

Prickar och bakvända fyrar

Att navigera i amatörradions digitala skärgård

Björn Ekelund SM7IUN



Fyrar?

NCDXF/IARU International Beacon Project

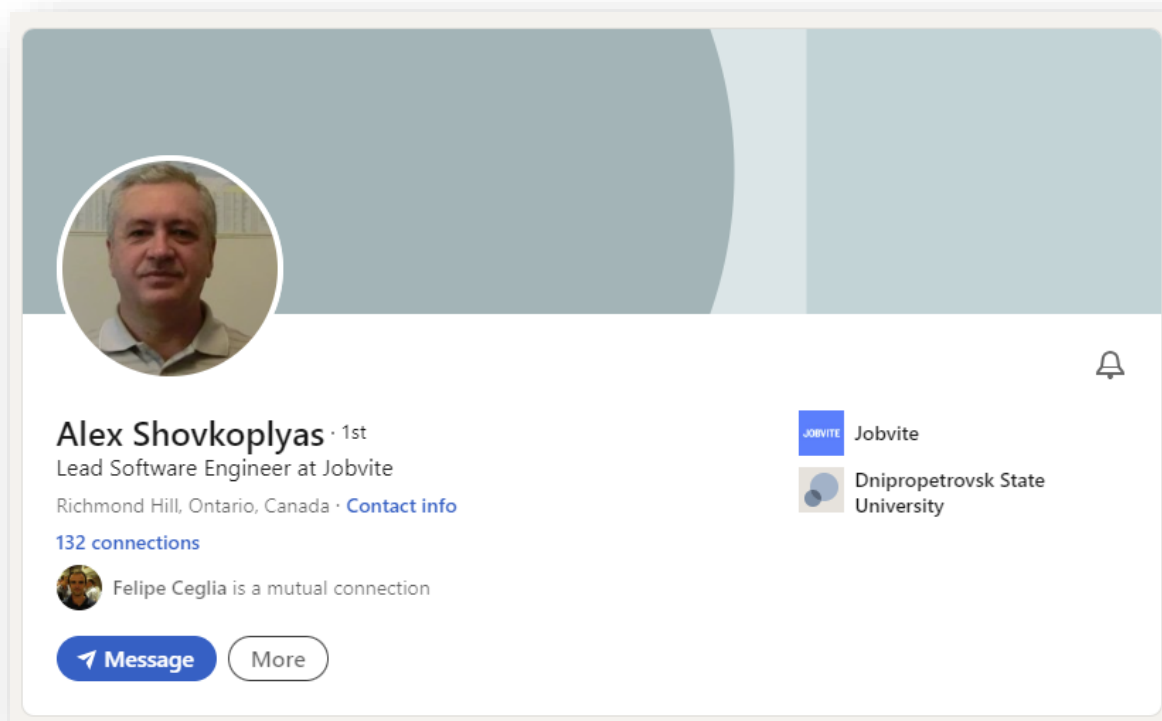
Transmission Schedule



Bakvända fyrrar!

Det startade med en briljant ingenjör

Alex Shovkopyas, VE3NEA ex UR5EMI
"Canadian ham of the year" 2014

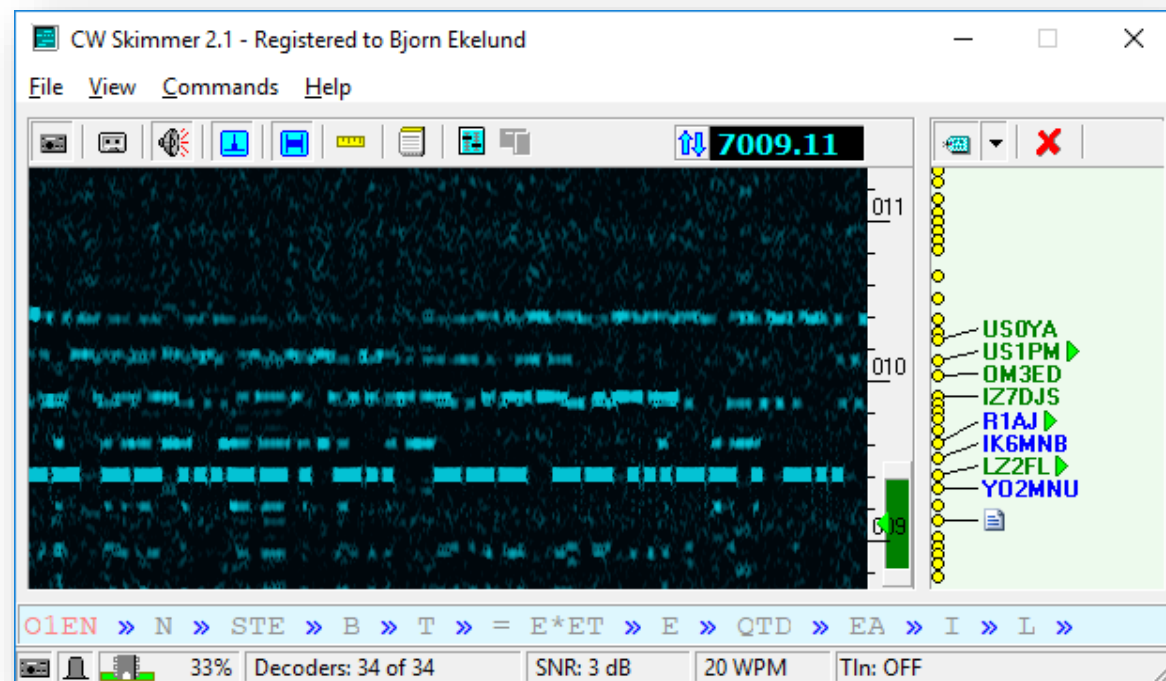


Alex Shovkopyas · 1st
Lead Software Engineer at Jobvite
Richmond Hill, Ontario, Canada · [Contact info](#)
132 connections
Felipe Ceglia is a mutual connection
[Message](#) [More](#)

Jobvite
Dnipropetrovsk State University



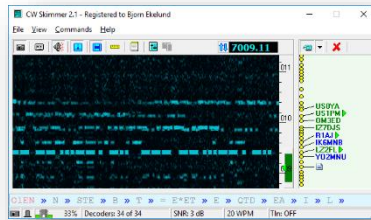
Morseavkodaren "CW Skimmer"



- Publicerad 2008 efter "sju års funderande"
- Baserad på Bayesisk statistik, en "sorts" enkel AI
- Primärt tänkt att hantera pile-ups

2008: Planeterna stod på linje

Alex VE3NEA



Felipe PY1NB
(now CT7ANO)



Dick W3OA



Nick F5VIH

Pete N4ZR



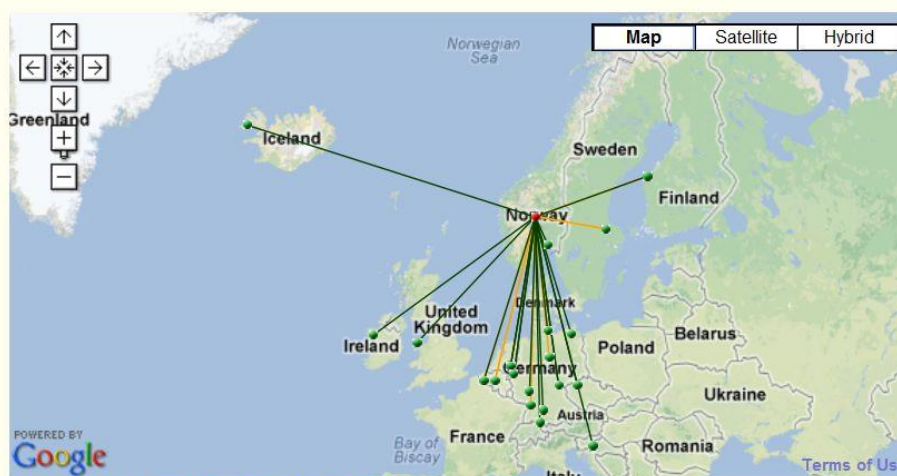
Phil N8VB



REVERSE BEACON NETWORK

welcome main dx spots skimmers downloads about contact us

Map Satellite Hybrid



POWERED BY Google

world wide / zoom to US / zoom to Europe / zoom to North Atlantic

show/hide my last filters

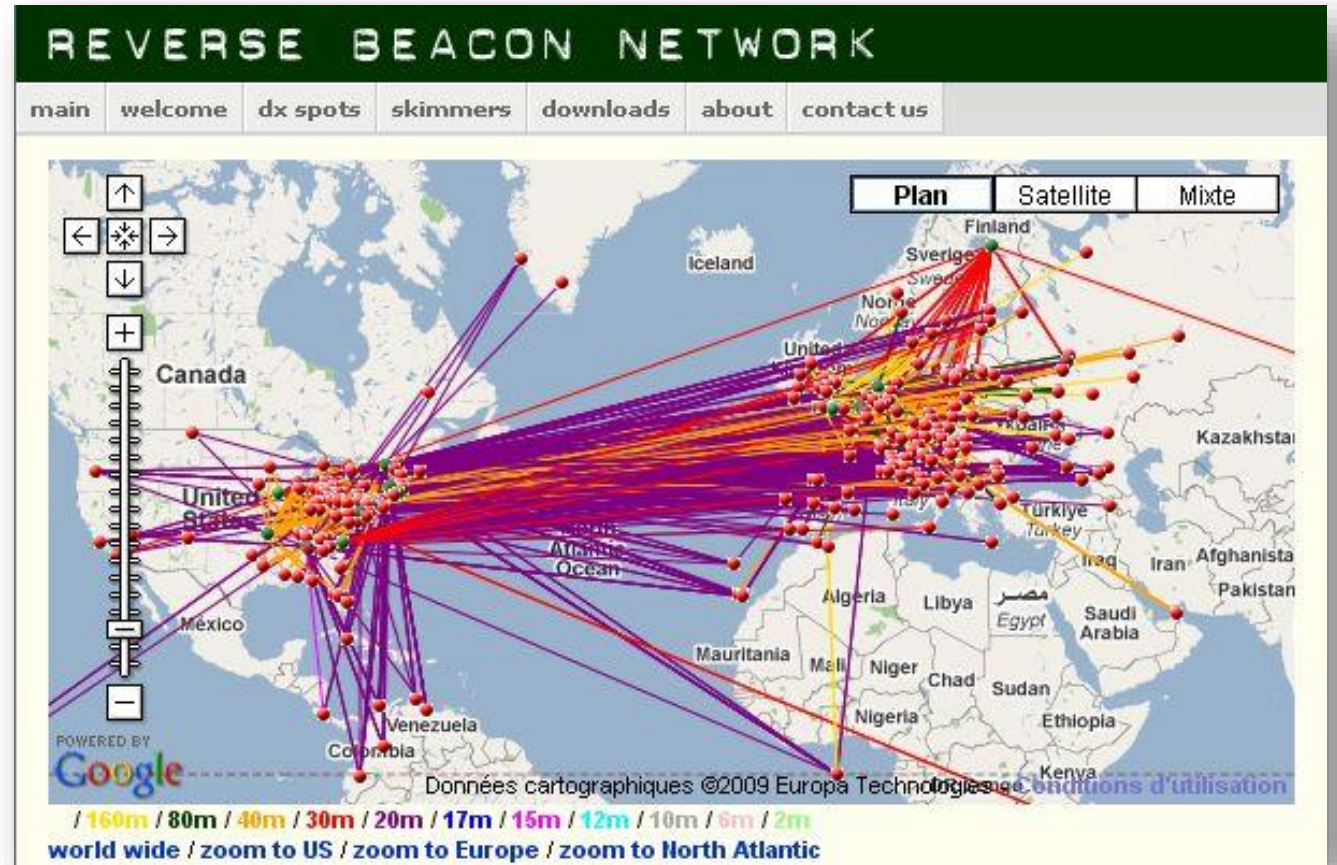
showing spots for DX call: LA3ZA rows to show: 50

search spot by callsign

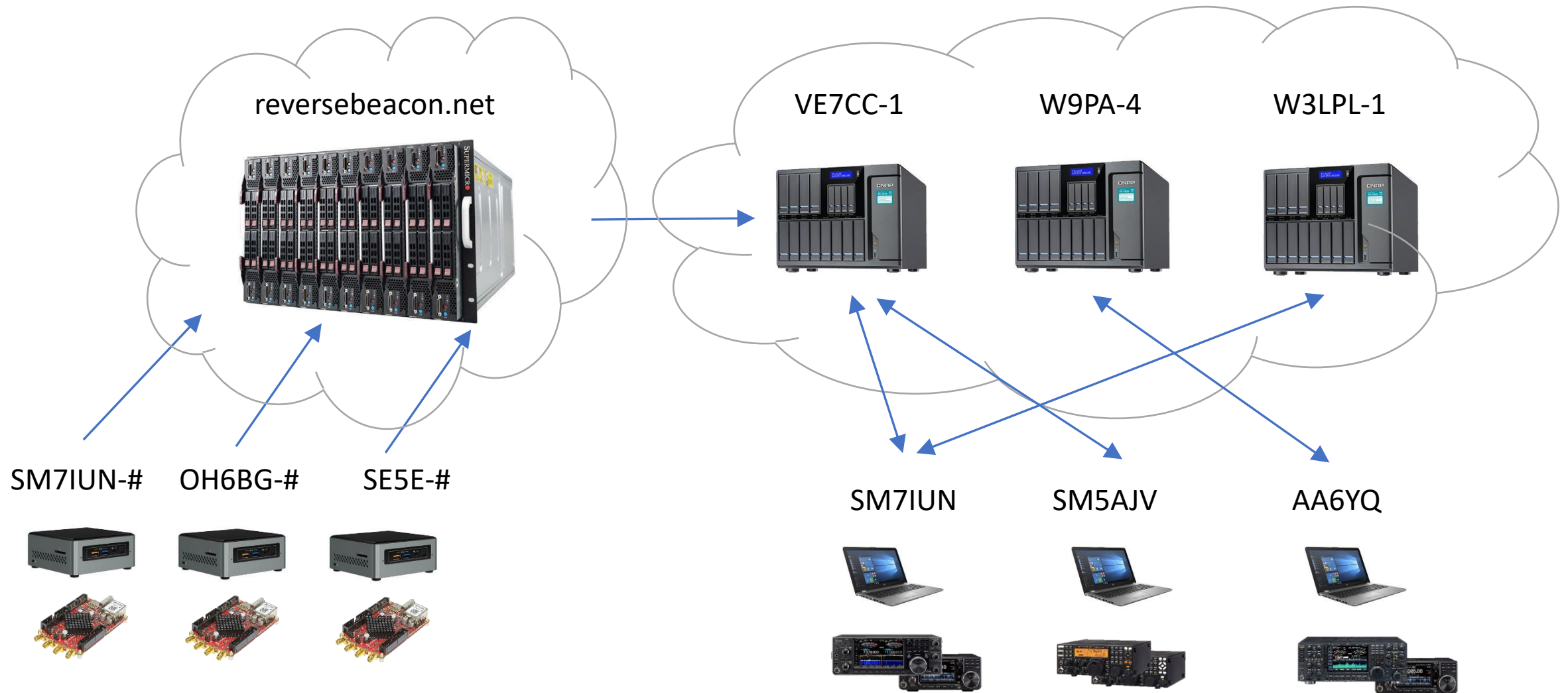
de	dx	freq	cq/dx	snr	speed	time
DL0LBS	LA3ZA	3534.4	CW CQ [LoTW]	19 dB	16 wpm	2031z 22 Apr
DL1EMY	LA3ZA	3534.3	CW CQ [LoTW]	29 dB	15 wpm	2028z 22 Apr
DR1A	LA3ZA	3534.3	CW CQ [LoTW]	23 dB	15 wpm	2028z 22 Apr
LA5EKA	LA3ZA	3534.3	CW CQ [LoTW]	16 dB	15 wpm	2016z 22 Apr
DF7GB	LA3ZA	3534.3	CW CQ [LoTW]	19 dB	15 wpm	2016z 22 Apr

The Reverse Beacon network

- Ett globalt nätverk av robotmottagare, "skimmers"
- Över 200 "skimmers" som lyssnar dygnet runt
- Global täckning men flest mottagare i EU och NA



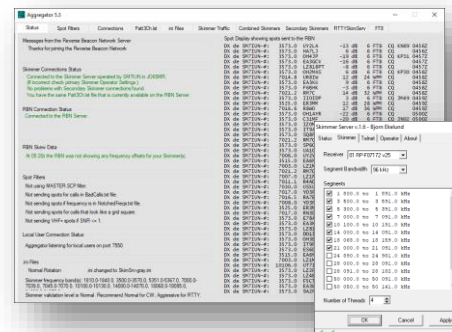
RBN och klustret



En skimmers beståndsdelar

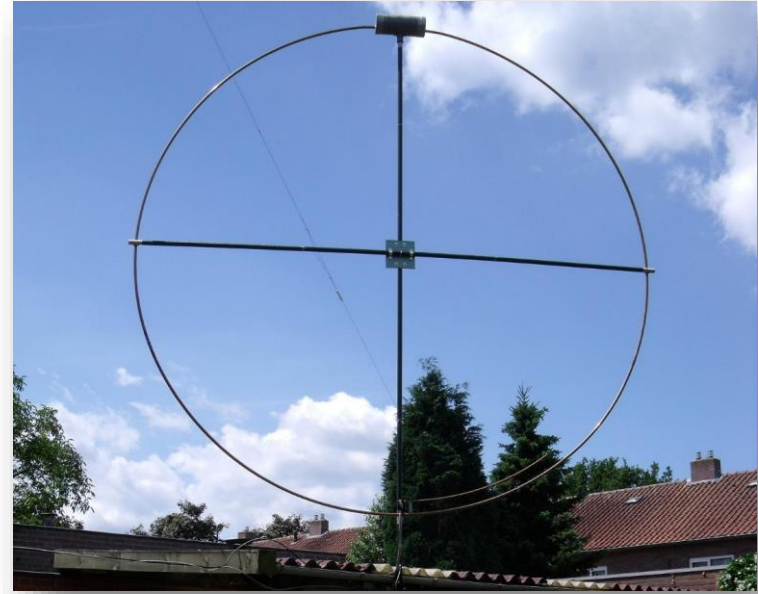


```
for i in people.data.users:
    response = client.api.statuses.user_timeline.get(screen_name=i.scre
    print 'Got', len(response.data), 'tweets from', i.screen_name
    if len(response.data) != 0:
        tldate = response.data[0]['created_at']
        tldate2 = datetime.strptime(tldate, '%a %b %d %H:%M:%S +0000 %Y')
        today = datetime.now()
        howlong = (today-tldate2).days
        if howlong < daywindow:
            print i.screen_name, 'has tweeted in the past', daywindow,
            totaltweets += len(response.data)
            for j in response.data:
                if j.entities.urls:
                    for k in j.entities.urls:
                        newurl = k['expanded_url']
                        urlset.add(newurl, j.user.screen_name)
        else:
            print i.screen_name, 'has not tweeted in the past', daywind
```



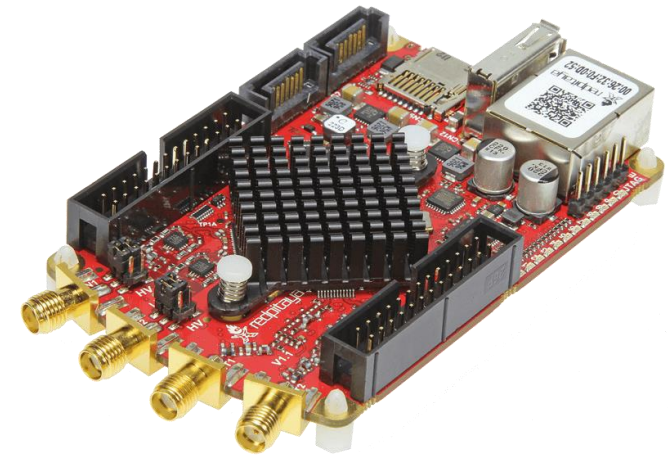
#1 Antenn

- Skall vara
 - Bredbandig
 - Alltid ansluten
 - Vara immun mot lokala störkällor eller placerad i en störfri miljö
- Behöver inte
 - Fungera för sändning
 - Vara särskilt effektiv, SNR är viktigare än RSSI
 - Vara stor



#2 Mottagare

- Behöver
 - Ha en digital kvadraturutgång samplad vid 48, 96, eller 196kHz
 - Producera radiodata i QS1R- eller HPSDR-format via Ethernet
 - Täcka hela kortvågen, helst 1.8 till 52MHz
 - Ha stöd för ett flertal mottagarinstanser
 - Vara frekvensstabil
- Behöver inte
 - Knappar och vred
 - En audiokedja



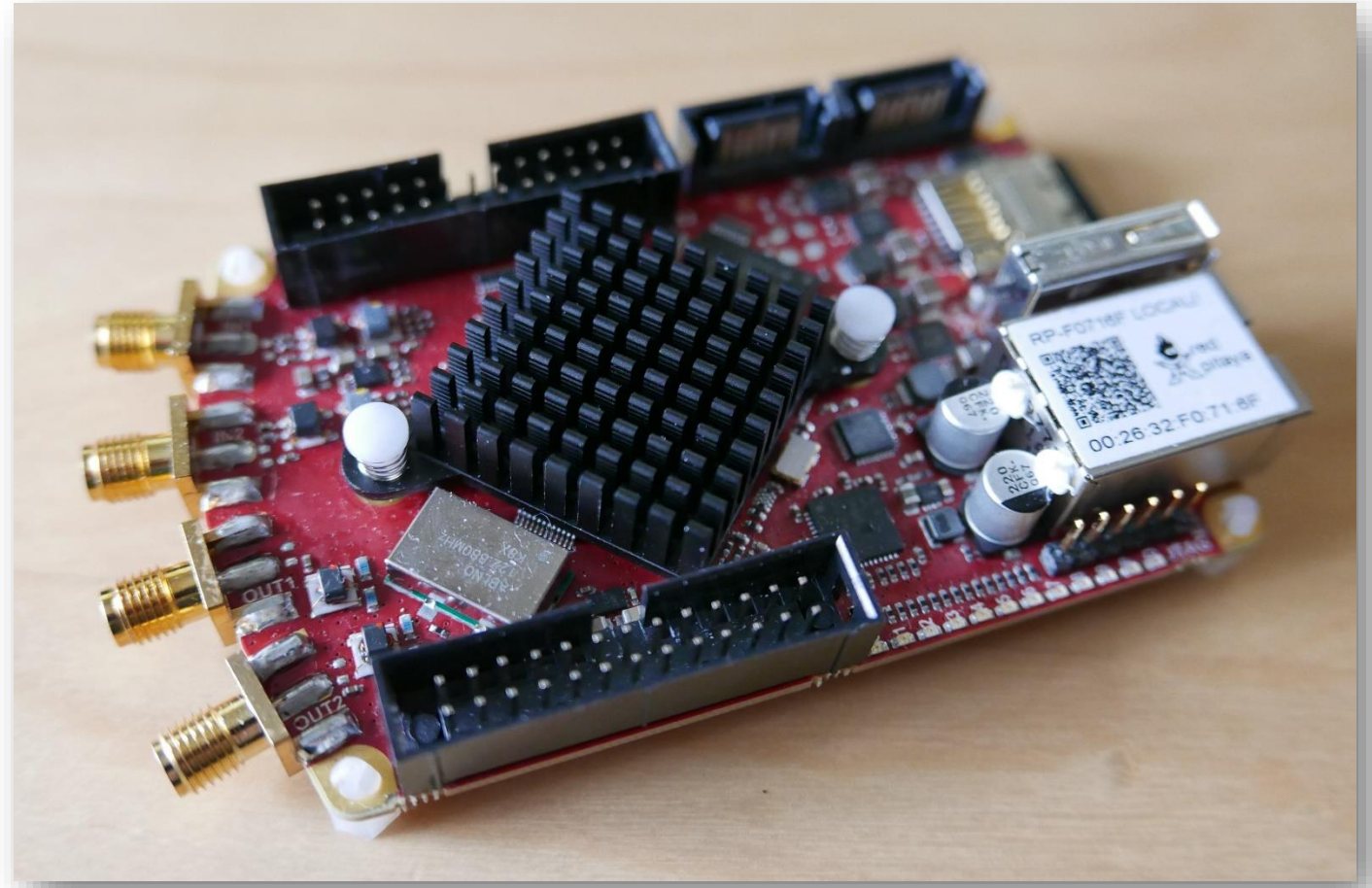
SDR-mottagare



“The Raspberry Pi of DSP”

Red Pitaya 122.88-16

- Byggd på Xilinx Zynq 7020
- FPGA med 85,000 logiska celler
- 220 programmerbara DSP segment
- Prestanda på 276 GMAC/s
- 667MHz Cortex A9 MPcore med Neon and CoreSight co-processorer
- Två 122.88MHz 16 bit ADC/DAC
- Fyra 100kHz ADC/DAC
- 16 GPIO
- ABLNO XO <50fs jitter



Pavel Demin @ KU Leuven



Pavel Demin · 1st

IT Engineer at Université catholique de Louvain

Ottignies-Louvain-la-Neuve, Walloon Region, Belgium · [Contact info](#)

129 connections

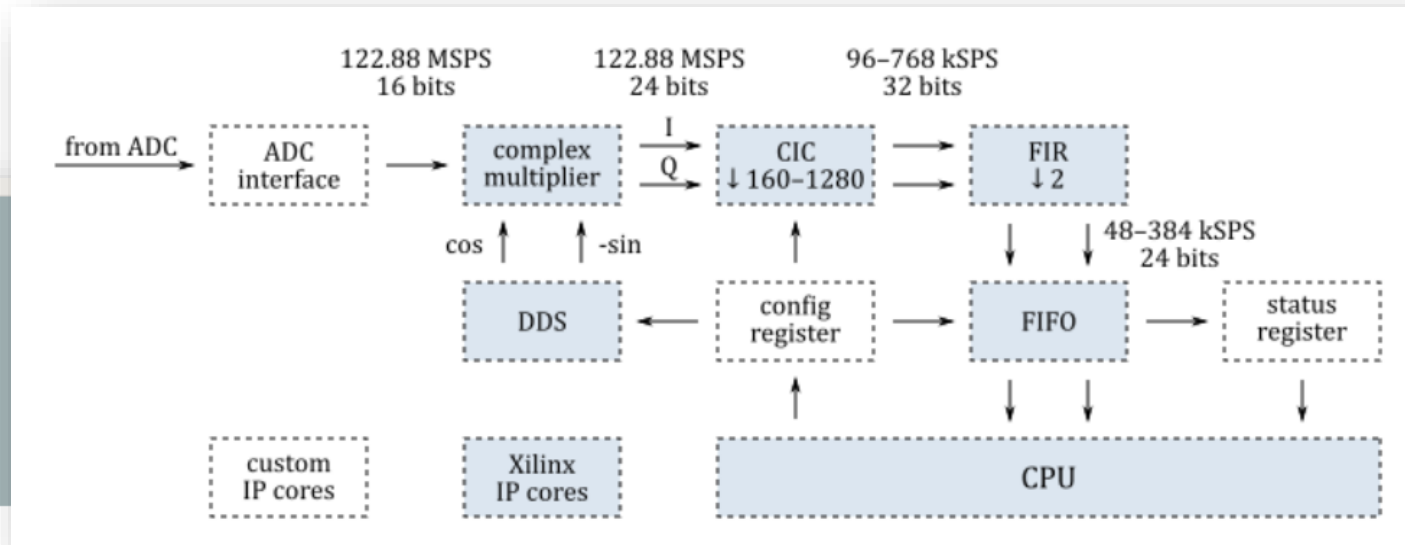


Felipe Ceglia and Rok Ursic are mutual connections

[Message](#)

[More](#)

Université catholique de Louvain
 Université Joseph Fourier - Grenoble 1



1. List of components
2. Links
3. Development machine
4. LED blinker
5. SDR receiver
6. SDR transceiver
7. SDR transceiver compatible with HPSDR
8. SDR receiver compatible with HPSDR
9. Embedded SDR transceiver
10. Wideband SDR transceiver
11. Multiband WSPR transceiver
12. Multiband FT8 transceiver
13. Pulsed Nuclear Magnetic Resonance
14. Multichannel Pulse Height Analyzer
15. Scanning system
16. Vector Network Analyzer
17. Alpine with pre-built applications

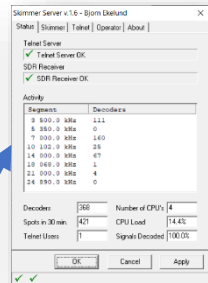
Skimmernodens programvara



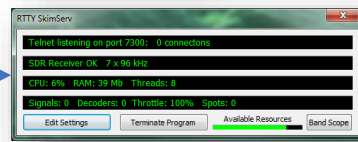
CWSL_Tee.dll



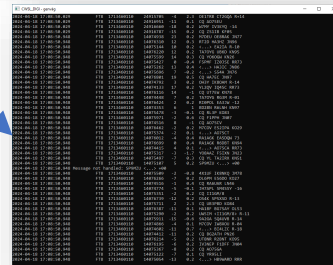
Morse



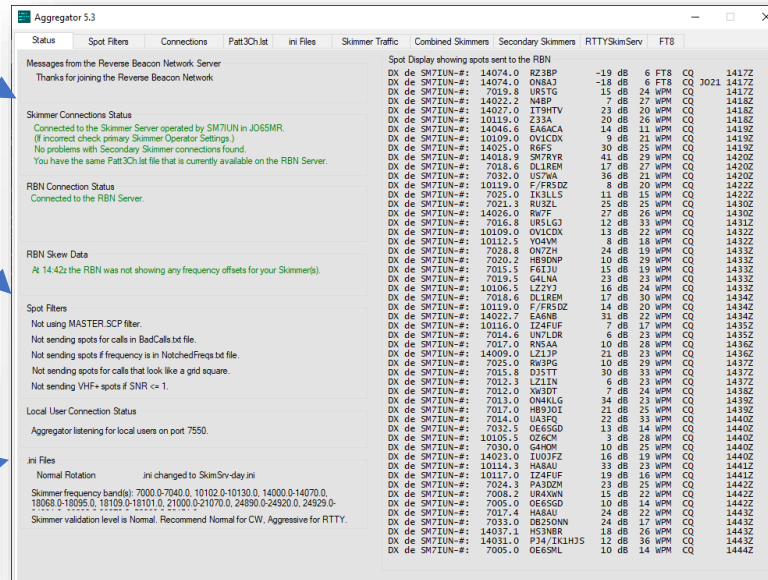
RTTY



JT moder

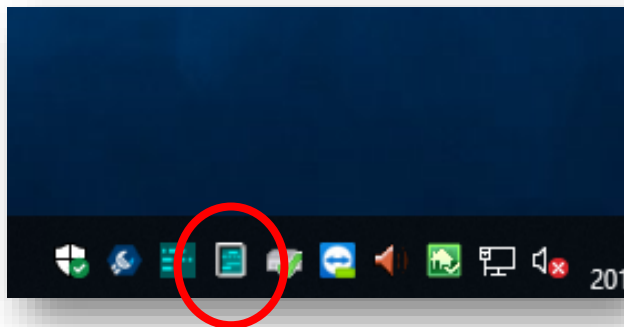


Windows PC



CW Skimmer Server

- En "inbyggd" version av CW Skimmer
- Telnet gränssnitt till RBN Aggregator eller en klusternod
- 8 × 92kHz segment motsvarar 10-20% last på en 2GHz Core i5 processor
- Kostar 75 USD



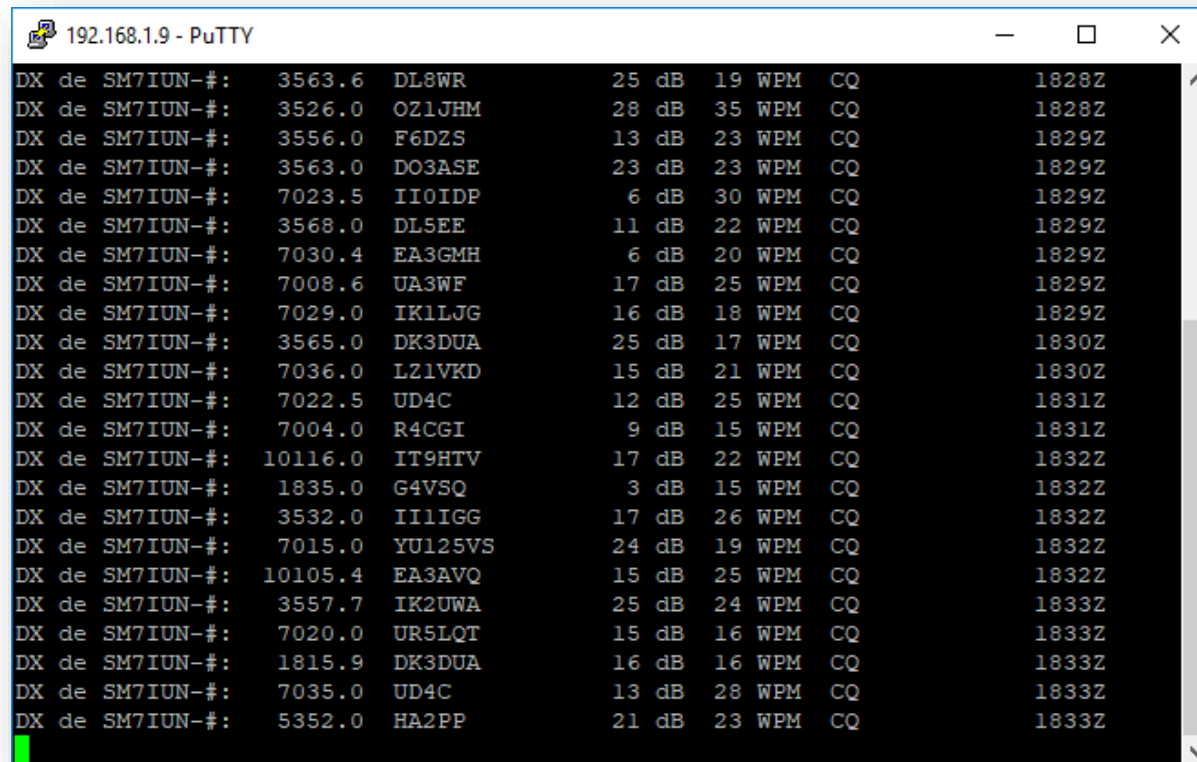
<http://www.dxatlas.com/SkimServer>

A screenshot of the Skimmer Server v.1.6 - Bjorn Ekelund application window. The window has a title bar with a close button (X) and a menu bar with 'Status', 'Skimmer', 'Telnet', 'Operator', and 'About'. The main content area is divided into sections: 'Telnet Server' with a green checkmark and 'Telnet Server OK'; 'SDR Receiver' with a green checkmark and 'SDR Receiver OK'; and 'Activity' which contains a table. Below the table are several status fields: 'Decoders' (368), 'Number of CPU's' (4), 'Spots in 30 min.' (421), 'CPU Load' (14.4%), 'Telnet Users' (1), and 'Signals Decoded' (100.0%). At the bottom of the window are 'OK', 'Cancel', and 'Apply' buttons, and two green checkmarks in the bottom-left corner.

Segment	Decoders
3 500.0 kHz	111
5 350.0 kHz	0
7 000.0 kHz	160
10 102.0 kHz	25
14 000.0 kHz	67
18 068.0 kHz	1
21 000.0 kHz	4
24 890.0 kHz	0

CW Skimmer Server

Producera ett Telnetflöde med frekvens, avkodad anropssignal, SNR, sändningshastighet och tidpunkt

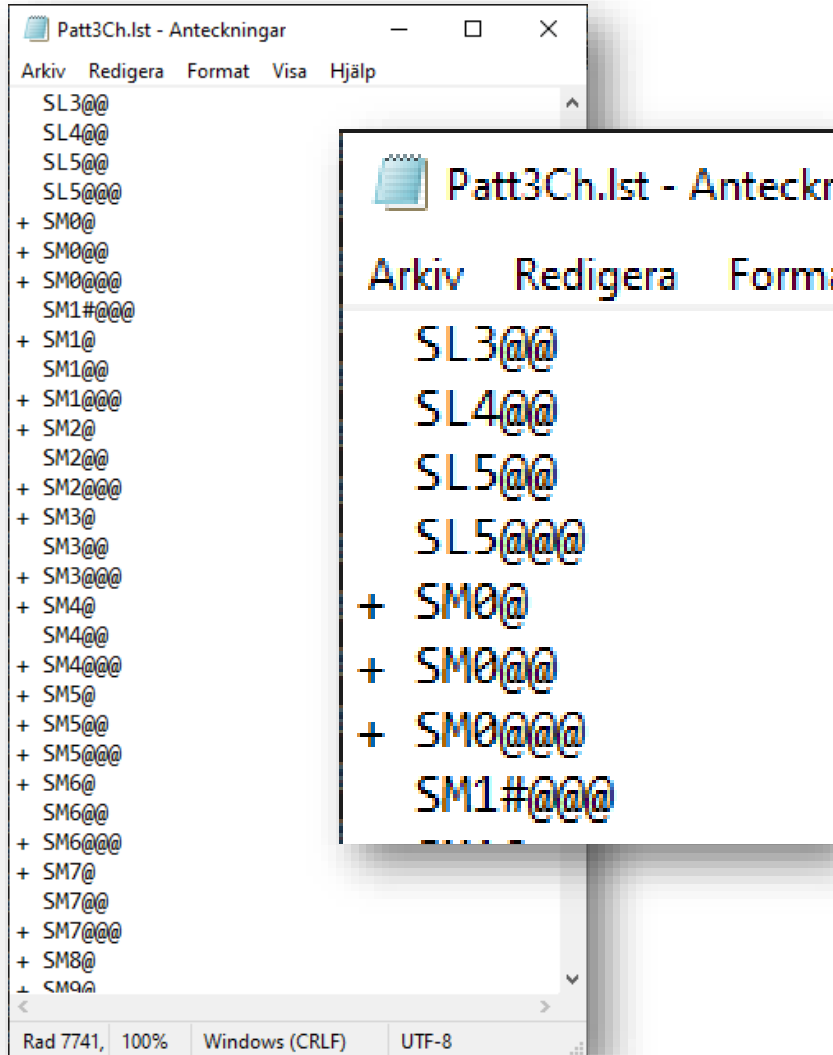


The screenshot shows a PuTTY terminal window titled "192.168.1.9 - PuTTY". The terminal displays a list of CW call reports. Each line contains the following information: a call sign (e.g., DL8WR), a frequency (e.g., 3563.6), a signal strength (e.g., 25 dB), a speed (e.g., 19 WPM), and a time (e.g., 1828Z). The data is presented in a structured, tabular format.

Call Sign	Frequency (kHz)	SNR (dB)	Speed (WPM)	Time (Zulu)
DL8WR	3563.6	25	19	1828Z
OZ1JHM	3526.0	28	35	1828Z
F6DZS	3556.0	13	23	1829Z
DO3ASE	3563.0	23	23	1829Z
II0IDP	7023.5	6	30	1829Z
DL5EE	3568.0	11	22	1829Z
EA3GMH	7030.4	6	20	1829Z
UA3WF	7008.6	17	25	1829Z
IK1LJG	7029.0	16	18	1829Z
DK3DUA	3565.0	25	17	1830Z
LZ1VKD	7036.0	15	21	1830Z
UD4C	7022.5	12	25	1831Z
R4CGI	7004.0	9	15	1831Z
IT9HTV	10116.0	17	22	1832Z
G4VSQ	1835.0	3	15	1832Z
II1IGG	3532.0	17	26	1832Z
YU125VS	7015.0	24	19	1832Z
EA3AVQ	10105.4	15	25	1832Z
IK2UWA	3557.7	25	24	1833Z
UR5LQT	7020.0	15	16	1833Z
DK3DUA	1815.9	16	16	1833Z
UD4C	7035.0	13	28	1833Z
HA2PP	5352.0	21	23	1833Z

- Normalt rapporterar CW Skimmer Server endast stationer som ropar CQ men en del (LID) skimmerägare väljer att rapportera alla hörda call.

Mönsterdatabasen Patt3ch.Ist



```
Patt3Ch.Ist - Anteckningar
Arkiv Redigera Format Visa Hjälp
SL3@@
SL4@@
SL5@@
SL5@@@
+ SM0@
+ SM0@@
+ SM0@@@
SM1#@@@
+ SM1@
SM1@@
+ SM1@@@
+ SM2@
SM2@@
+ SM2@@@
+ SM3@
SM3@@
+ SM3@@@
+ SM4@
SM4@@
+ SM4@@@
+ SM5@
+ SM5@@
+ SM5@@@
+ SM6@
SM6@@
+ SM6@@@
+ SM7@
SM7@@
+ SM7@@@
+ SM8@
+ SM9@
Rad 7741, 100% Windows (CRLF) UTF-8
```

```
Patt3Ch.Ist - Anteckningar
Arkiv Redigera Format
SL3@@
SL4@@
SL5@@
SL5@@@
+ SM0@
+ SM0@@
+ SM0@@@
SM1#@@@
```

- @ = valfri bokstav
- # = valfri siffra
- + = aktiv station
- SL7FRO ❌
- SMOHEV ✅
- "Watch list" för prioriterade call

Udda call för dxpedition eller contest?

Kontakta **Pete N4ZR** pete.n4zr@gmail.com

Vem blir spottad?

- Lyssnar på flera tusen 50Hz "kanaler"
- 256 tecken långt minne
- Nyckelord: CQ QRZ TEST NA SS FD UP
- Känslig för QSD
- 10 minuters repetitionscykel

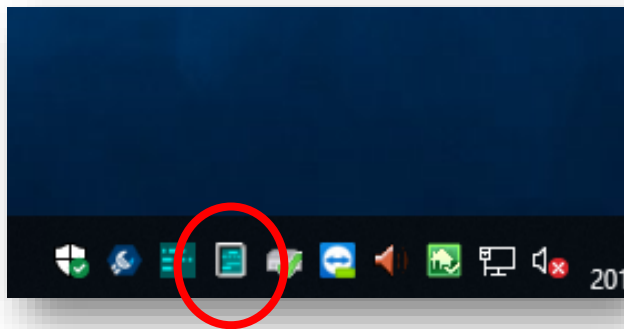
- CWT SM7IUN ❌
- CQ CWT SM7IUN ✓
- WSEM RM2D ❌

Number of Repetitions Required to be Spotted

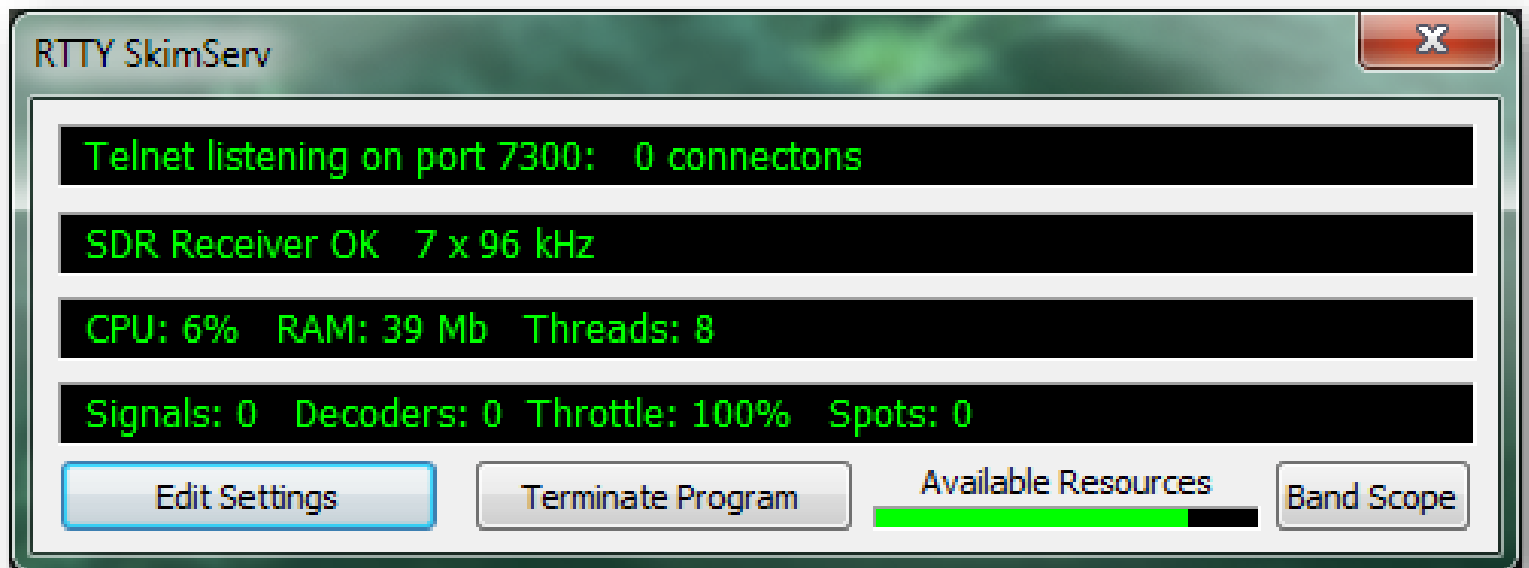
Pattern File/Validation	Minimal	Normal	Aggressive	Paranoid*
Watch list	1	1	2	2
+ in pattern file	2	2	4	-
No + but in file	2	3	4	-
Not in file	2	5	-	-
Not ITU prefix	-	-	-	-

RTTY Skimmer Server

- En RTTY-version av CW Skimmer Server med ett Telnet gränssnitt till RBN
- CPU-krävande
- Kostar 50 USD



<http://www.dxatlas.com/SkimServer>



CWSL_DIGI

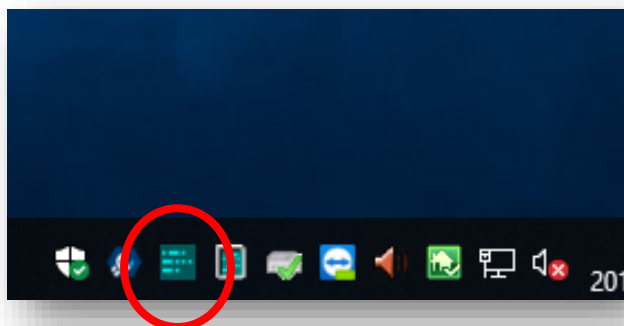
Avkodar alla trafiksätt som stöds av WSJT-X: FT8, FT4, JT65, JS8Call, WSPR, etc.

```
CWSL_DIGI - genväg
2024-04-18 17:08:50.029 FT8 1713460110 24915705 -4 2.3 OE1TRB CT2GQA R+14
2024-04-18 17:08:50.029 FT8 1713460110 24916951 -11 0.1 CQ A075EU
2024-04-18 17:08:50.029 FT8 1713460110 24916660 -18 0.2 W7MY IV3KYQ -14
2024-04-18 17:08:50.029 FT8 1713460110 24916787 -15 0.2 CQ Z511B KF05
2024-04-18 17:08:50.948 FT8 1713460110 14074038 23 0.2 M7DEU OE8RAK JN77
2024-04-18 17:08:50.948 FT8 1713460110 14076310 12 0.3 RT2D HA3HZ JN96
2024-04-18 17:08:50.948 FT8 1713460110 14075144 10 0.2 <...> EA2IA R-10
2024-04-18 17:08:50.948 FT8 1713460110 14076220 12 0.2 TA7OYG UB6D KN95
2024-04-18 17:08:50.948 FT8 1713460110 14075599 14 0.3 CQ Y060GW KN26
2024-04-18 17:08:50.948 FT8 1713460110 14075427 0 -0.4 F5PMF IZ0JSE RR73
2024-04-18 17:08:50.948 FT8 1713460110 14075262 13 0.4 <...> HA3IC JN86
2024-04-18 17:08:50.948 FT8 1713460110 14075696 7 -0.2 <...> S54A JN76
2024-04-18 17:08:50.948 FT8 1713460110 14076801 19 0.5 CQ HA7EC JN97
2024-04-18 17:08:50.948 FT8 1713460110 14074792 3 0.2 OH3Y IK8OAM R-14
2024-04-18 17:08:50.948 FT8 1713460110 14074133 17 0.2 YL2QV IQ4SC RR73
2024-04-18 17:08:50.948 FT8 1713460110 14076116 14 -1 CQ UT7EW KN78
2024-04-18 17:08:50.948 FT8 1713460110 14074448 7 0.2 TA7OYG RG3M R-01
2024-04-18 17:08:50.948 FT8 1713460110 14076424 2 0.2 RI0POL EA3JW -12
2024-04-18 17:08:50.948 FT8 1713460110 14074353 6 1 BD2BN R6LNH KN97
2024-04-18 17:08:50.948 FT8 1713460110 14075478 -3 -0.1 CQ RLP3 KO83
2024-04-18 17:08:50.948 FT8 1713460110 14075971 -2 0.6 CQ F1PPH JN07
2024-04-18 17:08:50.948 FT8 1713460110 14074516 8 -1 CQ A075CV
2024-04-18 17:08:50.948 FT8 1713460110 14076462 -2 0.2 M7COV ES2IPA K029
2024-04-18 17:08:50.948 FT8 1713460110 14075374 -2 0.1 <...> A075CT
2024-04-18 17:08:50.948 FT8 1713460110 14076012 -4 0.4 RA1AGK EASDQW 73
2024-04-18 17:08:50.948 FT8 1713460110 14076699 0 0.4 RA1AGK R6DBT KN94
2024-04-18 17:08:50.948 FT8 1713460110 14074415 4 0.1 <...> A075CA RR73
2024-04-18 17:08:50.948 FT8 1713460110 14075317 -3 -1.7 Y08AAZ F5IXN JN23
2024-04-18 17:08:50.948 FT8 1713460110 14075497 -7 0.3 CQ YL TA2IRX KN51
2024-04-18 17:08:50.948 FT8 1713460110 14075107 5 0.2 SP9MZU <...> +00
2024-04-18 17:08:50.948 Message not handled: SP9MZU <...> +00
2024-04-18 17:08:50.948 FT8 1713460110 14075509 -2 -0.8 4X1UF IK8NKQ JN78
2024-04-18 17:08:50.948 FT8 1713460110 14076266 -7 0.2 DL6PM ES6DO K027
2024-04-18 17:08:50.948 FT8 1713460110 14074516 -1 0.4 CQ RA6UAR LN46
2024-04-18 17:08:50.948 FT8 1713460110 14074774 -5 -0.1 JH7APL SM4SSV -16
2024-04-18 17:08:50.948 FT8 1713460110 14075351 -2 0.2 CQ I1IGM/8
2024-04-18 17:08:50.948 FT8 1713460110 14076739 -12 0.2 OS4K SP5XSD R-13
2024-04-18 17:08:50.948 FT8 1713460110 14075711 2 2.3 CQ UB3PBD KO84
2024-04-18 17:08:50.948 FT8 1713460110 14076387 -11 0.1 HA1BF BG7SAY OL53
2024-04-18 17:08:50.948 FT8 1713460110 14075290 -2 0.2 UW5IM <I1IGM/8> R-11
2024-04-18 17:08:50.948 FT8 1713460110 14075911 -15 -0.6 9A2GA SQ4UVB R-14
2024-04-18 17:08:50.948 FT8 1713460110 14074866 -4 0.1 M7COV IW8XOU R-04
2024-04-18 17:08:50.948 FT8 1713460110 14074602 -11 0.7 <...> B14LZC R-18
2024-04-18 17:08:50.948 FT8 1713460110 14074412 -11 0.2 CQ BG2ATH PN26
2024-04-18 17:08:50.948 FT8 1713460110 14076214 -5 0.2 UT8NR R2BNT KO95
2024-04-18 17:08:50.948 FT8 1713460110 14076195 -6 0.2 IV3NEP F1DFF JN04
2024-04-18 17:08:50.948 FT8 1713460110 14075367 -8 0.2 CQ A075GA
2024-04-18 17:08:50.948 FT8 1713460110 14075122 -7 0.1 CQ YR95LI
2024-04-18 17:08:50.948 FT8 1713460110 14075054 -13 0.2 <...> HB9WARD RRR
```

- Producerar spottar via UDP på samma sätt som WSJT-X och MSHV
- Kan köra ett godtyckligt antal avkodare men det **kostar processorkraft**
- Rapporterar **alla hörda stationer**
- **Gratis**

RBN Aggregator

- **Kurerar och aggregerar** spottar från skimmermottagaren innan den rapporterar dem till RBN
- Försumbar CPU-last
- Ansluter till CW Skimmer Server och RTTY Skimmer Server via Telnet
- Ansluter till WSJT-X, MSHV och CWSL_DIGI via UDP



A screenshot of the RBN Aggregator 5.4b1 software interface. The window title is "Aggregator 5.4b1". The interface is divided into several sections. On the left, there are status messages from the Reverse Beacon Network Server, Skimmer Connections Status, RBN Connection Status, RBN Skew Data, Spot Filters, and Local User Connection Status. On the right, there is a "Spot Display" showing a list of spots sent to the RBN. The spots are listed in a table with columns for call sign, frequency, mode, and other details. The status messages indicate that the aggregator is connected to the RBN Server and is listening for local users on port 7550. The spot display shows a list of spots with call signs like DX de SM7IUN-#, frequencies, and modes like F6IJ, RK3Q/7, HB90BQR, etc.

The Reverse Beacon network

- En webbtjänst
- En kortvågens "data lake" med all data tillgängligt för nedladdning (CW & RTTY)
- 300,000,000+ datapunkter sen 2009
- En rik uppsättning analysverktyg

REVERSE BEACON NETWORK

welcome main dx spots skimmers downloads about contact us

Map Satellite Hybrid

POWERED BY Google

/ 160m / 80m / 40m / 30m / 20m / 17m / 15m / 12m / 10m / 6m / 2m

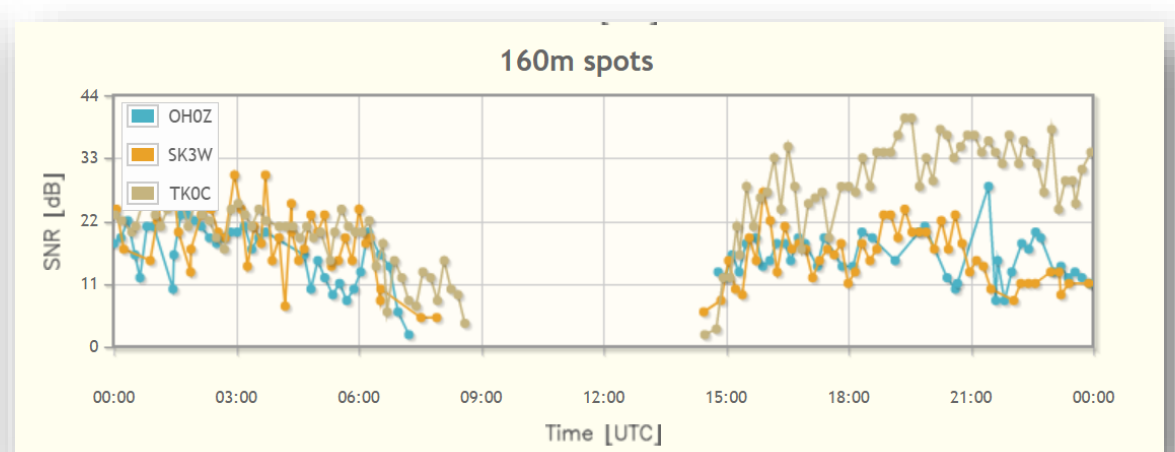
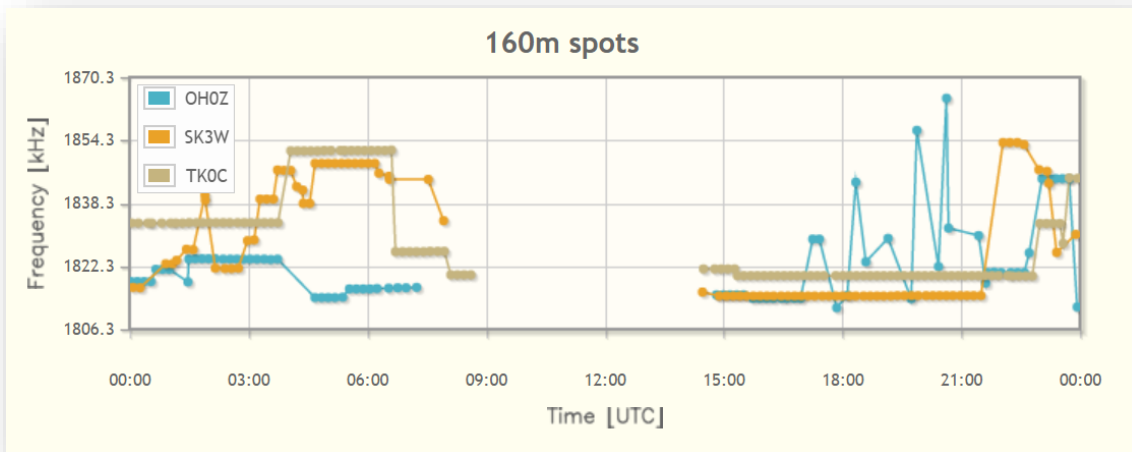
world wide / zoom to US / zoom to Europe / zoom to North Atlantic

show/hide my last filters

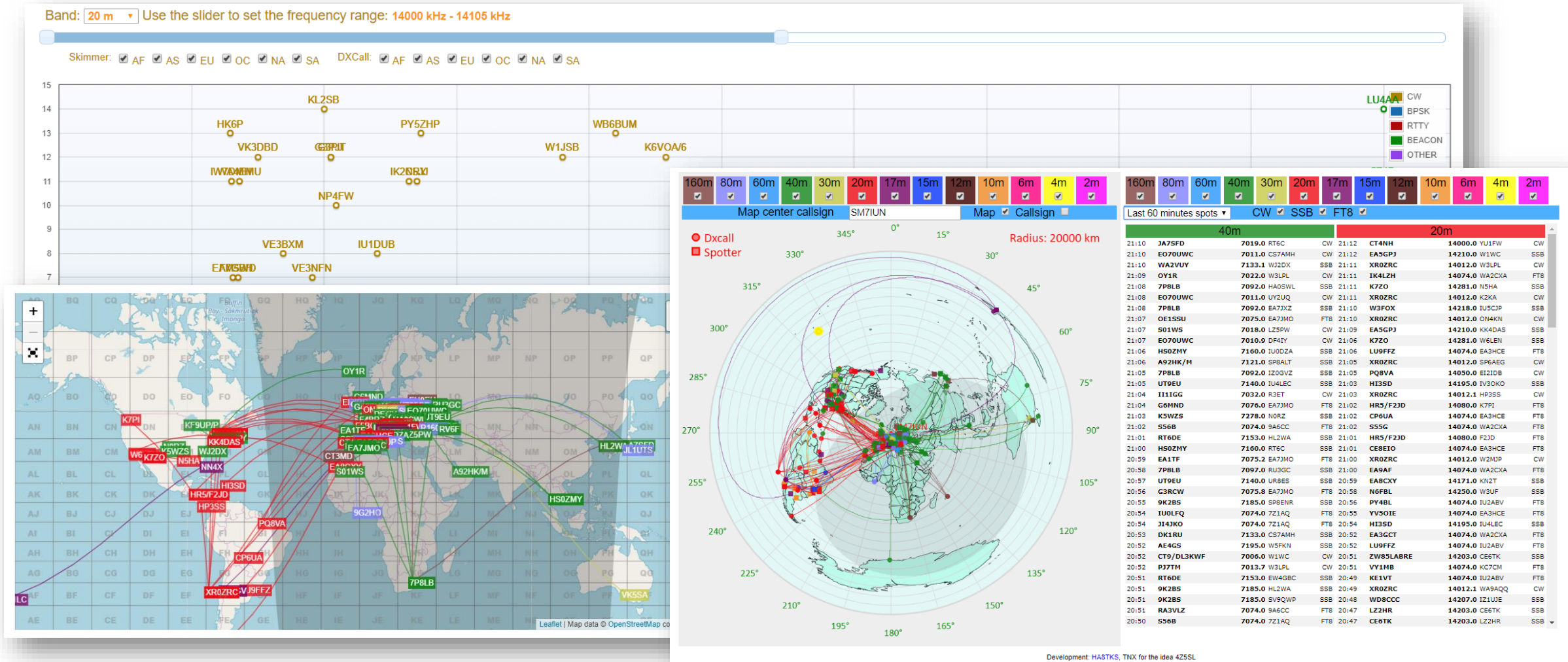
showing spots for DX call: LA3ZA rows to show: 50

search spot by callsign

de	dx	freq	cq/dx	snr	speed	time
DL0LBS	LA3ZA	3534.4	CW CQ [LoTW]	19 dB	16 wpm	2031z 22 Apr
DL1EMY	LA3ZA	3534.3	CW CQ [LoTW]	29 dB	15 wpm	2028z 22 Apr
DR1A	LA3ZA	3534.3	CW CQ [LoTW]	23 dB	15 wpm	2028z 22 Apr
LA6EKA	LA3ZA	3534.3	CW CQ [LoTW]	16 dB	15 wpm	2016z 22 Apr
DF7GB	LA3ZA	3534.3	CW CQ [LoTW]	19 dB	15 wpm	2016z 22 Apr

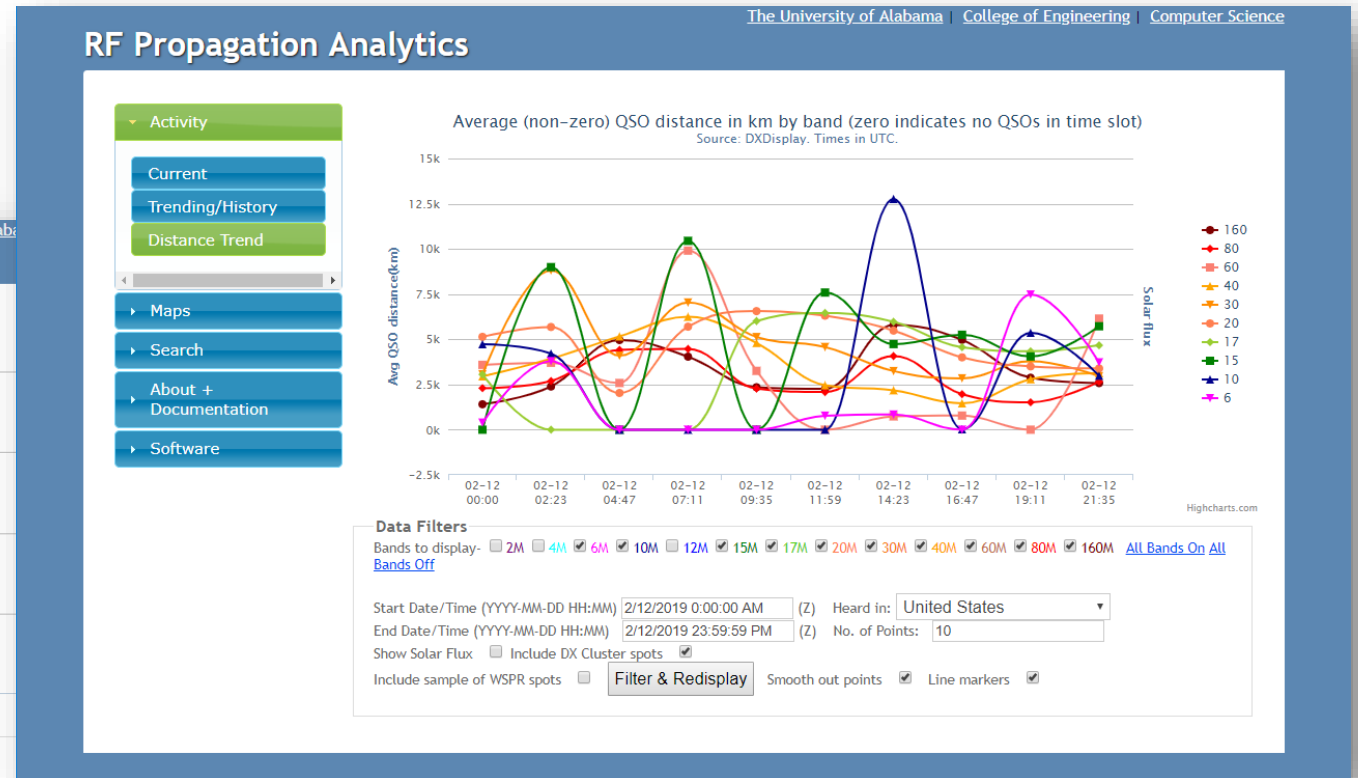
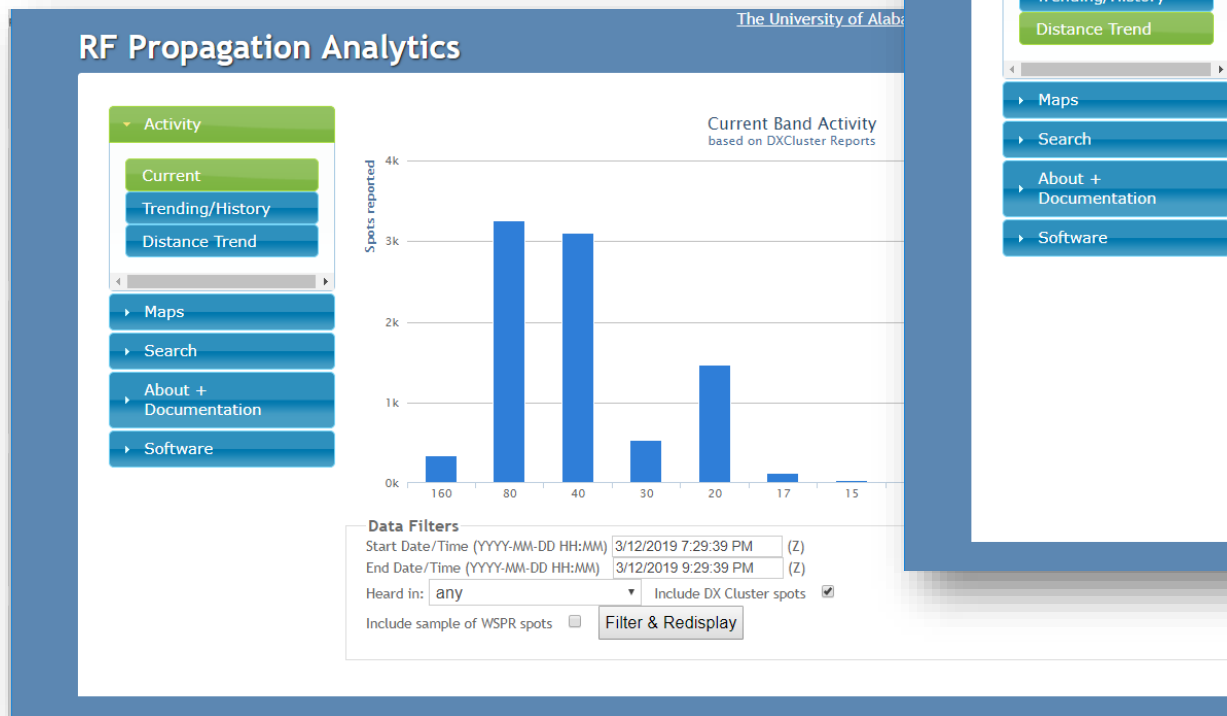


Cloud-to-cloud: HA8TKS



<https://dxcluster.ha8tk.hu>

Cloud-to-cloud: University of Alabama



Cloud-to-cloud: DX maps

DXMAPS Site Personal Radio Software DX maps DX news Search... Translate Login

DXMAPS 4.0 - QSO/SWL real time information (Information ab)

Map List Graph Chat Europe Africa N.America S.America Asia Oceania World ✓ Gray line Select options Modes

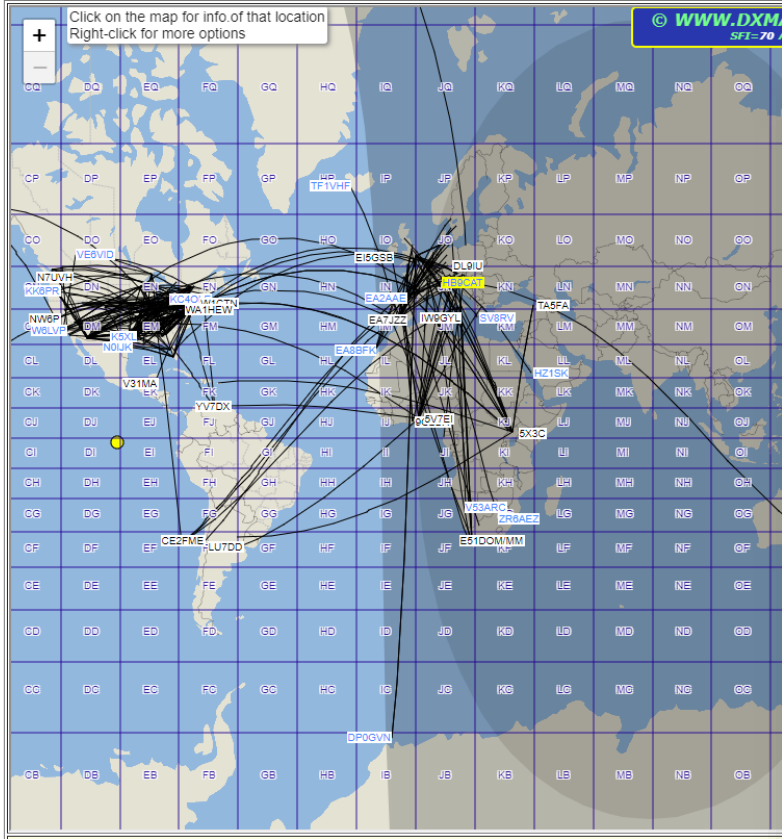
LF - HF VHF & up 2200 m 600 m 160 m 80 m 60 m 40 m 30 m 20 m 17 m 15 m 12 m 10 m All bands Ticker

envatoelements

Click on the map for info of that location
Right-click for more options

© WWW.DXMAPS.COM - QSO/SWL 18:14z-18:50z
SFI=70 A=12 K=2-Unsettled SWX=Minor st.

- ROYALTY FREE AUDIO TRACKS
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- AND MORE!
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DXMAPS 4.0 - QSO/SWL real time information

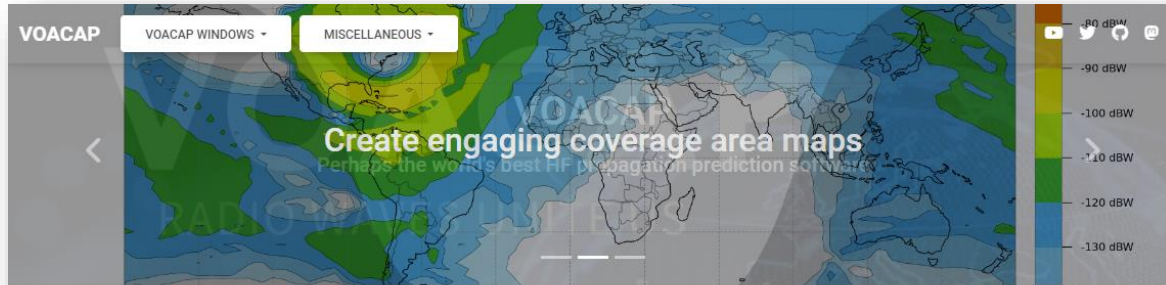
Map List Graph Chat Europe Africa N.America S.America Asia Oceania World ✓ Gray line Select options Modes

LF - HF VHF & up 2200 m 600 m 160 m 80 m 60 m 40 m 30 m 20 m 17 m 15 m 12 m 10 m All bands Ticker

WWW.DXMAPS.COM 18:57z WWW info: SFI=70 A=12 K=2-Unsettled SWX=Minor storm

2019-03-17 18:57	IK2QEB (JN55LD)	14.218.0 SSB	5V7EI (JJ06)	4399 km	
2019-03-17 18:54	I7OEB (JM99AX)	14.218.0 SSB	XR0ZRC (FF06)	12851 km	Up 6. Trx
2019-03-17 18:54	F8JUV (JN18BW)	14.074.0 FT8	6W7/ON4AVT (IK14MI)	4220 km	FT8
2019-03-17 18:50	IV3RJT (JN65SW)	14.215.0 SSB	9G2DX (IJ95)	4705 km	LoTW trn 4 qso 73 s
2019-03-17 18:50	DL9IU (JO50KG)	14.074.4 FT8	CE2FME (FF47)	12189 km	trn FT8 qso
2019-03-17 18:50	F8BNU (JO10K)	14.032.0 CW	5X3C (KJ61HW)	6066 km	trn for qso.73 up
2019-03-17 18:49	TA5FA (KN90UX)	14.248.0 SSB	5X3C (KJ61HW)	4397 km	
2019-03-17 18:46	EI5GSB (IO51WU)	14.218.0 SSB	5V7EI (JJ06)	5109 km	Thanks Lads La Fheile Padraig
2019-03-17 18:44	K0DMW (EN35)	14.097.1 WSPR	F1AGR (JN04RJ)	6955 km	EN35<->JN04RJ WSPR SNR=-29
2019-03-17 18:44	OZ7IT (JO65DF)	14.097.1 WSPR	V53ARC (JG87)	8649 km	JO65DF<->JG87 WSPR SNR=-22
2019-03-17 18:44	G4CUI (OJ93FI)	14.097.2 WSPR	F1AGR (JN04RJ)	1019 km	IO93FI<->JN04RJ WSPR SNR=-25
2019-03-17 18:44	IZ0FKE (JN61FW)	14.097.2 WSPR	G0CCL (JO02BF)	1472 km	JN61FW<->JO02BF WSPR SNR=-11
2019-03-17 18:44	OZ7IT (JO65DF)	14.097.1 WSPR	G0CCL (JO02BF)	865 km	JO65DF<->JO02BF WSPR SNR=-23
2019-03-17 18:44	EA2AAE (IN82KU)	14.097.1 WSPR	G0CCL (JO02BF)	1069 km	IN82KU<->JO02BF WSPR SNR=-24
2019-03-17 18:42	TA5FA (KN90UX)	14.248.0 SSB	5X3C (KJ61HW)	4397 km	up5
2019-03-17 18:42	TR0TTEL (JJ40RL)	14.218.0 SSB	OE3JC (JN88HH)	5361 km	
2019-03-17 18:41	DL7JAN (JN49IF)	14.248.0 SSB	5X3C (KJ61HW)	5727 km	up5
2019-03-17 18:40	IW9GYL (JM77MN)	14.022.0 CW	E51DOM/MM (JF97)	7796 km	up 0.8 great ears!! Enjo! 3Y0I
2019-03-17 18:36	EA7JZZ (IM87EC)	14.215.0 SSB	9G2DX (IJ95)	3521 km	LoTW Trn QSO, 5/7 in Spain, 73
2019-03-17 18:36	IK2WSO (JN45OL)	14.218.0 SSB	5V7EI (JJ06)	4401 km	5 to 10 up
2019-03-17 18:36	IV3OKO (JN66IB)	14.215.0 SSB	9G2DX (IJ95)	4694 km	
2019-03-17 18:35	IK2YDJ (JN55)	14.218.0 SSB	XR0ZRC (FF06)	12580 km	trn for qso
2019-03-17 18:34	VK3KHZ (QF22PE)	14.097.1 WSPR	HB9TJM (JN36FQ)	16524 km	QF22PE<->JN36FQ WSPR SNR=-25
2019-03-17 18:34	DL/PA0EHG (JO32SQ)	14.097.1 WSPR	EA7ADI (IM77AI)	2000 km	JO32SQ<->IM77AI WSPR SNR=-20
2019-03-17 18:34	OZ7IT (JO65DF)	14.097.1 WSPR	G0CCL (JO02BF)	865 km	JO65DF<->JO02BF WSPR SNR=-20
2019-03-17 18:34	EA8BFK (IL38BO)	14.097.2 WSPR	F1AGR (JN04RJ)	2218 km	IL38BO<->JN04RJ WSPR SNR=-22
2019-03-17 18:34	EA8BFK (IL38BO)	14.097.1 WSPR	M0AEZ (JO01DE)	2774 km	IL38BO<->JO01DE WSPR SNR=-20
2019-03-17 18:34	SM4VEY (JO59WK)	14.097.0 WSPR	EA7ADI (IM77AI)	2765 km	JO59WK<->IM77AI WSPR SNR=-11
2019-03-17 18:34	DP0GVN (B59VI)	14.097.1 WSPR	G0CCL (JO02BF)	13675 km	IB59UH<->JO02BF WSPR SNR=-26
2019-03-17 18:34	TF1VHF (HP84WL)	14.097.0 WSPR	EA7ADI (IM77AI)	3199 km	HP84WL<->IM77AI WSPR SNR=-22
2019-03-17 18:34	OZ7IT (JO65DF)	14.097.0 WSPR	EA7ADI (IM77AI)	2415 km	JO65DF<->IM77AI WSPR SNR=-2
2019-03-17 18:34	EA8BFK (IL38BO)	14.097.1 WSPR	G0CCL (JO02BF)	2869 km	IL38BO<->JO02BF WSPR SNR=-3
2019-03-17 18:34	EA8BFK (IL38BO)	14.097.1 WSPR	PD1RA (JO22XF)	3094 km	IL38BO<->JO22XF WSPR SNR=-21
2019-03-17 18:34	DK8FTJA (JN58OE)	14.097.1 WSPR	HZ1SK (KL91)	3860 km	JN58OE<->KL91 WSPR SNR=-24
2019-03-17 18:33	IK4ZGX (JN54KV)	14.022.0 CW	E51DOM/MM (JF97)	8640 km	trn
2019-03-17 18:33	5V7XRO (JO60F)	14.218.0 SSB	IK8BQE (JN70EN)	4035 km	LoTW a great dser..
2019-03-17 18:31	IK4SE (JN54PL)	14.218.0 SSB	5V7EI (JJ06)	4335 km	mondo pescatori...
2019-03-17 18:31	OE3IDE (JN78XK)	14.218.0 SSB	5V7EI (JJ06)	4867 km	NOT XR0ZRC
2019-03-17 18:31	IT8ZZ (JM68QD)	14.223.0 SSB	IK8BQE (JN70EN)	282 km	LoTW e ascolta.poi scrivi.
2019-03-17 18:31	F4WBL (JN25)	14.218.0 SSB	XR0ZRC (FF06)	12163 km	
2019-03-17 18:30	IK8RQF (JN70EN)	14.218.0 SSB	XR0ZRC (FF06)	12594 km	

Cloud-to-cloud: VOACAP



Voice of A Program V

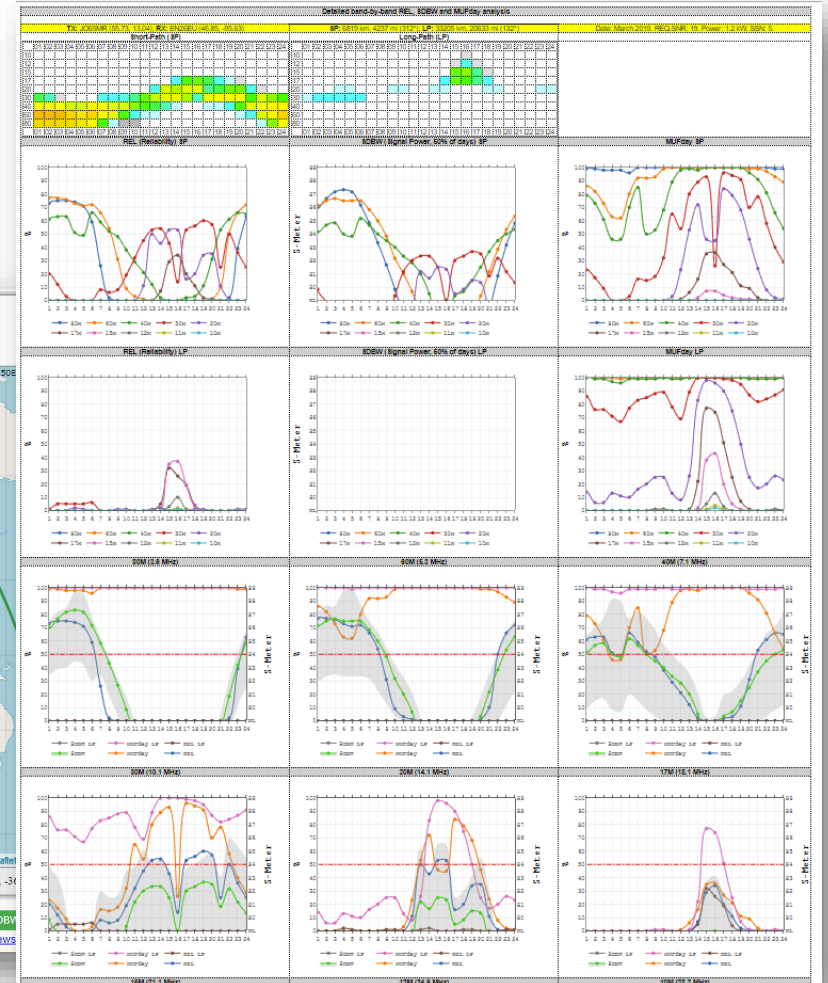
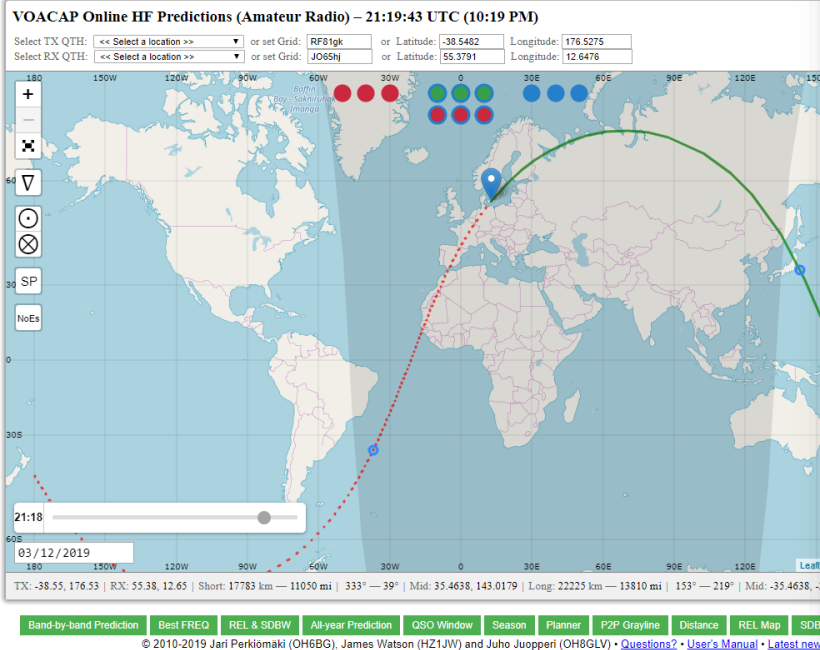
VOACAP is free propagation pre developed for V should get you

Need a user ma

A more compre using the softw Signal-to-Noise The book is ava

Need standalor (Jim Watson).

Running any sci prohibited unless site owners.



Klientprogram: DXLab SpotCollector

Del av den betydligt större DXLab-sviten för komplett hantering av en amatörradiostation. Integrerad med utbredningsförutsägelser, loggbok, diplomhantering, etc.

SpotCollector 8.3.0 @ 2019-03-12 21:52 Z [CC,DXK,PF,DXV,PV] 6 entries (log: SM7IUN.mdb)

WWV 03-12 2106 Z
SFI 71 History
Q: 6 A 9 1 K

Outgoing spot
Call CT1ILT 1 840,0 Freq Cluster
Notes X Local

Spot source status
Report Stats Prop Config Help

	Freq	Call	DXCCCountry	Mode	LastTime	Notes	Source	Network	LastOr	NA	SA	EU	AF	AS	Odx	State	Need	SPS	SPro
	1 820,6	3B8XF	Mauritius Islan	CW	2019-03-12 2144	QSX 1822.25	DL1ROJ	EI7MRE	EU			Y			359		DZ		
	1 824,6	JA5DQH	Japan	CW	2019-03-12 2142	CW 18 dB 22 WPM CQ	JF2IWL-#	VE7CC	AS			Y		Y	1270		DZ		
	1 840,0	7P8LB	Lesotho	FT8	2019-03-12 2141	FT8 normal	EU0EU-@	CQDX	EU			Y	Y		897		DZ		
	7 092,0	7P8LB	Lesotho	SSB	2019-03-12 2142	only Ja	IV3RJT	CQDX	EU			Y			630		D	3	
	10 110,0	XR0ZRC	Juan Fernandi	CW	2019-03-12 2145	QSX 10111.88 IOTA SAC	EA4ZK	EI7MRE	EU		Y	Y		Y	936		DZ	-8	3
	14 012,0	XR0ZRC	Juan Fernandi	CW	2019-03-12 2149	still 569 here	DM5EM	EI7MRE	EU	Y	Y	Y			538		D	7	38

Sort
 First Call
 Last Freq
 Rcv Az

Filter: SQL [Need F]
ce2sv X AutoHide Need Call DXCC Freq Tag Band Mode Cont Origin
Audio Age LoTW eQSL Mrthn S

Color codes
■ verified ■ unwrkd B or M
■ unneeded ■ unwrkd counter
■ unconfmd ■ special tag

Need F Need C N+ EU CWops Unkwn Need S My spot Myneed

Vad kan RBN göra för dig?

Test



- Bandöppningar
- Fyller bandkartan
- Spottar dig
- Visar lediga frekvenser
- Jämförelser med konkurrenter

DX

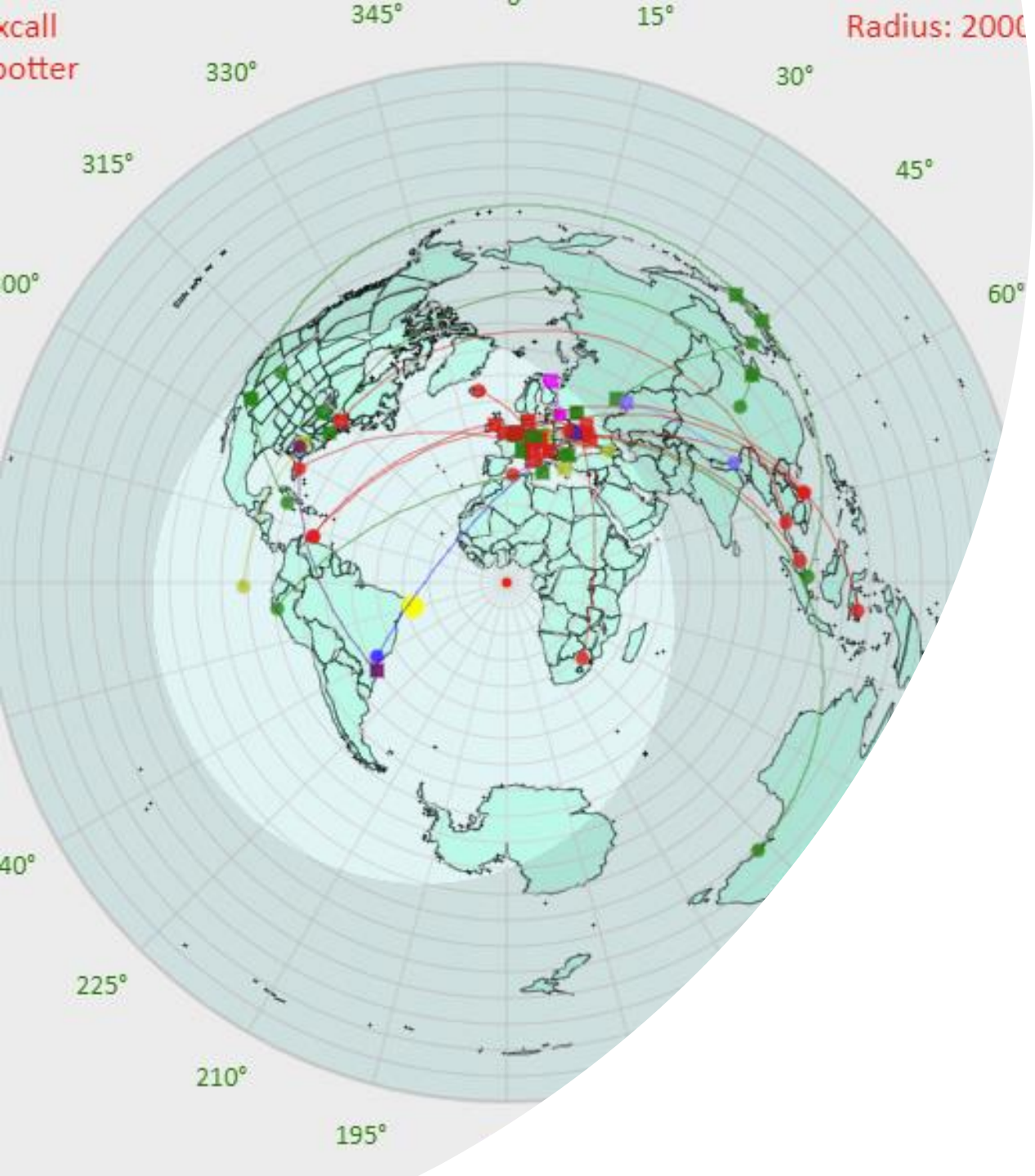


- Varseblivning
- Bandöppningar
- Utbredningsanalys
- Varningar

Antenn- experiment

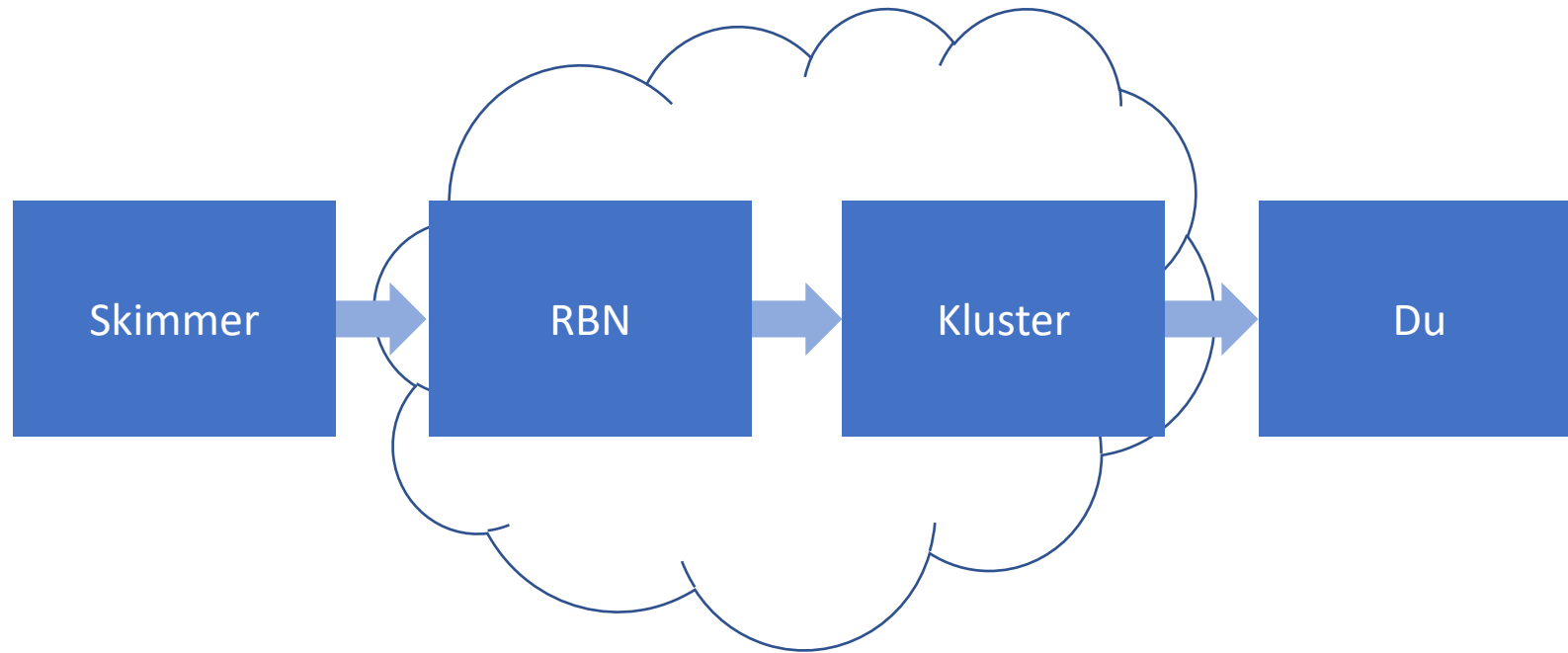


- Antennprestanda
- Riktverkan och utbredningsvinkel
- A-B tester



Tack

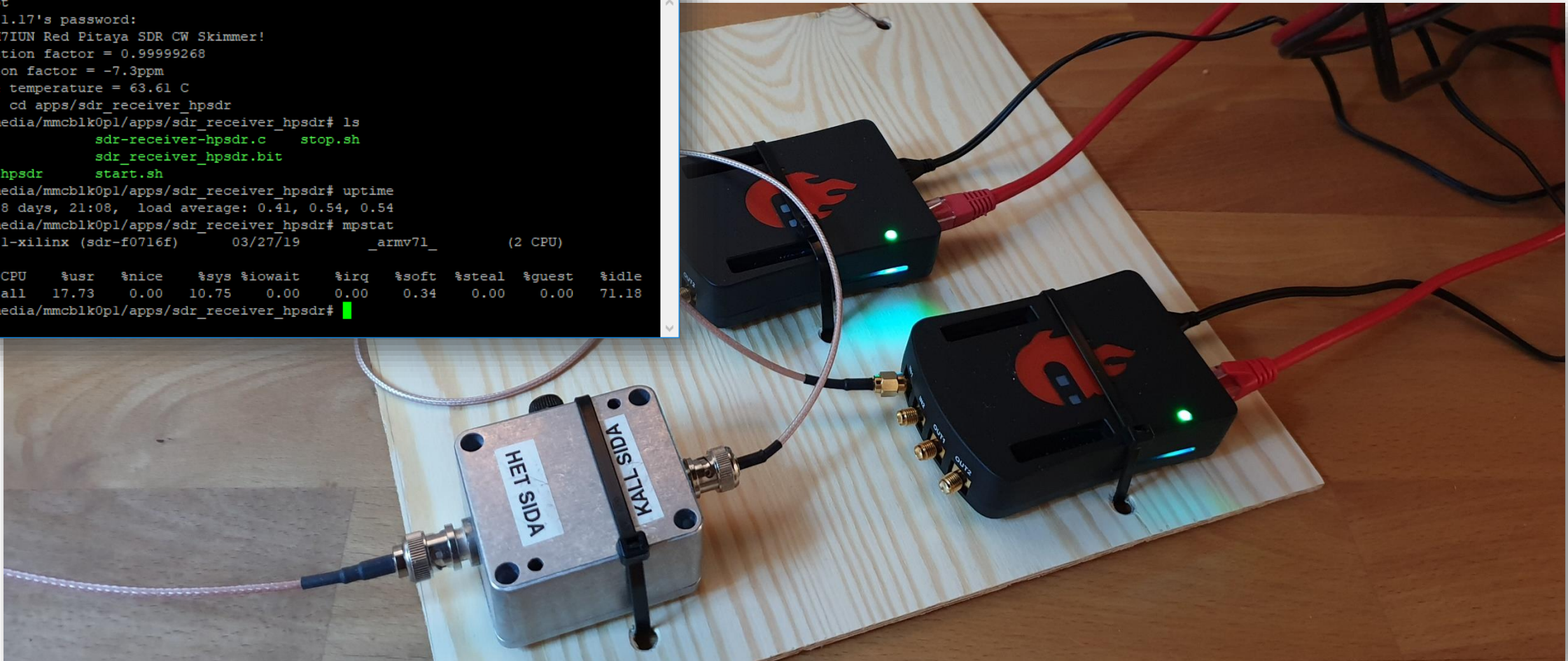
Hela kedjan



SM7IUN-#

```
192.168.1.17 - PuTTY
login as: root
root@192.168.1.17's password:
Welcome to SM7IUN Red Pitaya SDR CW Skimmer!
HPSDR calibration factor = 0.99999268
FT8 calibration factor = -7.3ppm
Zynq 7020 die temperature = 63.61 C
sdr-f0716f:~# cd apps/sdr_receiver_hpsdr
sdr-f0716f:/media/mmcblk0pl/apps/sdr_receiver_hpsdr# ls
Makefile          sdr-receiver-hpsdr.c  stop.sh
index.html        sdr_receiver_hpsdr.bit
sdr-receiver-hpsdr  start.sh
sdr-f0716f:/media/mmcblk0pl/apps/sdr_receiver_hpsdr# uptime
 12:20:18 up 8 days, 21:08,  load average: 0.41, 0.54, 0.54
sdr-f0716f:/media/mmcblk0pl/apps/sdr_receiver_hpsdr# mpstat
Linux 4.14.101-xilinx (sdr-f0716f)    03/27/19    _armv7l_    (2 CPU)

12:20:19  CPU  %usr  %nice  %sys  %iowait  %irq  %soft  %steal  %guest  %idle
12:20:19  all  17.73  0.00  10.75  0.00    0.00  0.34  0.00  0.00  71.18
sdr-f0716f:/media/mmcblk0pl/apps/sdr_receiver_hpsdr#
```



#3 Värddator och mjukvara



• “CW Skimmer Server” och/eller “RTTY Skimmer Server”

- Avkodar telegrafi inom den anslutna radions passband
- CW tar ca 10-20% av en 2GHz Core i5 medan RTTY tar **mycket** mer

• “CWSL_DIGI”

- Kör ett godtyckligt antal kopior av WSJT-X utan GUI

• “RBN Aggregator”

- Konsoliderar och kurerar strömmen av avkodade anropssignaler från flera skimrar och publicerar på RBN
- Kan styra bandcyklning

