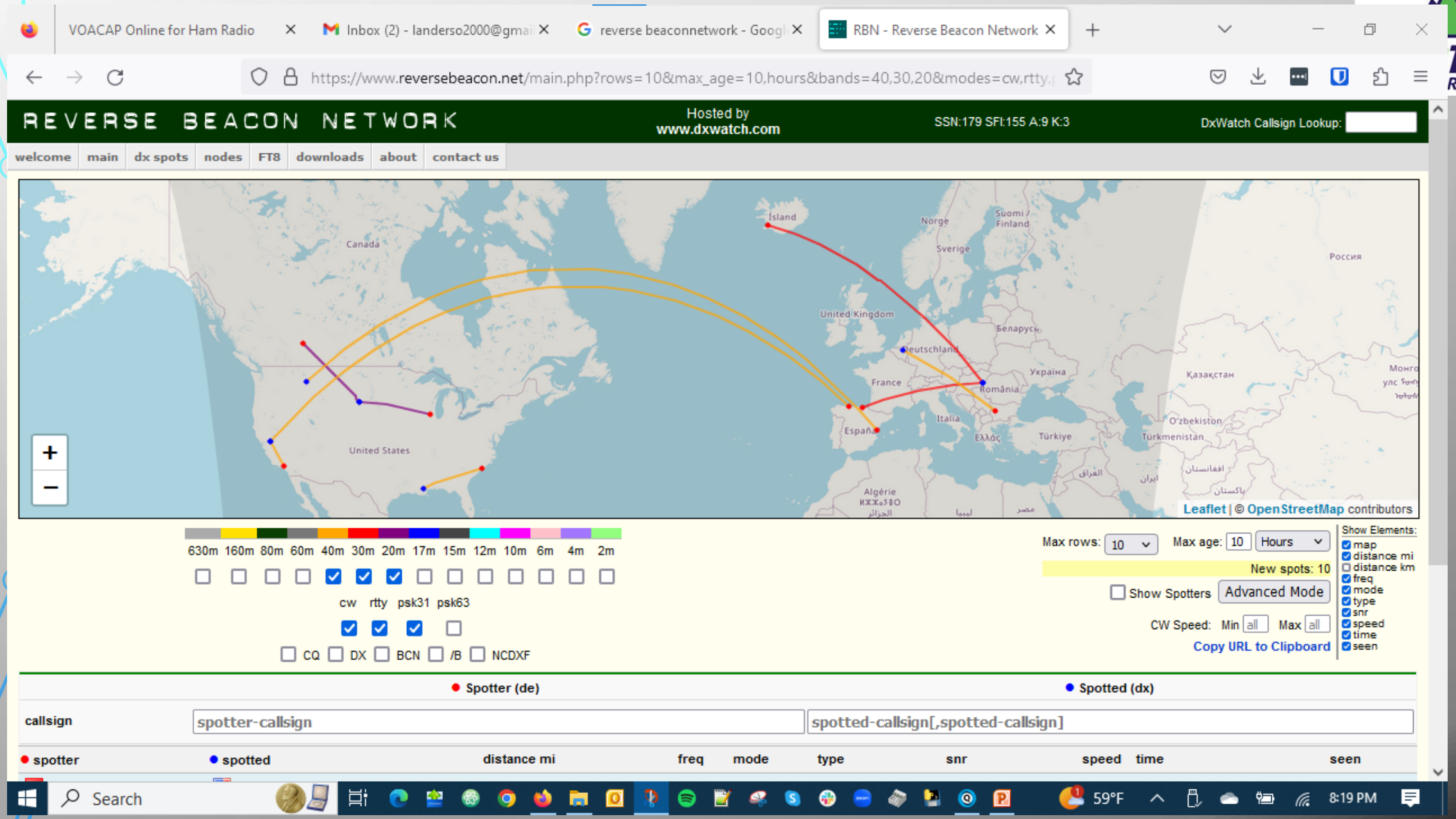
RBN, CONT'D

- The receiving stations, utilizing CW Skimmers, collect data about CW, RTTY, & PSK transmitted signals, including its frequency, signal strength, and the time of reception, and the operator's callsign.
- The collected data is then sent to a central server or database, which processes and stores the information.
- Radio operators can access the RBN's database. They can search for their callsign or frequency to see when and where their signal was received and what the signal strength was at those locations.

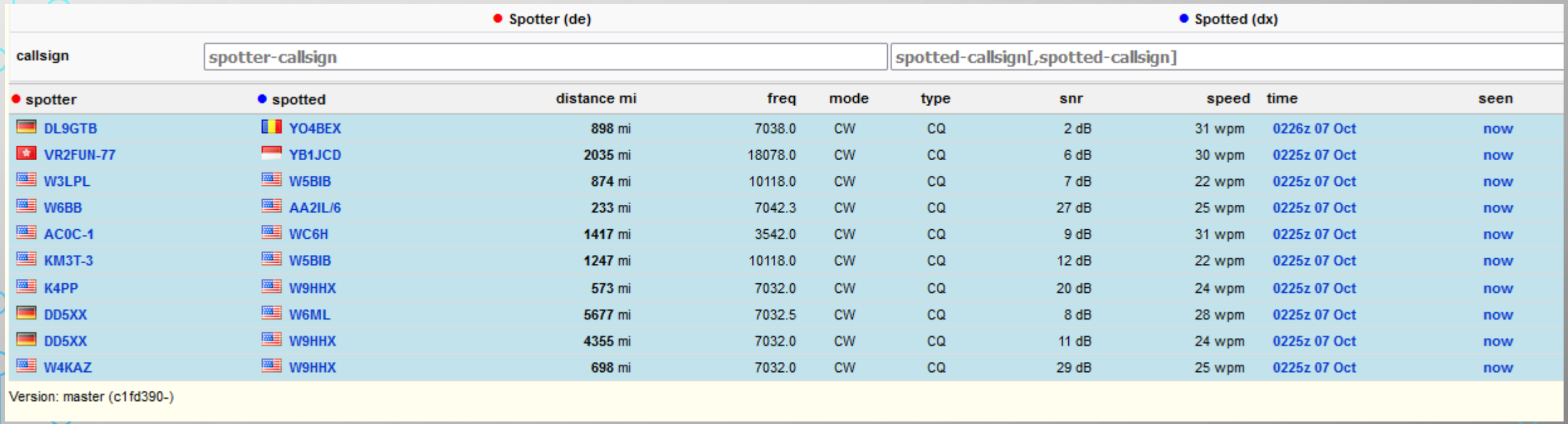
CW SKIMMER


CW Skimmer
File View Help
7025.66
027
026
CQ EA5FV
CQ MW5A
CQ EA4KA
CQ AE6PP
CQ W2UP
QRL?
CQ UA6LV
KT0R
CQ EA3AKY
14 » TU EA3AKY TEST » A ? » KA4GE
69%
Decoders: 491 of 491
SNR: 10 dB
29 WPM

RBN ONLINE APPLICATION

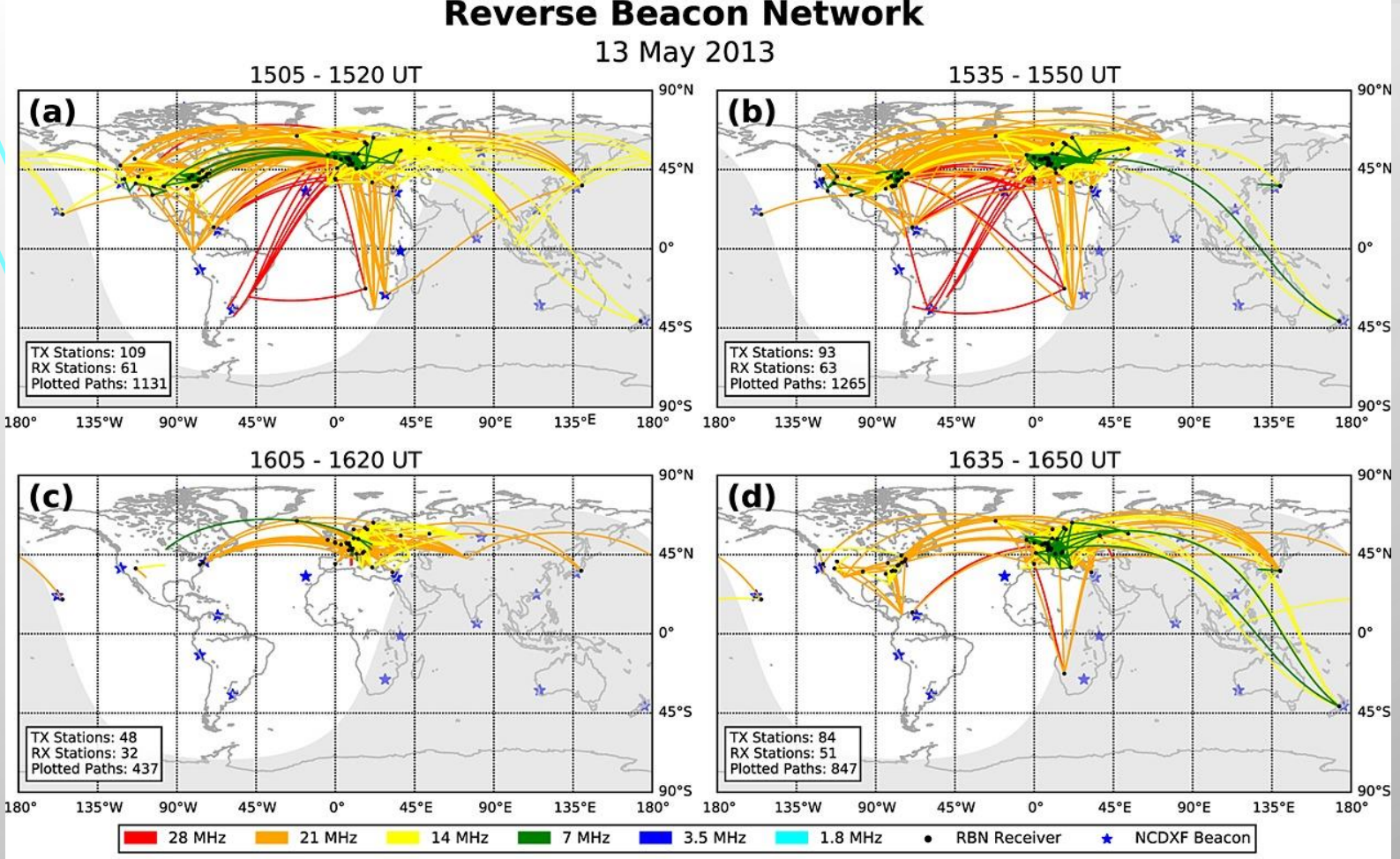


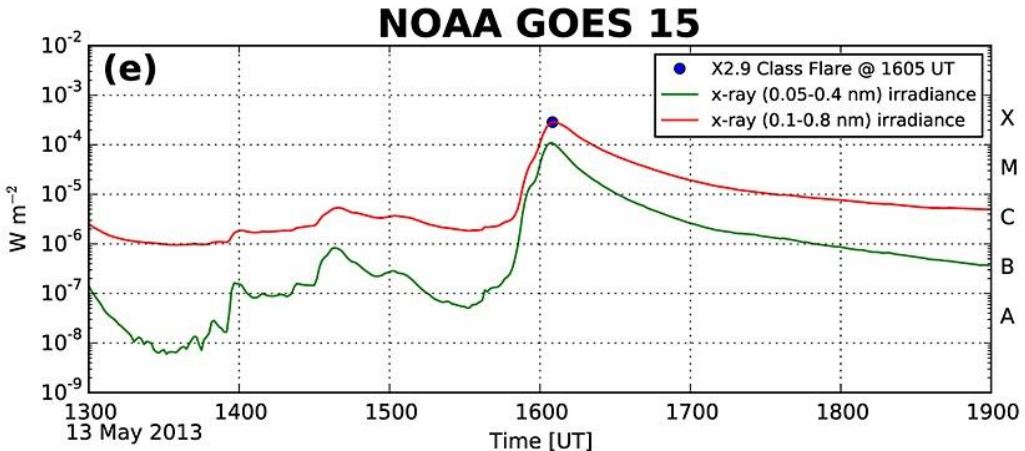
REVERSE BEACON NETWORK



	Spotter (de)		Spotted (dx)						
callsign	spotter-callsign		spotted-callsign[,spotted-callsign]						
spotter	spotted	distance mi	freq	mode	type	snr	speed	time	seen
DL9GTB	YO4BEX	898 mi	7038.0	CW	CQ	2 dB	31 wpm	0226z 07 Oct	now
VR2FUN-77	YB1JCD	2035 mi	18078.0	CW	CQ	6 dB	30 wpm	0225z 07 Oct	now
W3LPL	W5BIB	874 mi	10118.0	CW	CQ	7 dB	22 wpm	0225z 07 Oct	now
W6BB	AA2IL/6	233 mi	7042.3	CW	CQ	27 dB	25 wpm	0225z 07 Oct	now
AC0C-1	WC6H	1417 mi	3542.0	CW	CQ	9 dB	31 wpm	0225z 07 Oct	now
KM3T-3	W5BIB	1247 mi	10118.0	CW	CQ	12 dB	22 wpm	0225z 07 Oct	now
K4PP	W9HHX	573 mi	7032.0	CW	CQ	20 dB	24 wpm	0225z 07 Oct	now
DD5XX	W6ML	5677 mi	7032.5	CW	CQ	8 dB	28 wpm	0225z 07 Oct	now
DD5XX	W9HHX	4355 mi	7032.0	CW	CQ	11 dB	24 wpm	0225z 07 Oct	now
W4KAZ	W9HHX	698 mi	7032.0	CW	CQ	29 dB	25 wpm	0225z 07 Oct	now

Version: master (c1fd390-)





RBN is used by atmospheric and solar scientists to study propagation affects during a solar eclipse.

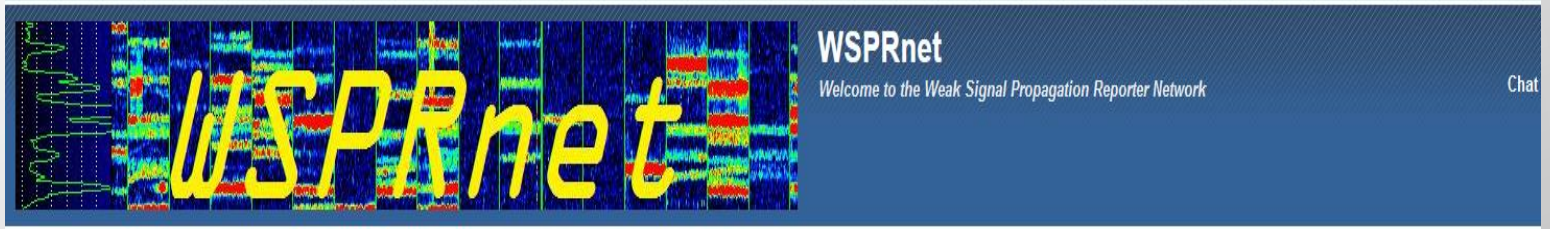
WSPR (WSPRNET)

- From Wikipedia:

WSPR (pronounced "whisper") is an acronym for *Weak Signal Propagation Reporter*. It is a protocol, implemented in a computer program, used for weak-signal radio communication between amateur radio operators. The protocol was designed, and a program written initially, by Joe Taylor, K1JT. The software code is now open source and is developed by a small team. The program is designed for sending and receiving low-power transmissions to test propagation paths on the MF and HF bands.

https://www.wsprnet.org

WSPR



Frequencies

USB dial (MHz): 0.136, 0.4742, 1.8366, 3.5686, 5.2872, 5.3647, 7.0386, 10.1387, 13.5539, 14.0956, 18.1046, 21.0946, 24.9246, 28.1246, 50.293, 70.091, 144.489, 432.300, 1296.500

Navigation

- Add content
- Forums

3rd Party Maps and Data

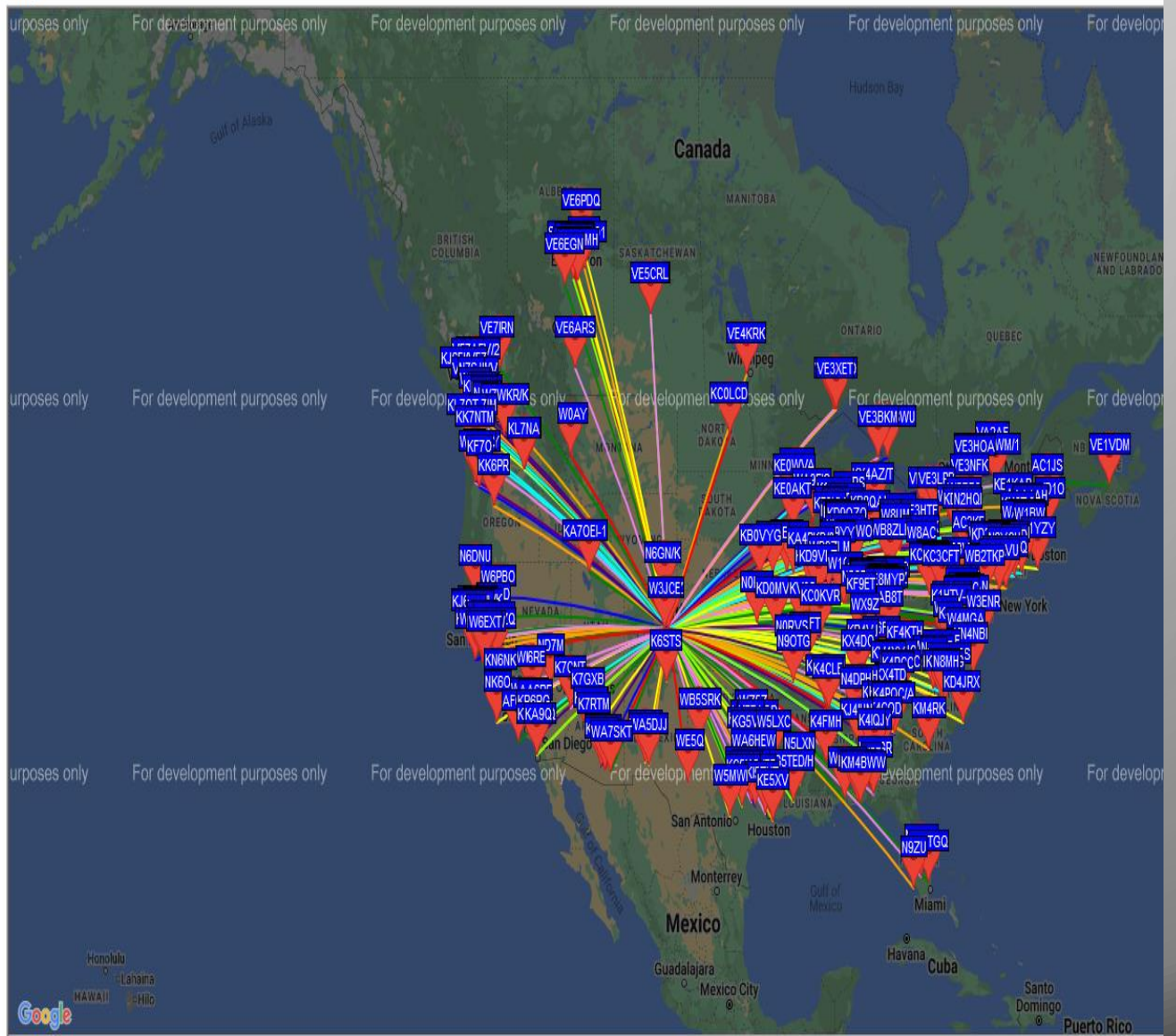
WSPR Rocks!
M0XDK Map
KB9AMG Monthly Stats
WA2ZKD Spot Analysis
DJ2LS WSPR Spot Heat Map
LU7AA/LU7ABF Maps/Graphs

Who's online

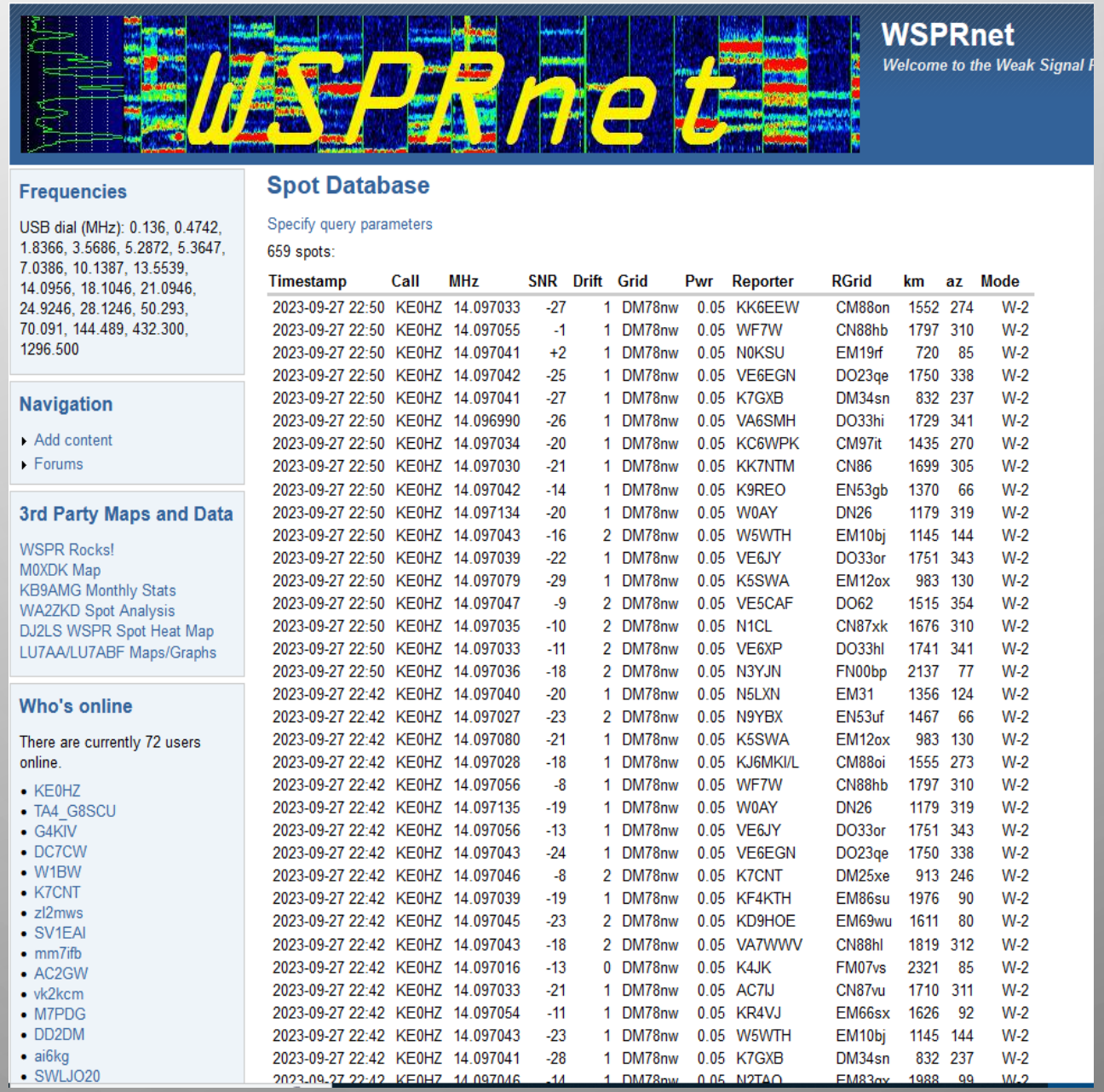
There are currently 71 users online.

- KE0HZ
- ve7hqt
- AC9RZ
- WA4DT
- N4WLO
- K6JFZ
- kj6wsm
- KF5GCF
- VK7JJ
- R2BIY
- kg7cui
- KC2DSH
- SP3BLK

Map



WSPRNET DATABASE



WSPRnet

Welcome to the Weak Signal

Frequencies

USB dial (MHz): 0.136, 0.4742, 1.8366, 3.5686, 5.2872, 5.3647, 7.0386, 10.1387, 13.5539, 14.0956, 18.1046, 21.0946, 24.9246, 28.1246, 50.293, 70.091, 144.489, 432.300, 1296.500

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Who's online

There are currently 72 users online.

- KE0HZ
- TA4_G8SCU
- G4KIV
- DC7CW
- W1BW
- K7CNT
- zl2mws
- SV1EAI
- mm7ifb
- AC2GW
- vk2kcm
- M7PDG
- DD2DM
- ai6kg
- SWLJO20

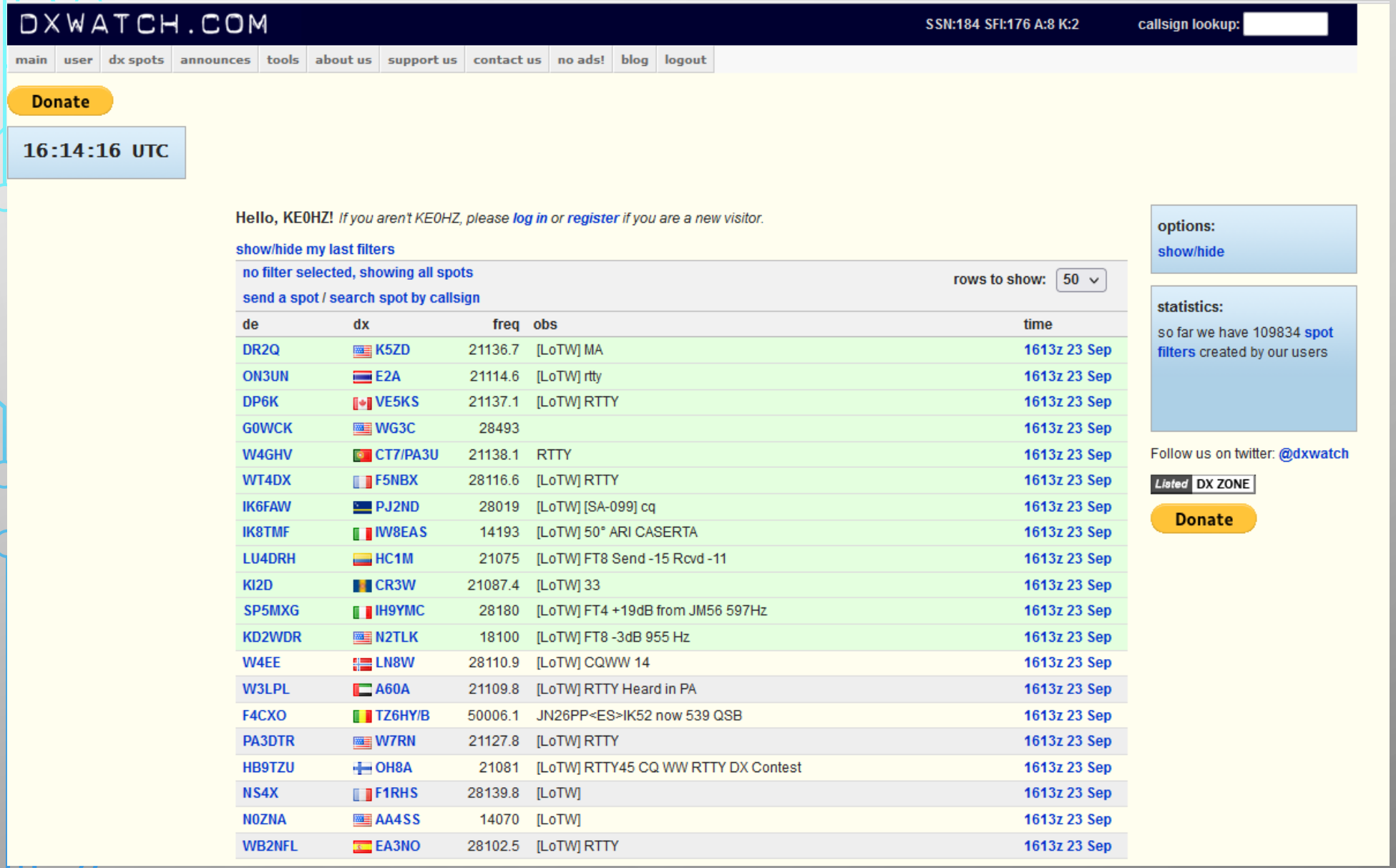
Spot Database

Specify query parameters

659 spots:

Timestamp	Call	MHz	SNR	Drift	Grid	Pwr	Reporter	RGrid	km	az	Mode
2023-09-27 22:50	KE0HZ	14.097033	-27	1	DM78nw	0.05	KK6EEW	CM88on	1552	274	W-2
2023-09-27 22:50	KE0HZ	14.097055	-1	1	DM78nw	0.05	WF7W	CN88hb	1797	310	W-2
2023-09-27 22:50	KE0HZ	14.097041	+2	1	DM78nw	0.05	N0KSU	EM19rf	720	85	W-2
2023-09-27 22:50	KE0HZ	14.097042	-25	1	DM78nw	0.05	VE6EGN	DO23qe	1750	338	W-2
2023-09-27 22:50	KE0HZ	14.097041	-27	1	DM78nw	0.05	K7GXB	DM34sn	832	237	W-2
2023-09-27 22:50	KE0HZ	14.096990	-26	1	DM78nw	0.05	VA6SMH	DO33hi	1729	341	W-2
2023-09-27 22:50	KE0HZ	14.097034	-20	1	DM78nw	0.05	KC6WPK	CM97it	1435	270	W-2
2023-09-27 22:50	KE0HZ	14.097030	-21	1	DM78nw	0.05	KK7NTM	CN86	1699	305	W-2
2023-09-27 22:50	KE0HZ	14.097042	-14	1	DM78nw	0.05	K9REO	EN53gb	1370	66	W-2
2023-09-27 22:50	KE0HZ	14.097134	-20	1	DM78nw	0.05	W0AY	DN26	1179	319	W-2
2023-09-27 22:50	KE0HZ	14.097043	-16	2	DM78nw	0.05	W5WTH	EM10bj	1145	144	W-2
2023-09-27 22:50	KE0HZ	14.097039	-22	1	DM78nw	0.05	VE6JY	DO33or	1751	343	W-2
2023-09-27 22:50	KE0HZ	14.097079	-29	1	DM78nw	0.05	K5SWA	EM12ox	983	130	W-2
2023-09-27 22:50	KE0HZ	14.097047	-9	2	DM78nw	0.05	VE5CAF	DO62	1515	354	W-2
2023-09-27 22:50	KE0HZ	14.097035	-10	2	DM78nw	0.05	N1CL	CN87xk	1676	310	W-2
2023-09-27 22:50	KE0HZ	14.097033	-11	2	DM78nw	0.05	VE6XP	DO33hl	1741	341	W-2
2023-09-27 22:50	KE0HZ	14.097036	-18	2	DM78nw	0.05	N3YJN	FN00bp	2137	77	W-2
2023-09-27 22:42	KE0HZ	14.097040	-20	1	DM78nw	0.05	N5LXN	EM31	1356	124	W-2
2023-09-27 22:42	KE0HZ	14.097027	-23	2	DM78nw	0.05	N9YBX	EN53uf	1467	66	W-2
2023-09-27 22:42	KE0HZ	14.097080	-21	1	DM78nw	0.05	K5SWA	EM12ox	983	130	W-2
2023-09-27 22:42	KE0HZ	14.097028	-18	1	DM78nw	0.05	KJ6MKI/L	CM88oi	1555	273	W-2
2023-09-27 22:42	KE0HZ	14.097056	-8	1	DM78nw	0.05	WF7W	CN88hb	1797	310	W-2
2023-09-27 22:42	KE0HZ	14.097135	-19	1	DM78nw	0.05	W0AY	DN26	1179	319	W-2
2023-09-27 22:42	KE0HZ	14.097056	-13	1	DM78nw	0.05	VE6JY	DO33or	1751	343	W-2
2023-09-27 22:42	KE0HZ	14.097043	-24	1	DM78nw	0.05	VE6EGN	DO23qe	1750	338	W-2
2023-09-27 22:42	KE0HZ	14.097046	-8	2	DM78nw	0.05	K7CNT	DM25xe	913	246	W-2
2023-09-27 22:42	KE0HZ	14.097039	-19	1	DM78nw	0.05	KF4KTH	EM86su	1976	90	W-2
2023-09-27 22:42	KE0HZ	14.097045	-23	2	DM78nw	0.05	KD9HOE	EM69wu	1611	80	W-2
2023-09-27 22:42	KE0HZ	14.097043	-18	2	DM78nw	0.05	VA7WWV	CN88hl	1819	312	W-2
2023-09-27 22:42	KE0HZ	14.097016	-13	0	DM78nw	0.05	K4JK	FM07vs	2321	85	W-2
2023-09-27 22:42	KE0HZ	14.097033	-21	1	DM78nw	0.05	AC7IJ	CN87vu	1710	311	W-2
2023-09-27 22:42	KE0HZ	14.097054	-11	1	DM78nw	0.05	KR4VJ	EM66sx	1626	92	W-2
2023-09-27 22:42	KE0HZ	14.097043	-23	1	DM78nw	0.05	W5WTH	EM10bj	1145	144	W-2
2023-09-27 22:42	KE0HZ	14.097041	-28	1	DM78nw	0.05	K7GXB	DM34sn	832	237	W-2
2023-09-27 22:42	KE0HZ	14.097046	-14	1	DM78nw	0.05	N2TAQ	EM83qx	1988	99	W-2

DXWATCH.COM



de	dx	freq	obs	time
DR2Q	K5ZD	21136.7	[LoTW] MA	1613z 23 Sep
ON3UN	E2A	21114.6	[LoTW] rtty	1613z 23 Sep
DP6K	VE5KS	21137.1	[LoTW] RTTY	1613z 23 Sep
G0WCK	WG3C	28493		1613z 23 Sep
W4GHV	CT7/PA3U	21138.1	RTTY	1613z 23 Sep
WT4DX	F5NBX	28116.6	[LoTW] RTTY	1613z 23 Sep
IK6FAW	PJ2ND	28019	[LoTW] [SA-099] cq	1613z 23 Sep
IK8TMF	IW8EAS	14193	[LoTW] 50° ARI CASERTA	1613z 23 Sep
LU4DRH	HC1M	21075	[LoTW] FT8 Send -15 Rcvd -11	1613z 23 Sep
KI2D	CR3W	21087.4	[LoTW] 33	1613z 23 Sep
SP5MXG	IH9YMC	28180	[LoTW] FT4 +19dB from JM56 597Hz	1613z 23 Sep
KD2WDR	N2TLK	18100	[LoTW] FT8 -3dB 955 Hz	1613z 23 Sep
W4EE	LN8W	28110.9	[LoTW] CQWW 14	1613z 23 Sep
W3LPL	A60A	21109.8	[LoTW] RTTY Heard in PA	1613z 23 Sep
F4CXO	TZ6HY/B	50006.1	JN26PP<ES>IK52 now 539 QSB	1613z 23 Sep
PA3DTR	W7RN	21127.8	[LoTW] RTTY	1613z 23 Sep
HB9TZU	OH8A	21081	[LoTW] RTTY45 CQ WW RTTY DX Contest	1613z 23 Sep
NS4X	F1RHS	28139.8	[LoTW]	1613z 23 Sep
N0ZNA	AA4SS	14070	[LoTW]	1613z 23 Sep
WB2NFL	EA3NO	28102.5	[LoTW] RTTY	1613z 23 Sep

Unlike PSK Reporter or RBN information in DXWATCH is uploaded by the users either manually or via the logging software.

DXHEAT

DX Cluster | Login/Signup

Filters

All | None

Sources

W3LPL

DXCC

VALID | OTHER

Modes

CW | PHONE | DIGI

Bands

SHF | UHF | VHF | 4m | 6m | 10m | 12m | 15m | 17m | 20m

DX de	Freq	DX	Tags	Comments	UTC	Date
OV5O	21 010,0	CT7/PA3GCU	@	TU new band, 73	20:07	27/09/23
PY8WW	50 313,0	ZD7MY	@	FT8 +0 dB 2129 Hz	20:07	27/09/23
RV3LO	3 524,0	UA3LNM/P		RDA SM-21 SM-29 SM-10	20:06	27/09/23
DO3HX	21 237,0	NX8T	@	73 Jim, stay save and good DXX	20:06	27/09/23
ON4EDG	7 041,0	G1IPU	@	PSK 599 JO20hx<>JO01nt	20:06	27/09/23
LU9DCE	28 075,0	N8DXE	@	FT8 Send -16 Rcvd -13	20:06	27/09/23
EB1DJ	28 486,0	EA5IPM	@	CQ DX	20:06	27/09/23
SP6EFY	14 074,0	N1DZJ	@	FT8 -23dB 1638Hz	20:06	27/09/23
WO2E	24 916,1	F4JRI	@		20:05	27/09/23
F4JSZ	14 226,0	JY5FA			20:05	27/09/23
EA4M	1 840,0	EA7JVC	@	FT8 -14dB from IM76 998Hz	20:05	27/09/23
NK9O	21 074,0	PA5DX	@		20:05	27/09/23
PY2CAT	28 180,0	I1SOP	@	CDM I*	20:04	27/09/23
YT1TU	18 072,9	K2TQC	@		20:04	27/09/23
W8CTO	14 316,0	AD0WN	@		20:04	27/09/23
EC3A	3 540,0	CT1APP	@		20:04	27/09/23
EA5JN	14 215,0	PE1ISP		POTA PA-0219	20:04	27/09/23
WO2E	24 916,1	OZ1RH	@		20:04	27/09/23
UX7IW	7 002,9	DK9PY			20:03	27/09/23
IU1PZC	7 155,0	IU1HIF		Alpi radio award 5 pt	20:03	27/09/23
KX3C	28 075,6	EB5AG	@		20:03	27/09/23
K2WOP	18 155,0	IK8FUN	@	GRAZIE FRANCO 73'S	20:03	27/09/23
WT4DX	24 945,0	S01WS	@	59 in TX	20:02	27/09/23
LU4DRH	24 916,0	F4JRI	@	FT8 Send -19 Rcvd -07	20:02	27/09/23
WY6K	18 105,8	PE1PEO	@		20:02	27/09/23
W3LPL	24 896,9	YV5IUA	@	Heard in MA and AZ	20:02	27/09/23
PY2CAT	28 074,0	DC9JVN	@	TNX QSO 73	20:02	27/09/23
IU4QRW	7 144,0	IK2ANI	@	ref. bg11	20:01	27/09/23
EA4M	1 840,0	OO7P	@	FT8 -12dB from JO21 2330Hz	20:01	27/09/23
EA8AM	24 948,0	PJ2ND	@	Tnx Jeff. 73....	20:01	27/09/23
WO2E	24 916,1	T77C	@		20:01	27/09/23
IU1HGO	7 155,0	IU1HIF		ALPIRADIO 5 PT	20:01	27/09/23
CE3SX	50 313,0	F4VPC	@	FF46<>IN87VV merci qso	20:01	27/09/23
SP3BW	14 210,0	PY6HD	@	Tnx QSO73	20:01	27/09/23
EA5HJV	14 178,0	HB9UOX	@		20:00	27/09/23

Realtime World Clock

20:07:31 UTC

Wednesday, 27. of September 2023

Search

CALLSIGN | Search

Default | Wildcard

Submit

Submit a DX Spot

(Login required)

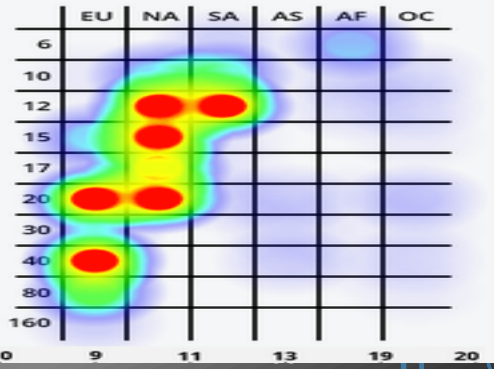
Propagation

Solar Activity
SFI: 165

Magnetic Activity
K: 3 A: 26

Band Activity

Your Continent is Europe



QRZCQ

QRZCQ - The database for radio hams

Report a problem | Help

2023-09-27 20:09:32 UTC

Call: SEARCH Advanced

Call: Pass: LOGIN or register

DX Cluster

DX-Cluster spots between 2200m and 70cm in the last 1 hours

Date / Time	Frequency	DX Call	Spotter	Remarks
2023-09-27 20:09:29	14048.5 kHz	W1AW/7	N7UVH	
2023-09-27 20:09:19	28180.0 kHz	PU5FLP	PY2CAT	TNX QSO 73
2023-09-27 20:09:18	28075.6 kHz	EB4DSP	KX3C	
2023-09-27 20:09:03	24916.2 kHz	F5JUS	W0RDR	
2023-09-27 20:08:42	18100.0 kHz	ZA/SV1ENG	DL4MFF	JN57IW<>JM99 tnx ft8
2023-09-27 20:08:42	14017.0 kHz	PY1QQ	SP5IXS	
2023-09-27 20:08:13	28180.0 kHz	W7DO	PY2CAT	TNX QSO 73
2023-09-27 20:07:37	14058.1 kHz	VE2JCW	AC8NI	
2023-09-27 20:07:15	21010.0 kHz	CT7/PA3GCU	OV5O	TU new band, 73
2023-09-27 20:07:10	50313.0 kHz	ZD7MY	PY8WW	FT8 +0 dB 2129 Hz
2023-09-27 20:06:44	3524.0 kHz	UA3LNM/P	RV3LO	RDA SM-21 SM-29 SM-10
2023-09-27 20:06:36	21237.0 kHz	NX8T	DO3HX	73 Jim, stay save and good DXX
2023-09-27 20:06:21	14074.0 kHz	YO4NF	WB8AKW	FT8
2023-09-27 20:06:20	7041.0 kHz	G1IPU	ON4EDG	PSK 599 JO20hx<>JO01nt
2023-09-27 20:06:19	28075.0 kHz	N8DXE	LU9DCE	FT8 Send -16 Rcvd -13
2023-09-27 20:06:14	7080.0 kHz	VK9LAA	OK1ALX	FT8 -21dB from QF98 591Hz
2023-09-27 20:06:06	28486.0 kHz	EA5IPM	EB1DJ	CQ DX
2023-09-27 20:06:03	14074.0 kHz	N1DZJ	SP6EFY	FT8 -23dB 1638Hz
2023-09-27 20:06:00	28180.0 kHz	YO9BLY	OK1ALX	FT4 -12dB from KN24 1912Hz
2023-09-27 20:05:47	24916.1 kHz	F4JRI	WO2E	
2023-09-27 20:05:35	14226.0 kHz	JY5FA	F4JSZ	
2023-09-27 20:05:22	1840.0 kHz	EA7JVC	EA4M	FT8 -14dB from IM76 998Hz
2023-09-27 20:05:10	21074.0 kHz	PA5DX	NK9O	
2023-09-27 20:04:57	28180.0 kHz	I1SOP	PY2CAT	CDM I*
2023-09-27 20:04:49	18072.9 kHz	K2TQC	YT1TU	
2023-09-27 20:04:37	14316.0 kHz	AD0WN	W8CTO	
2023-09-27 20:04:32	3540.0 kHz	CT1APP	EC3A	
2023-09-27 20:04:27	14215.0 kHz	PE1ISP	EA5JN	POTA PA-0219
2023-09-27 20:04:16	24916.1 kHz	OZ1RH	WO2E	
2023-09-27 20:03:52	7144.0 kHz	IK2ANI	PD9DY	CDM I* DCI BG011
2023-09-27 20:03:40	7002.9 kHz	DK9PY	UX7IW	
2023-09-27 20:03:38	14074.0 kHz	ES5QA	WB8AKW	FT8
2023-09-27 20:03:35	7155.0 kHz	IU1HIF	IU1PZC	Alpi radio award 5 pt
2023-09-27 20:03:19	28075.6 kHz	EB5AG	KX3C	

- Today featured: J9AQ

- Hottest QRG on DX Cluster now:

144174.0 kHz on 2m band
DX RA3LBW by UA4CC

- Current activities in calendar:

⇒ Contests

- Websites supporting QRZCQ:

QRZCQ supporting Websites

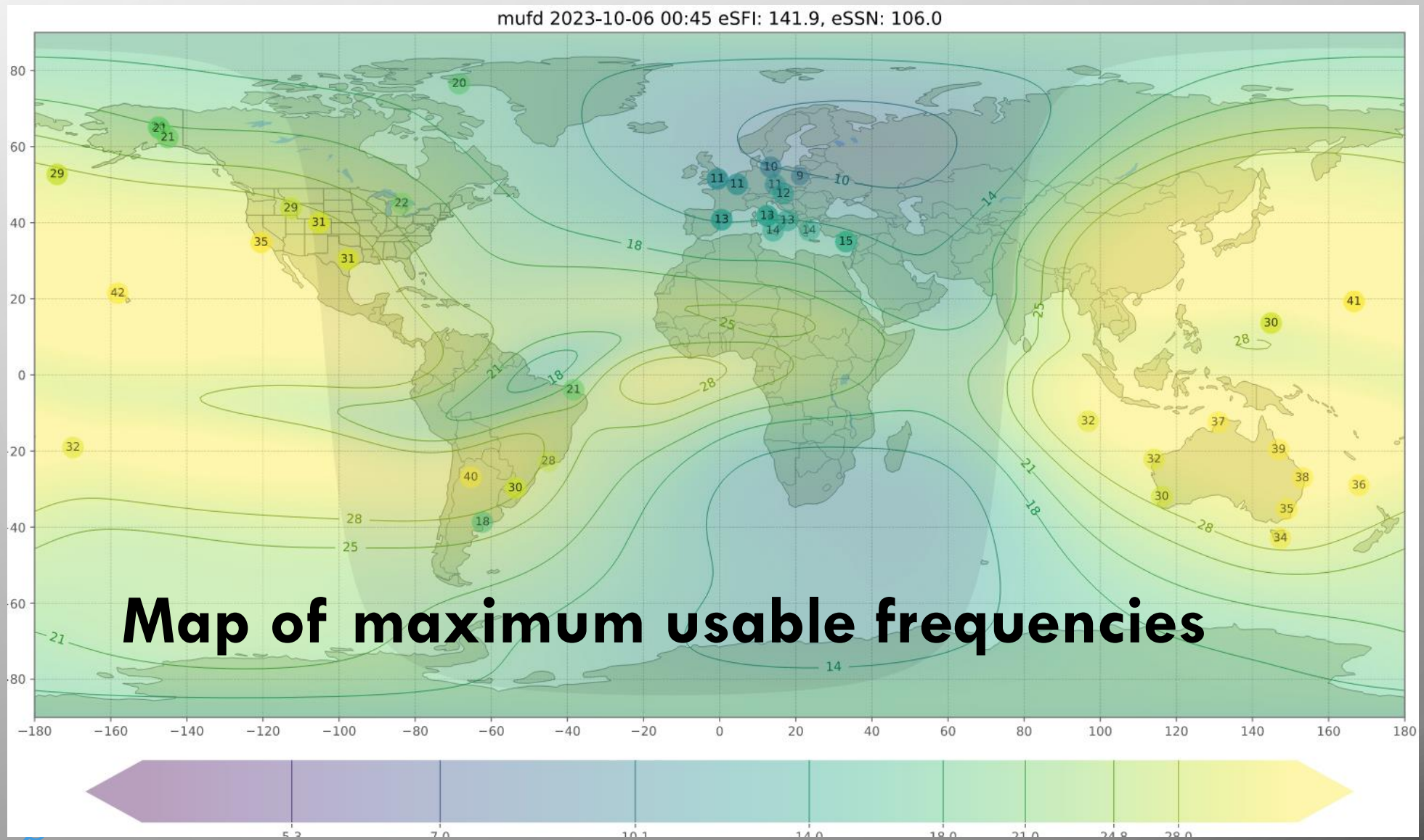
- Latest spotlessly clean profiles:

F5PEY	UR7EC	F51FDLO	F4HSN
KJ7ZJI	VA3FYB	IU1OPQ	PA3XYZ
JE3MDQ	HA8ZJ	KC2NJ	W4JCW
CT1DL	JR3AOW	EA1JW	LA1UW

- Users with most worked DXCCs:

OK1MP	OZ4RT	K9SM	K4XL	N6RW
SP8AJK	OH3SR	SM5CZQ	WB4OSS	JH1IFS
YS1RR	K6EID	K2MFY	K4MS	CT1ZW

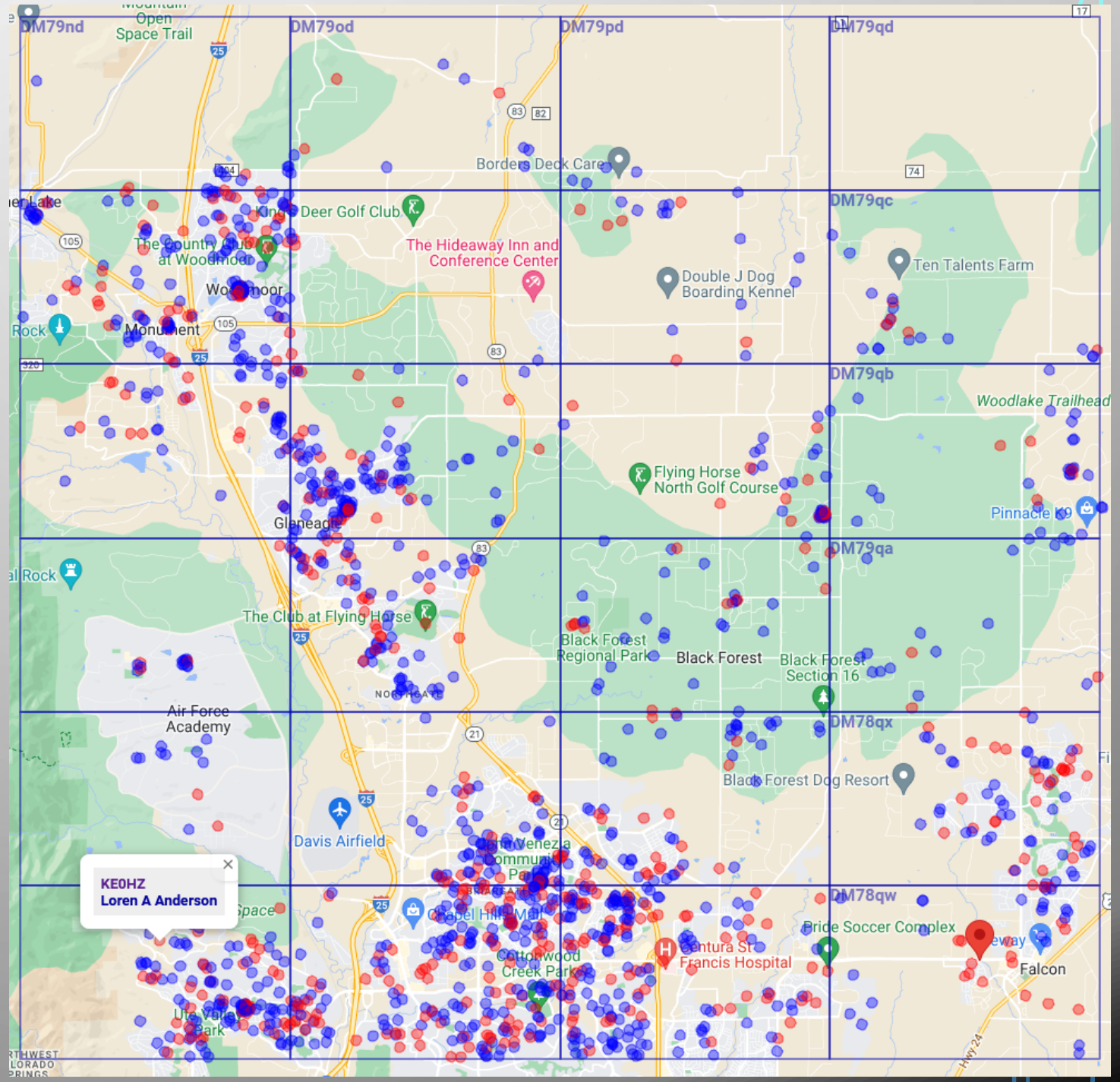
MUF CHART FROM DX.QSL.NET



GRID MAPPER

Consider using Grid Mapper to find Hams in needed gridsquares.

https://www.qrz.com/gridmapper



WISHING YOU GOOD DX!