

# Prickar och bakvända fyrar

Att navigera i amatörradions digitala skärgård

Björn Ekelund SM7IUN



Fyrar?

NCDXF/IARU International Beacon Project  
Transmission Schedule





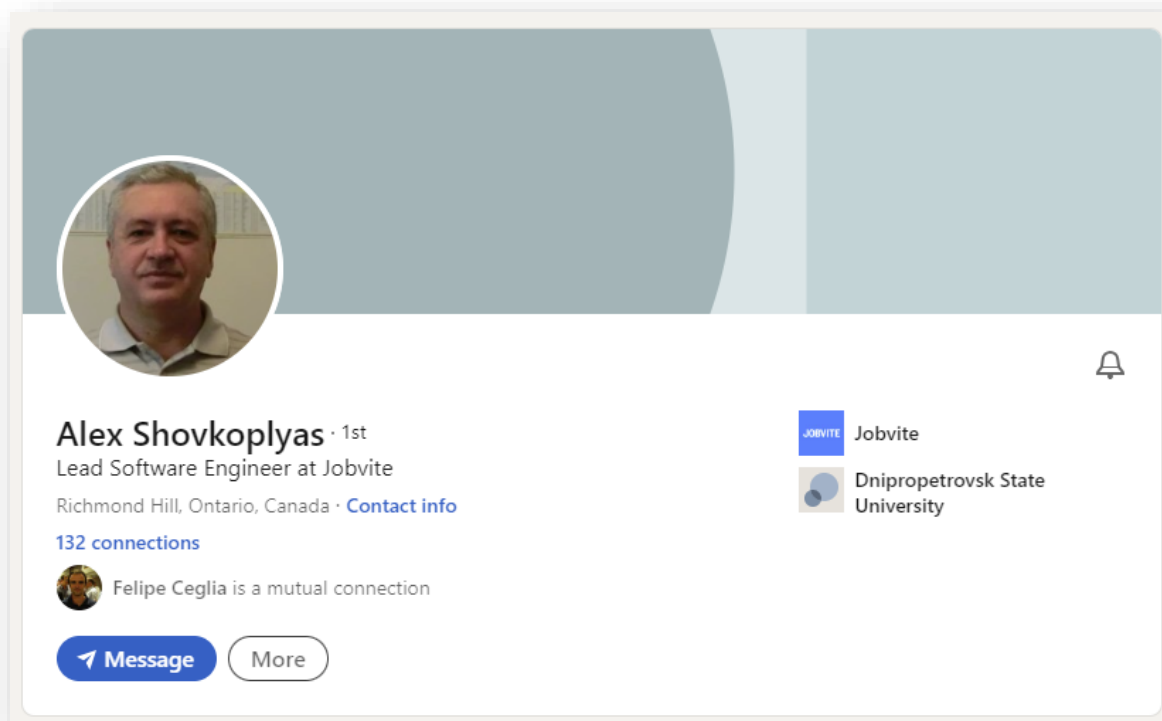
Bakvända fyrrar!

/ 160m / 80m / 40m / 30m / 20m / 17m / 15m / 12m / 10m / 6m / 2m  
world wide / zoom to US / zoom to Europe / zoom to North Atlantic

# Det startade med en briljant ingenjör

Alex Shovkopyas, VE3NEA ex UR5EMI

”Canadian ham of the year” 2014



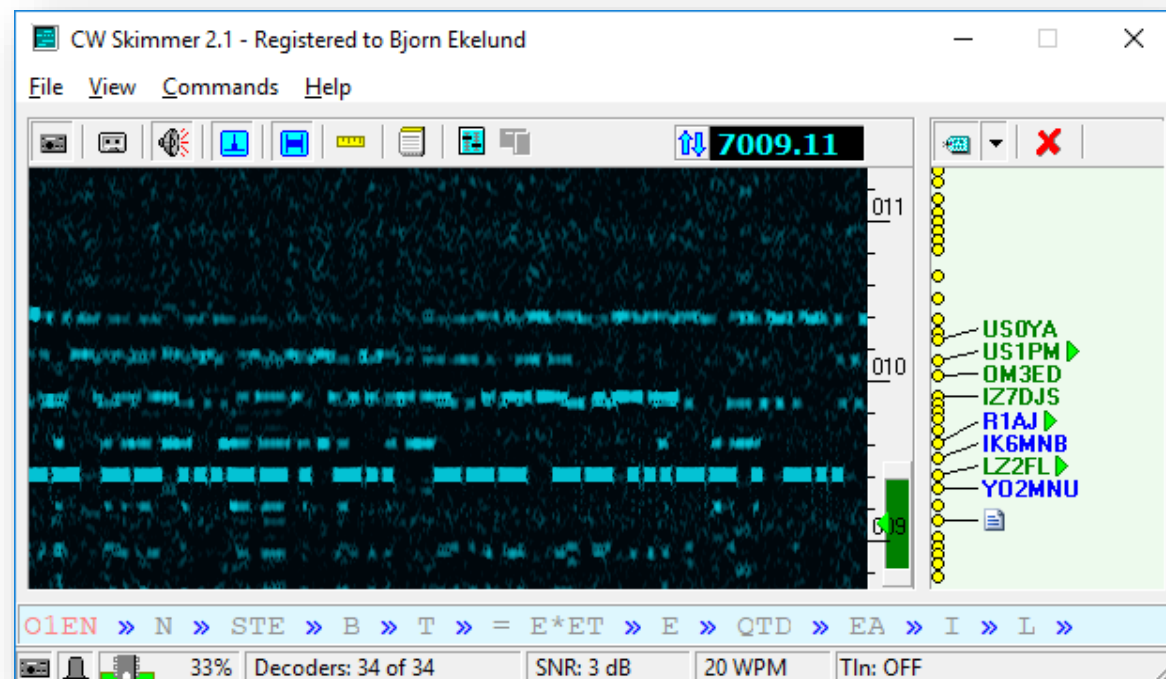
Alex Shovkopyas · 1st  
Lead Software Engineer at Jobvite  
Richmond Hill, Ontario, Canada · [Contact info](#)  
132 connections  
Felipe Ceglia is a mutual connection  
[Message](#) [More](#)

Jobvite  
Dnipropetrovsk State University





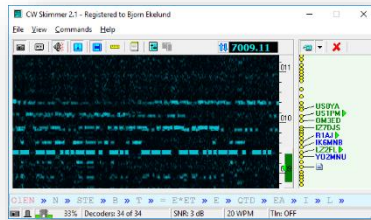
# Morseavkodaren "CW Skimmer"



- 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

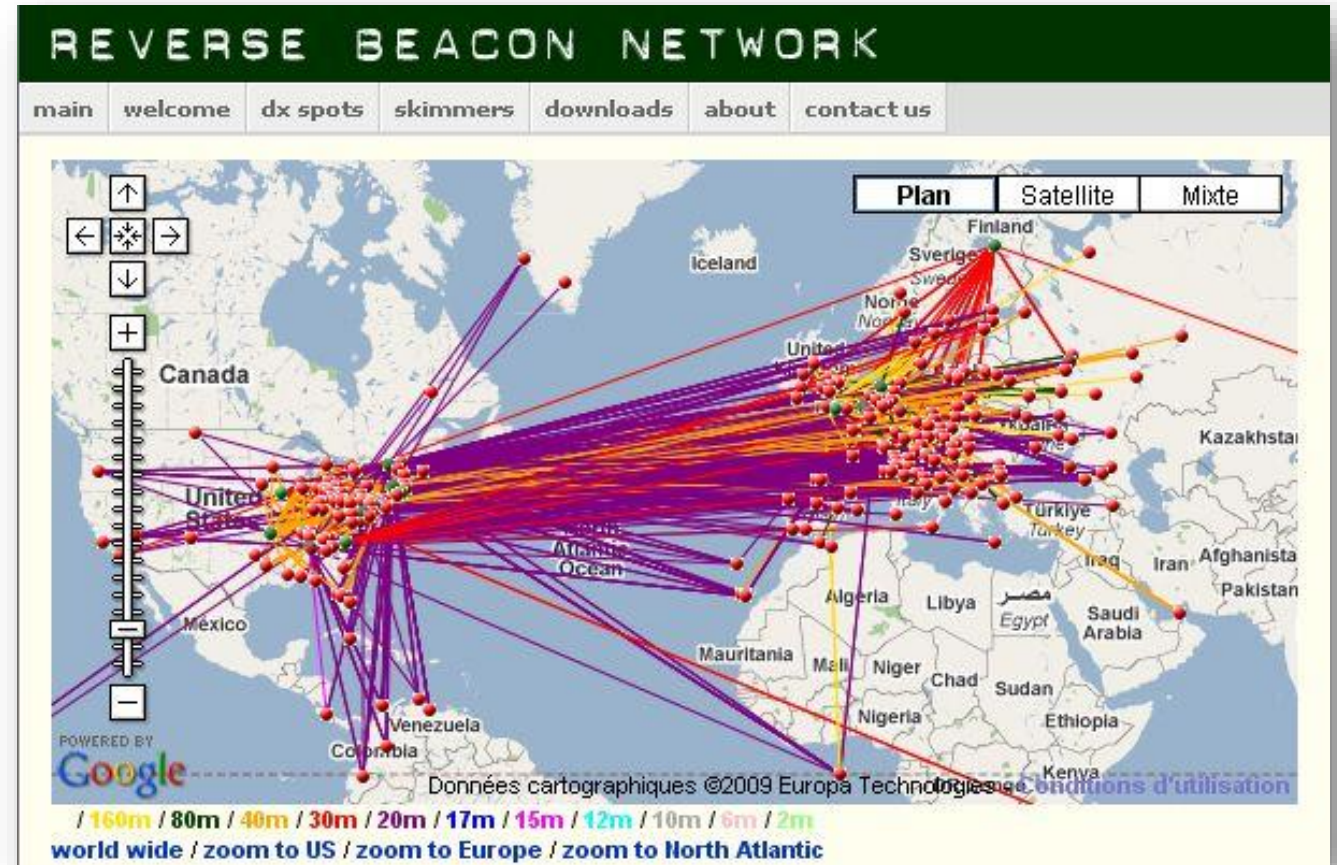
showing spots for DX call: LA3ZA rows to show: 50

search spot by callsign

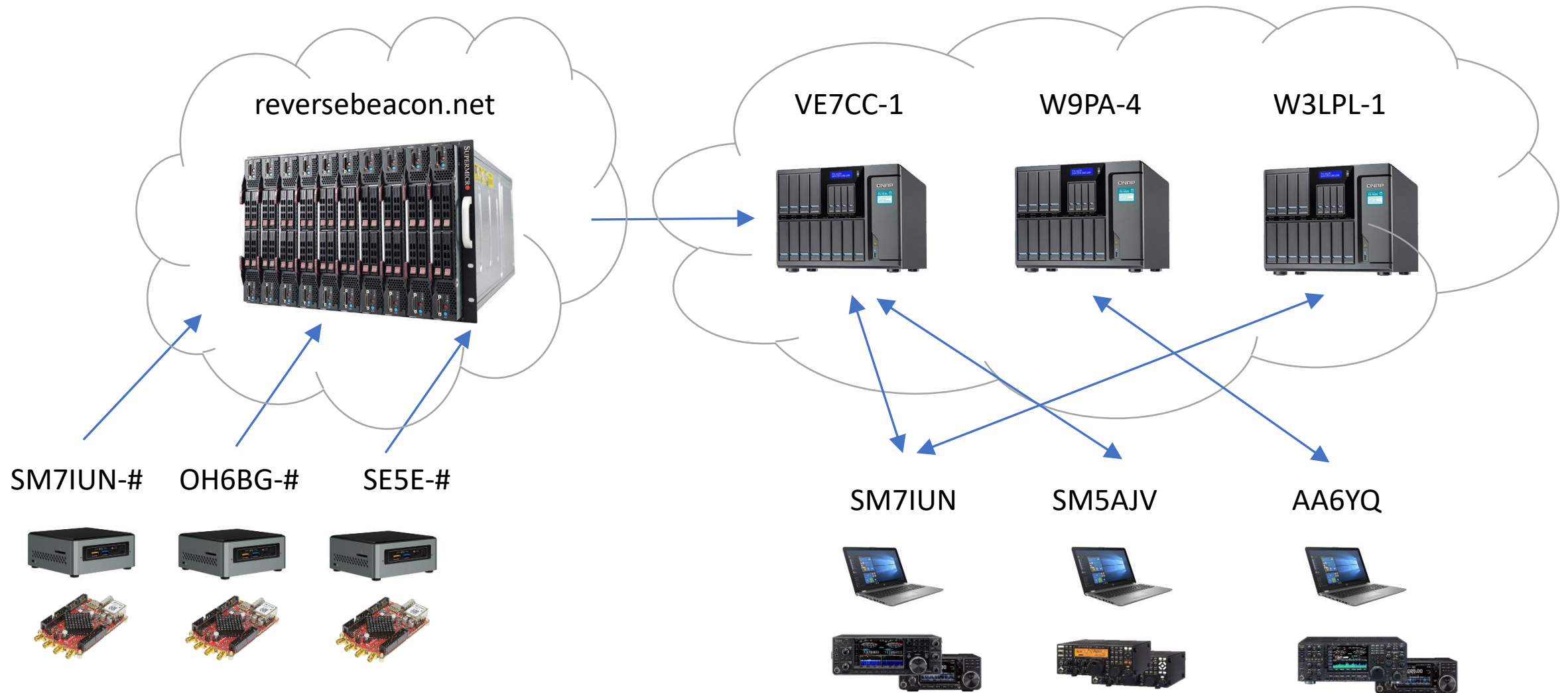
de	dx	freq	cq/dx	snr	speed	time
DL0LBS	LA3ZA	3534.4	CW CQ [LoTW]	19 dB	16 wpm	2031z 22 Apr
DL1EMY	LA3ZA	3534.3	CW CQ [LoTW]	29 dB	15 wpm	2028z 22 Apr
DR1A	LA3ZA	3534.3	CW CQ [LoTW]	23 dB	15 wpm	2028z 22 Apr
LA5EKA	LA3ZA	3534.3	CW CQ [LoTW]	16 dB	15 wpm	2016z 22 Apr
DF7GB	LA3ZA	3534.3	CW CQ [LoTW]	19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

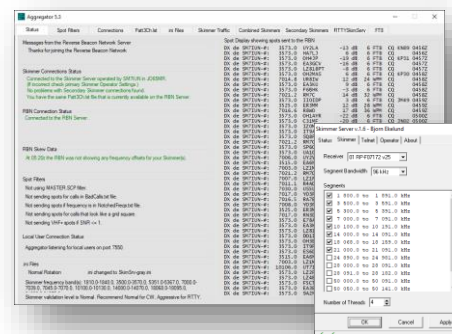




# En skimmers beståndsdelar

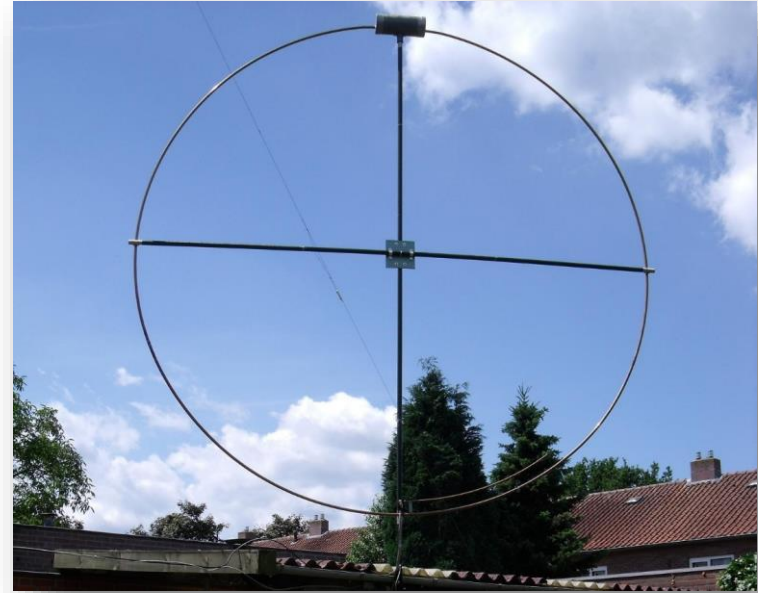


```
for i in people.data.users:
    response = client.api.statuses.user_timeline.get(screen_name=i.scre
    print 'Got', len(response.data), 'tweets from', i.screen_name
    if len(response.data) != 0:
        tldate = response.data[0]['created_at']
        tldate2 = datetime.strptime(tldate, '%a %b %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
```



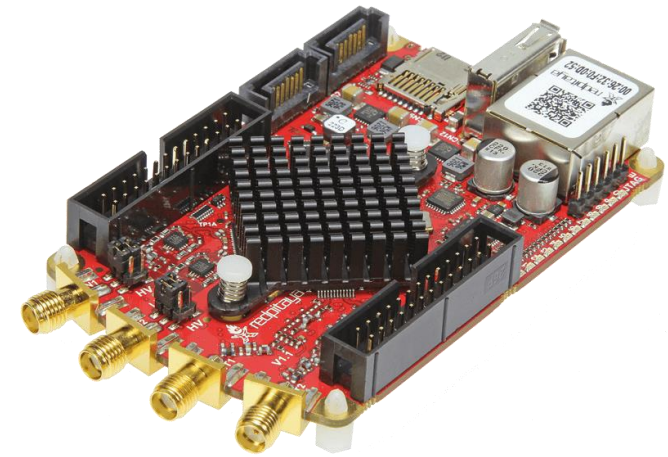
# #1 Antenn

- 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





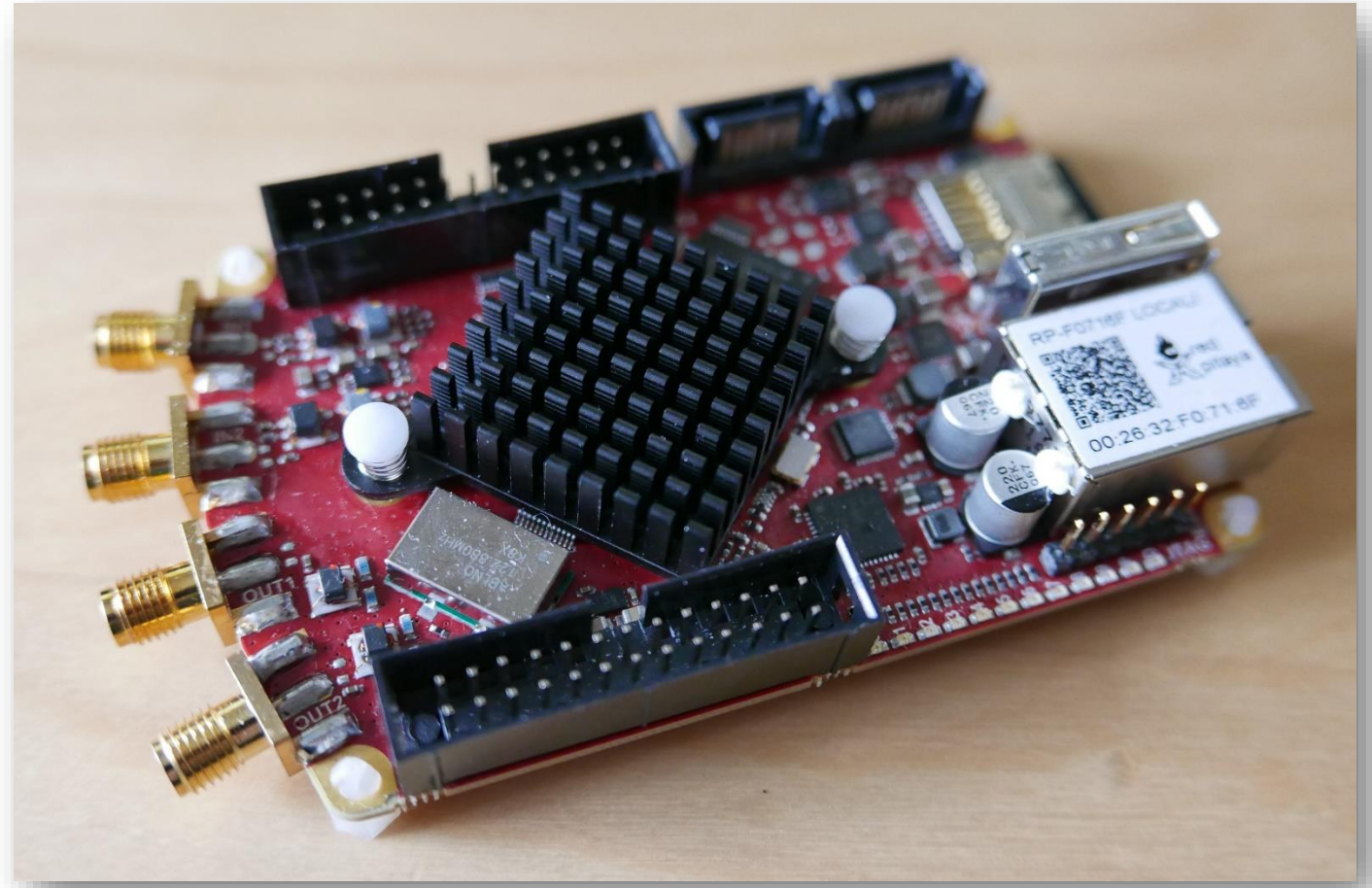
# SDR-mottagare



# “The Raspberry Pi of DSP”

Red Pitaya 122.88-16

- Byggt 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



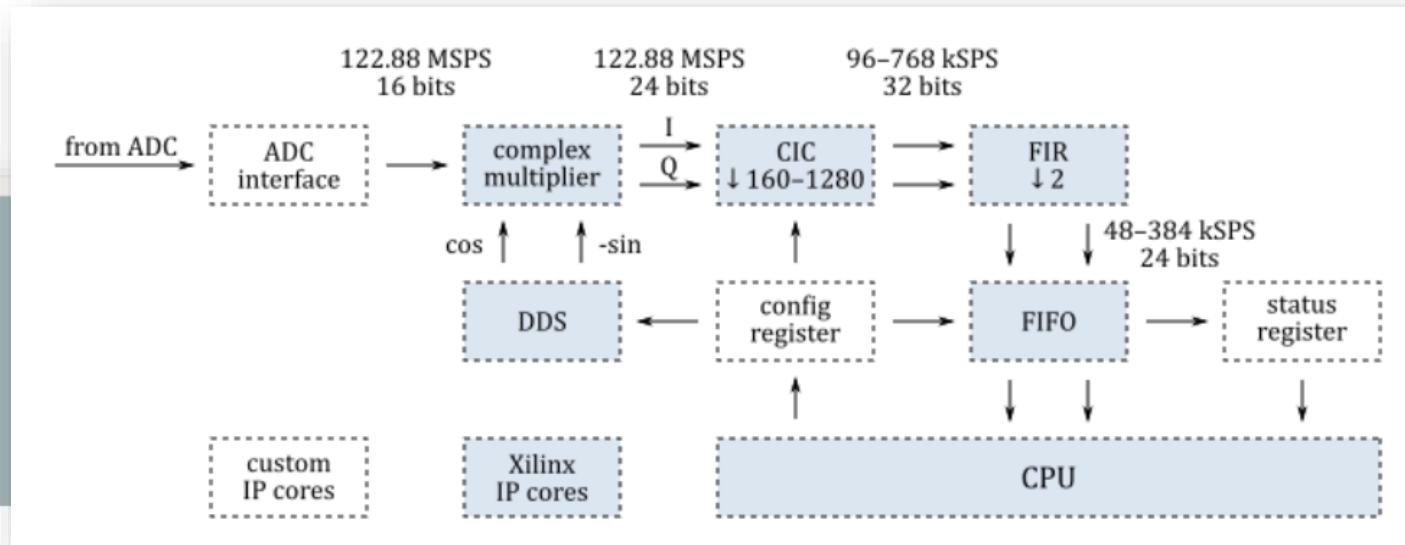
Felipe Ceglia and Rok Ursic are mutual connections

[Message](#)

[More](#)

Université catholique de Louvain

Université Joseph Fourier - Grenoble 1



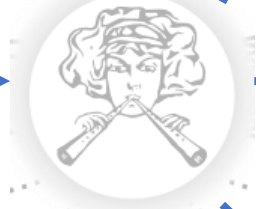
1. List of components
2. Links
3. Development machine
4. LED blinker
5. SDR receiver
6. SDR transceiver
7. SDR transceiver compatible with HPSDR
8. SDR receiver compatible with HPSDR
9. Embedded SDR transceiver
10. Wideband SDR transceiver
11. Multiband WSPR transceiver
12. Multiband FT8 transceiver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



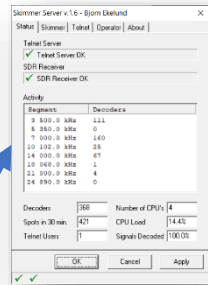
# Skimmernodens programvara



CWSL\_Tee.dll

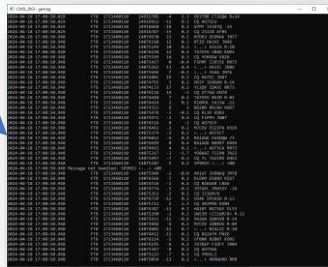
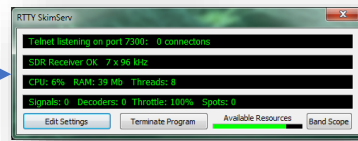


JT moder

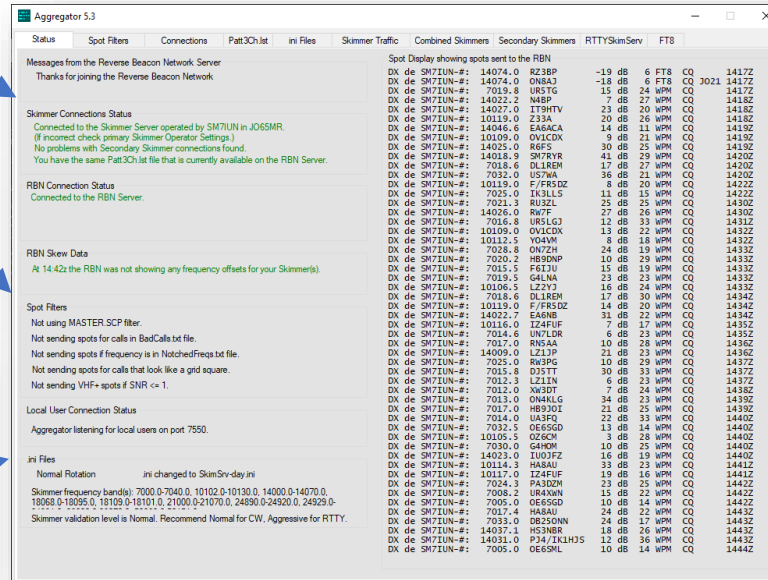


Morse

RTTY

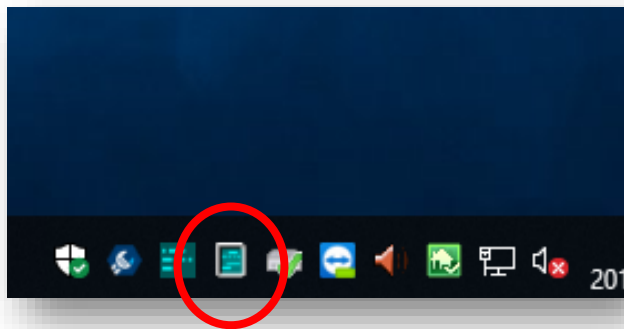


Windows PC



# 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>

Skimmer Server v.1.6 - Bjorn Ekelund

Status | Skimmer | Telnet | Operator | About

Telnet Server  
✓ Telnet Server OK

SDR Receiver  
✓ SDR Receiver OK

Activity

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

Decoders  Number of CPU's

Spots in 30 min.  CPU Load

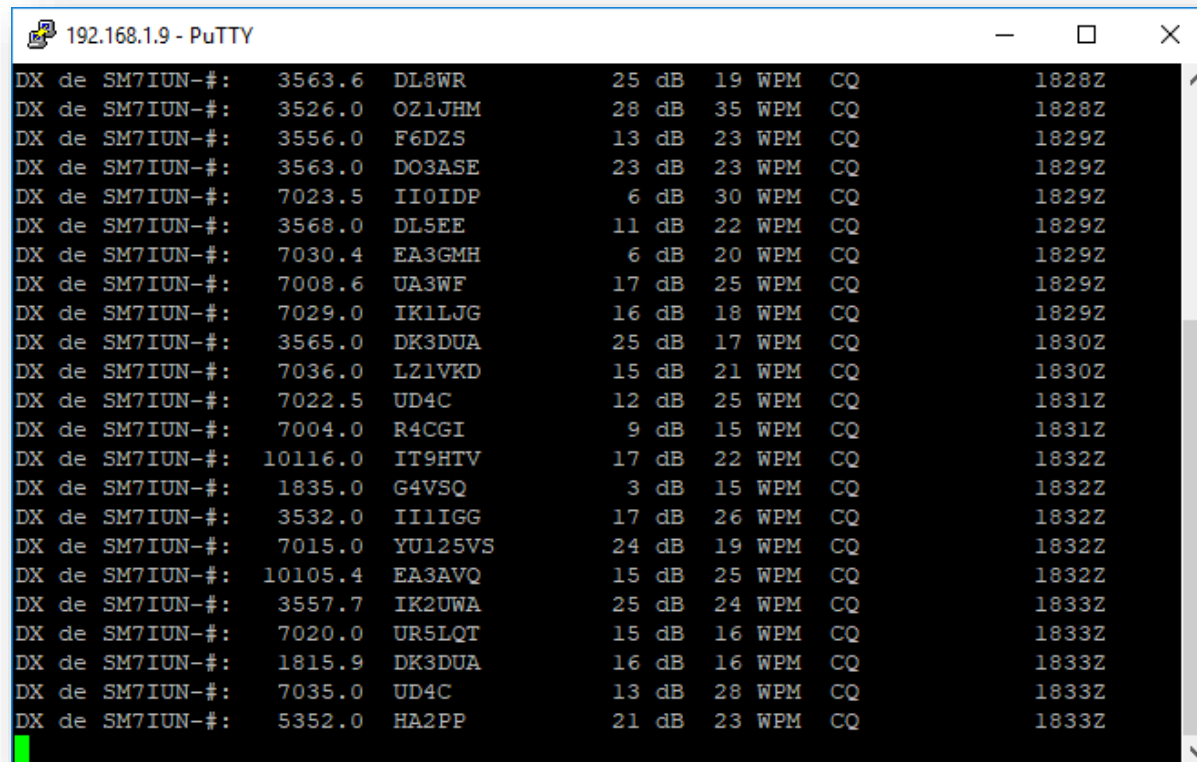
Telnet Users  Signals Decoded

OK Cancel Apply

✓ ✓

# CW Skimmer Server

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

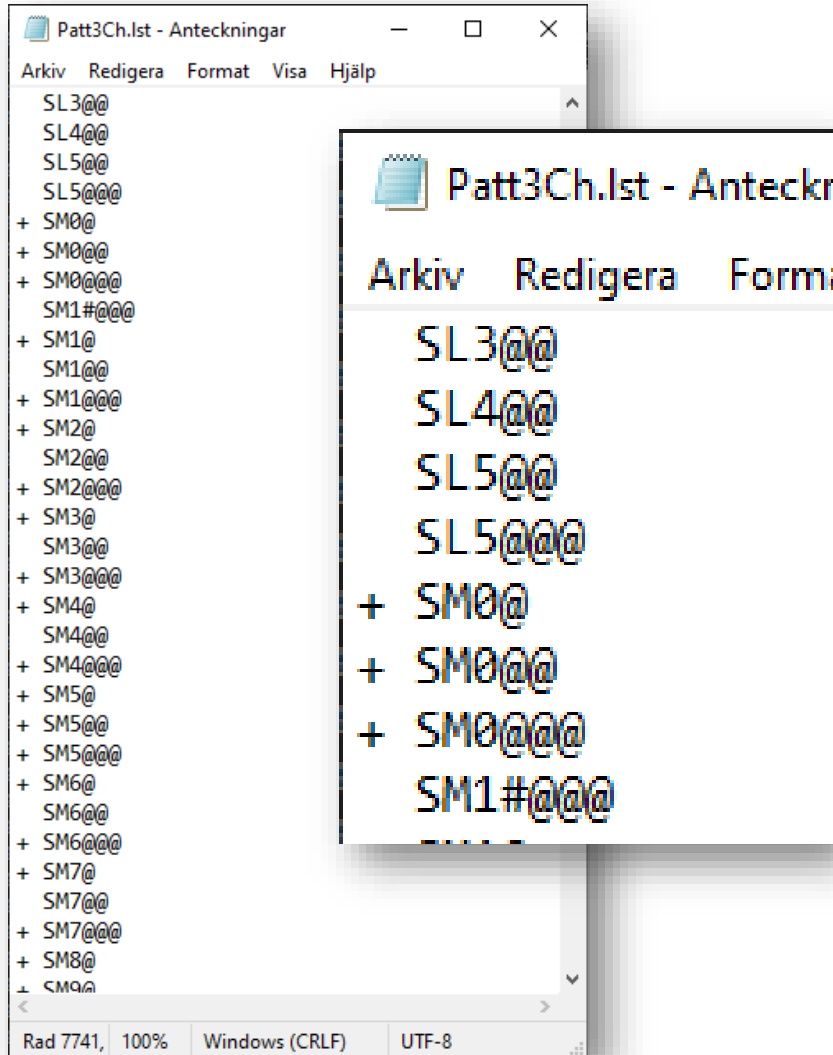


```
192.168.1.9 - PuTTY
DX de SM7IUN-#: 3563.6 DL8WR 25 dB 19 WPM CQ 1828Z
DX de SM7IUN-#: 3526.0 OZ1JHM 28 dB 35 WPM CQ 1828Z
DX de SM7IUN-#: 3556.0 F6DZS 13 dB 23 WPM CQ 1829Z
DX de SM7IUN-#: 3563.0 DO3ASE 23 dB 23 WPM CQ 1829Z
DX de SM7IUN-#: 7023.5 II0IDP 6 dB 30 WPM CQ 1829Z
DX de SM7IUN-#: 3568.0 DL5EE 11 dB 22 WPM CQ 1829Z
DX de SM7IUN-#: 7030.4 EA3GMH 6 dB 20 WPM CQ 1829Z
DX de SM7IUN-#: 7008.6 UA3WF 17 dB 25 WPM CQ 1829Z
DX de SM7IUN-#: 7029.0 IK1LJG 16 dB 18 WPM CQ 1829Z
DX de SM7IUN-#: 3565.0 DK3DUA 25 dB 17 WPM CQ 1830Z
DX de SM7IUN-#: 7036.0 LZ1VKD 15 dB 21 WPM CQ 1830Z
DX de SM7IUN-#: 7022.5 UD4C 12 dB 25 WPM CQ 1831Z
DX de SM7IUN-#: 7004.0 R4CGI 9 dB 15 WPM CQ 1831Z
DX de SM7IUN-#: 10116.0 IT9HTV 17 dB 22 WPM CQ 1832Z
DX de SM7IUN-#: 1835.0 G4VSQ 3 dB 15 WPM CQ 1832Z
DX de SM7IUN-#: 3532.0 II1IGG 17 dB 26 WPM CQ 1832Z
DX de SM7IUN-#: 7015.0 YU125VS 24 dB 19 WPM CQ 1832Z
DX de SM7IUN-#: 10105.4 EA3AVQ 15 dB 25 WPM CQ 1832Z
DX de SM7IUN-#: 3557.7 IK2UWA 25 dB 24 WPM CQ 1833Z
DX de SM7IUN-#: 7020.0 UR5LQT 15 dB 16 WPM CQ 1833Z
DX de SM7IUN-#: 1815.9 DK3DUA 16 dB 16 WPM CQ 1833Z
DX de SM7IUN-#: 7035.0 UD4C 13 dB 28 WPM CQ 1833Z
DX de SM7IUN-#: 5352.0 HA2PP 21 dB 23 WPM CQ 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](mailto:pete.n4zr@gmail.com)

<https://www.reversebeacon.net/pages/patt3ch.Ist+36>

# 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

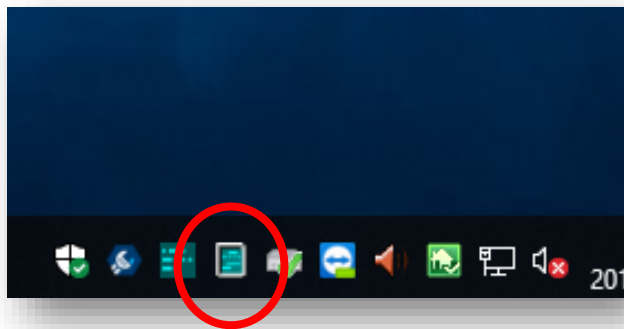
- CWT SM7IUN ✗
- CQ CWT SM7IUN ✓
- WSEM RM2D ✗

**Number of Repetitions Required to be Spotted**

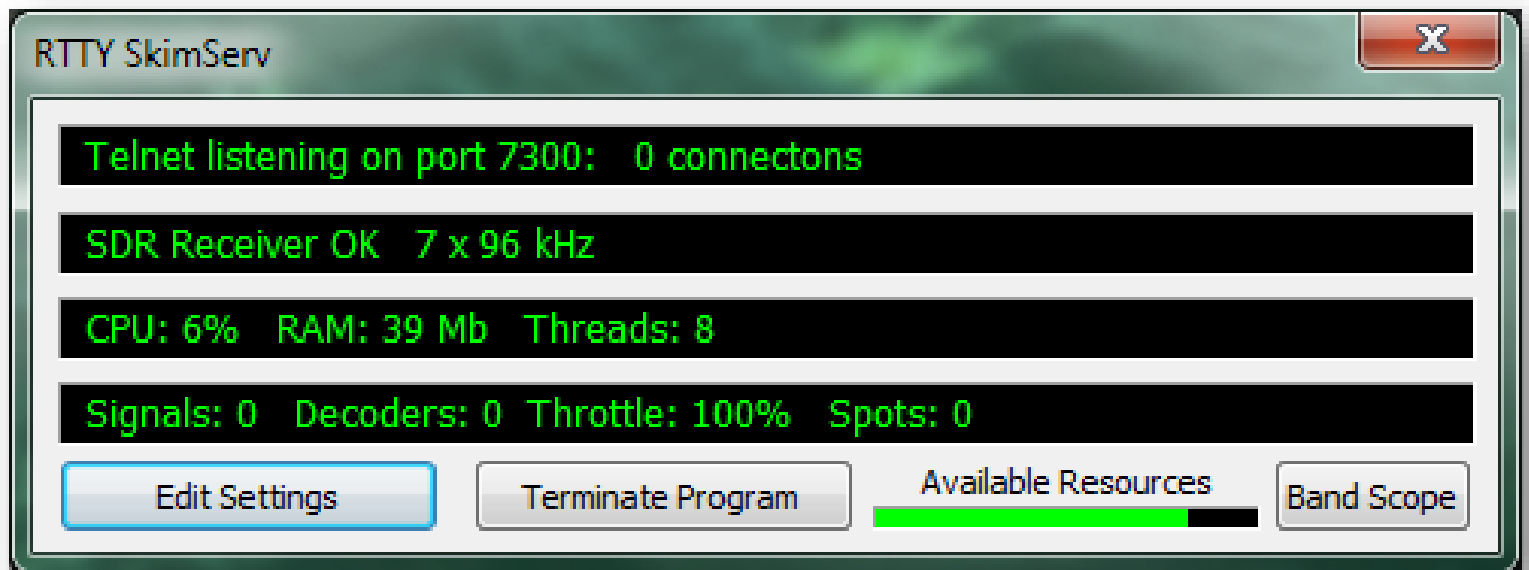
<b>Pattern</b>	Minimal	Normal	Aggressive	Paranoid*
<b>File/Validation</b>				
Watch list	1	1	2	2
+ in pattern file	2	2	4	-
No + but in file	2	3	4	-
Not in file	2	5	-	-
Not ITU prefix	-	-	-	-

# RTTY Skimmer Server

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



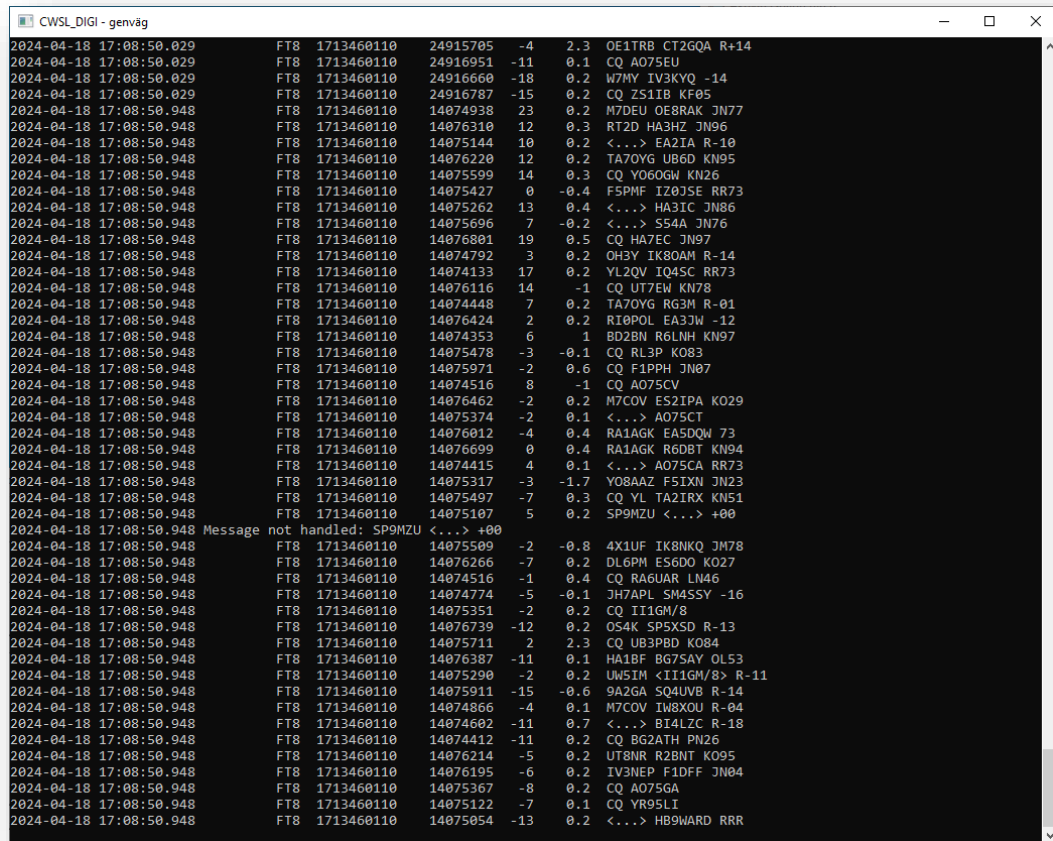
<http://www.dxatlas.com/SkimServer>





# CWSL\_DIGI

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

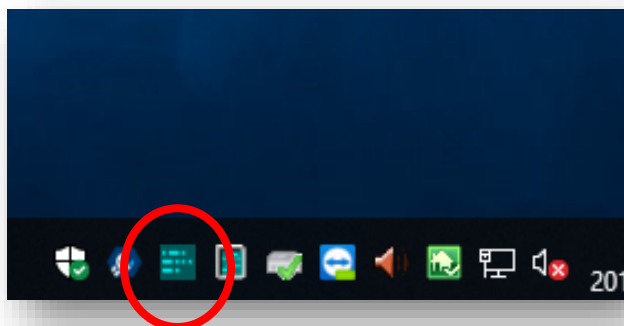


```
2024-04-18 17:08:50.029 FT8 1713460110 24915705 -4 2.3 OE1TRB CT2GQA R+14
2024-04-18 17:08:50.029 FT8 1713460110 24916951 -11 0.1 CQ A075EU
2024-04-18 17:08:50.029 FT8 1713460110 24916660 -18 0.2 W7MY IV3KYQ -14
2024-04-18 17:08:50.029 FT8 1713460110 24916787 -15 0.2 CQ Z511B KF05
2024-04-18 17:08:50.948 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 IK8NKK JM78
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 II1GM/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 <II1GM/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 <...> BI4LZC 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 and connection information. On the right, there is a 'Spot Display' showing a list of spots sent to the RBN. The status messages include: 'Messages from the Reverse Beacon Network Server: Thanks for joining the Reverse Beacon Network', 'Skimmer Connections Status: Connected to the Skimmer Server operated by SM7IUN in JO65MR. (If incorrect check primary Skimmer Operator Settings.) No problems with Secondary Skimmer connections found. You have the same Patt3Ch.lst file that is currently available on the RBN Server.', 'RBN Connection Status: Connected to the RBN Server.', 'RBN Skew Data: At 16:29z the RBN was not showing any frequency offsets for your Skimmer(s).', 'Spot Filters: Not using MASTER.SCP filter. Not sending spots for calls in BadCalls.txt file. Not sending spots if frequency is in NotchedFreqs.txt file. Not sending spots for calls that look like a grid square. Not sending VHF+ spots if SNR &lt;= 1.', 'Local User Connection Status: Aggregator listening for local users on port 7550.', and 'ini Files: Normal Rotation ini changed to SkimSrv-gray.ini'. The Spot Display shows a list of spots with columns for call sign, frequency, mode, and other details. The list includes calls like F6IJ, RK3Q/7, HB90BQR, IZ7WMM, YL3AJT, DJ6ZM, GOCBO, W7QC, F6IJ, R1ZY, RV6LNZ, LZ2HR, SVOAMS, W3WP, R1ZY, EA5EQ, ZB2CW, LZ7DL, YT2ZE, RK4CT, UA6EED, RU3KA, ZS6DN, 5V7EI, RU3KA, DL1GZH, G58VL, RN6HI/B, K2TV, OK3EE, LZ2JB, UB7K, UA6EED, R3OR, RK3Q/7, IT9FRT, DK5JPL, UB7K, 4Z4DX, HZ1TT, GOEJV, HB9JCI, SPLJPM, UA6KAC, R1ZY, RW3WP, PA2SAM, EAL1XT, and YT4EW.

# 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

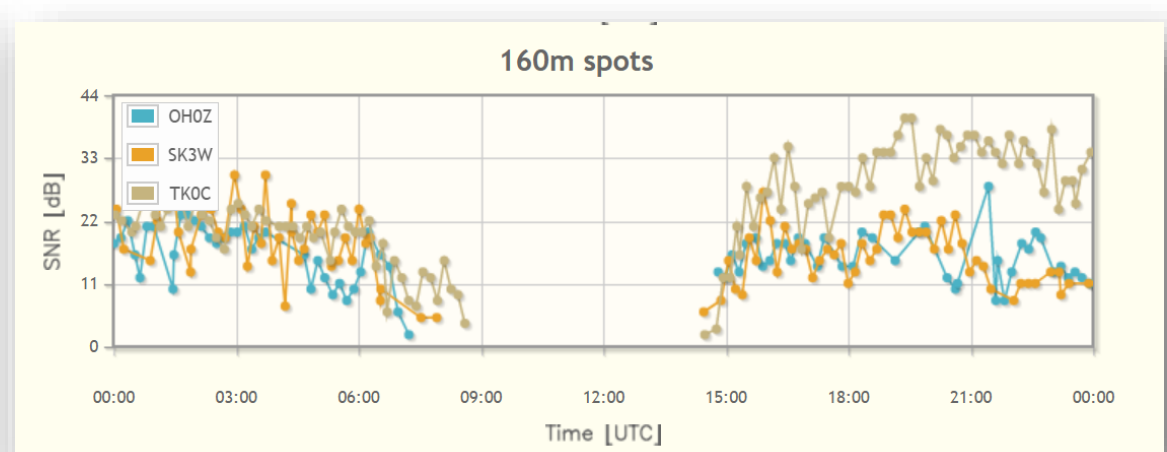
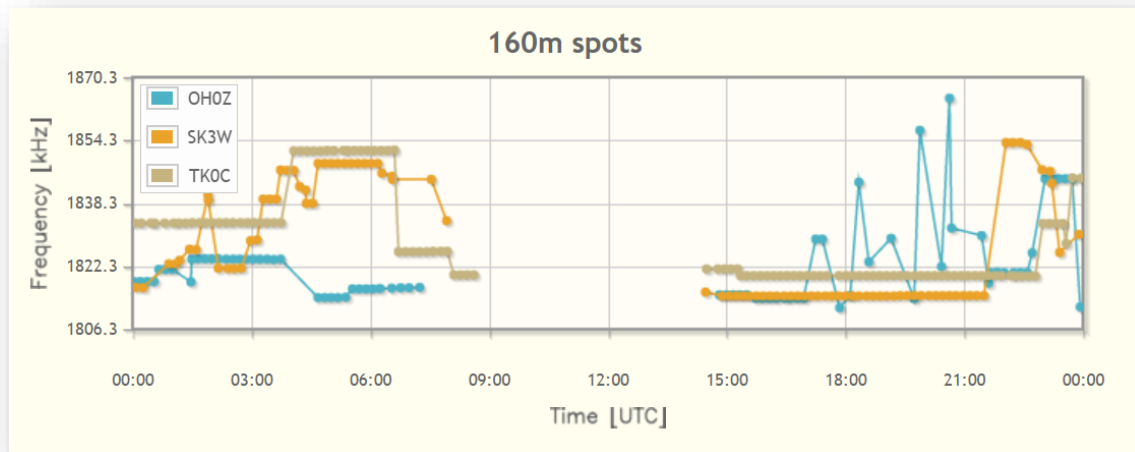
world wide / zoom to US / zoom to Europe / zoom to North Atlantic

show/hide my last filters

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

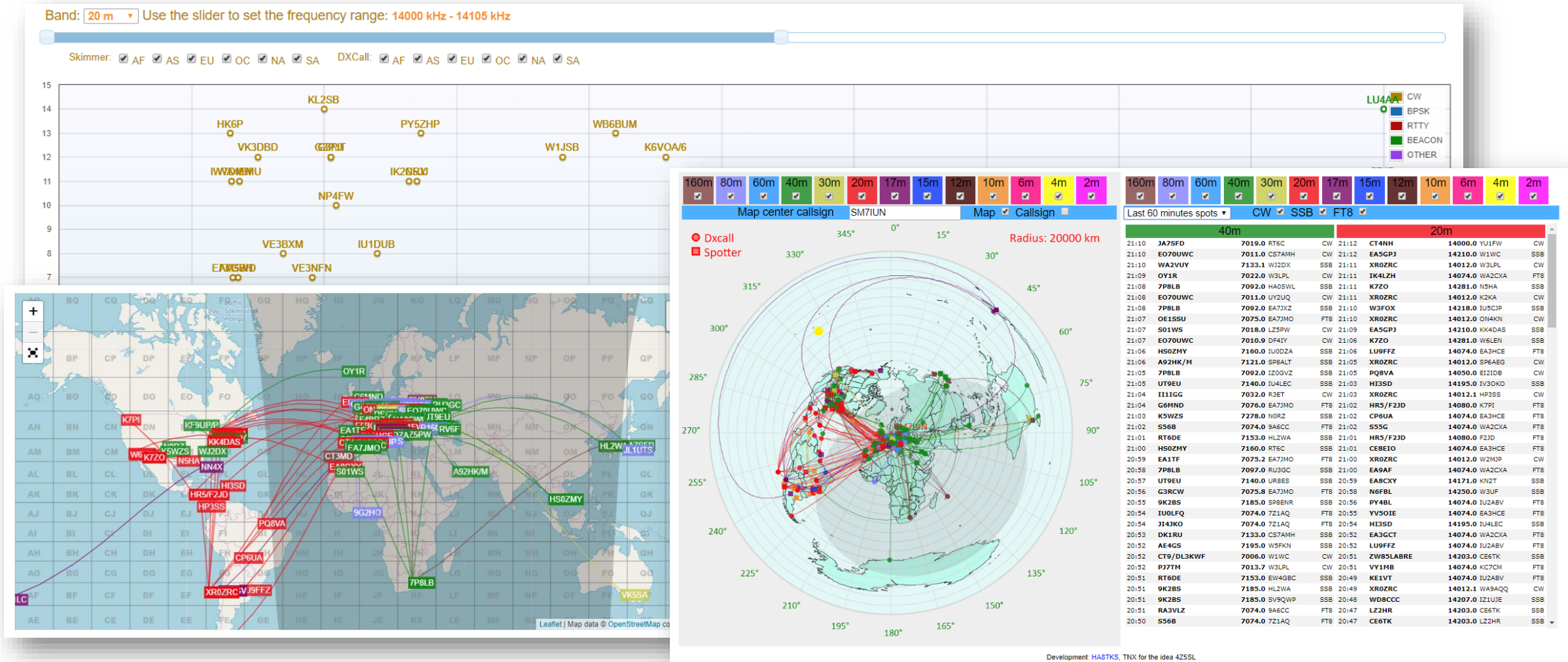
search spot by callsign

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



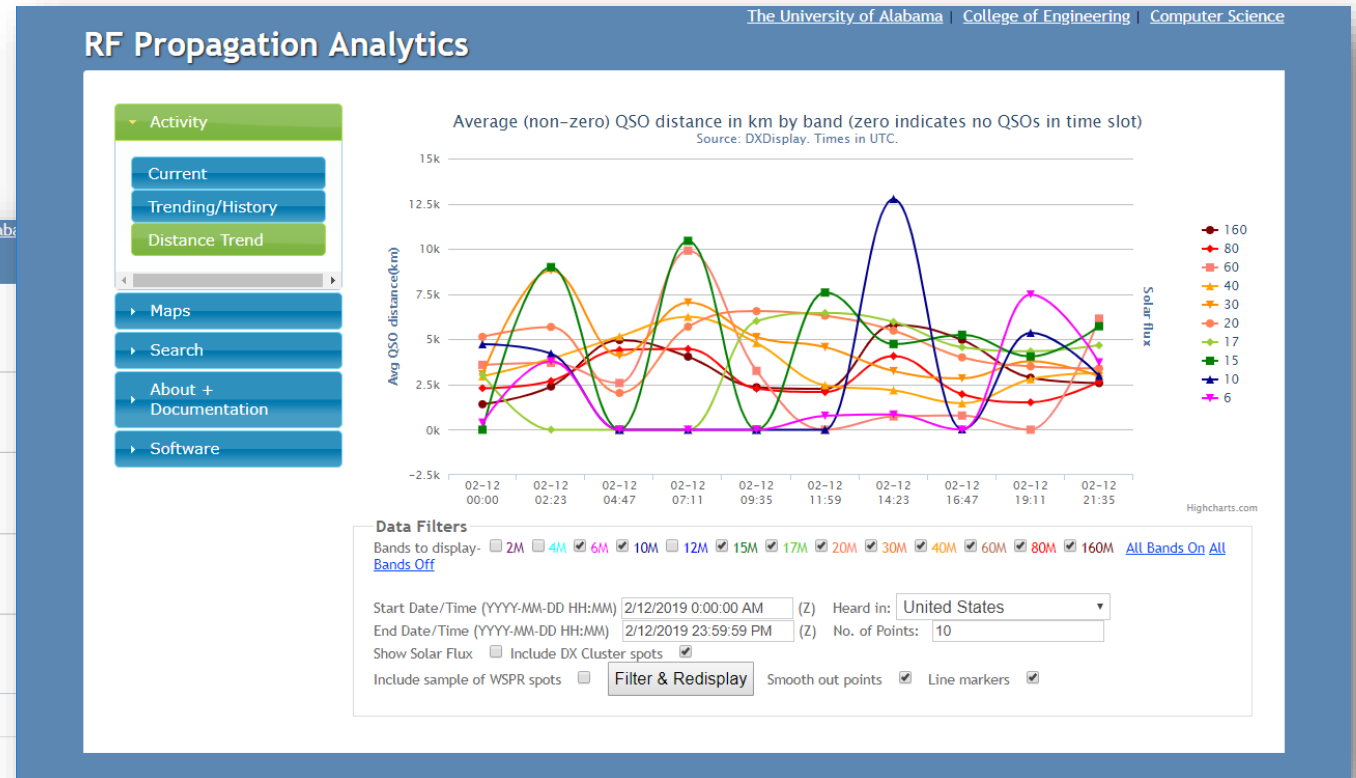
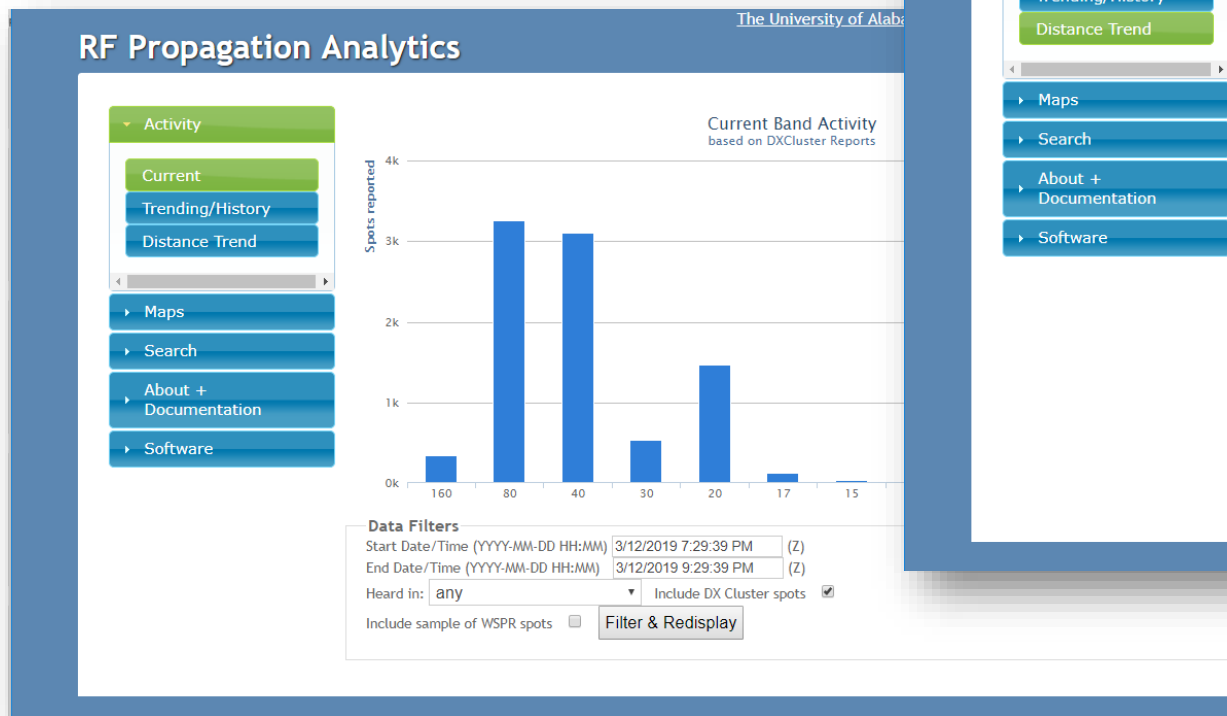


# Cloud-to-cloud: HA8TKS



<https://dxcluster.ha8tk.hu>

# Cloud-to-cloud: University of Alabama



# Cloud-to-cloud: DX maps

The image shows two overlapping screenshots of the DXMAPS 4.0 website. The top screenshot displays a world map with a grid of call sign locations and a network of black lines representing QSO/SWL connections. The bottom screenshot shows a detailed list of real-time information for the website, including call signs, times, frequencies, and distances.

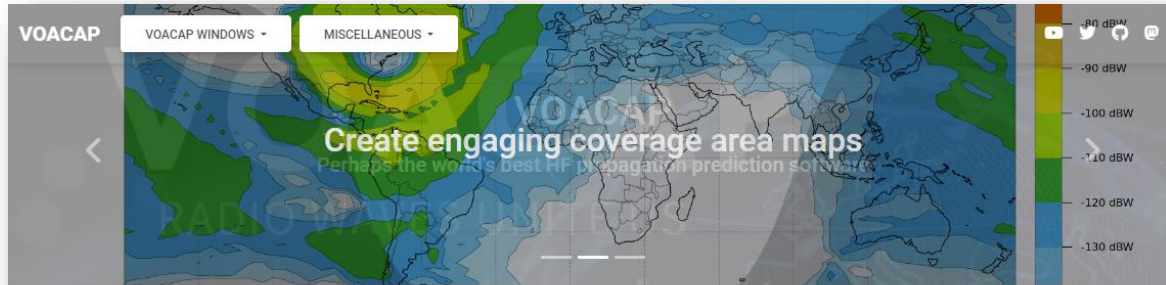
**WWW.DXMAPS.COM 18:57z**

Time	Call Sign	Mode	Frequency	Distance	Notes
2019-03-17 18:57	IK2QEB (JN55LD)	SSB	14.218.0	4399 km	
2019-03-17 18:54	I7OEB (JM99AX)	SSB	14.218.0	12851 km	Up 6. Trx
2019-03-17 18:54	F8JUV (JN18BW)	FT8	14.074.0	4220 km	FT8
2019-03-17 18:50	IV3RJT (JN65SW)	SSB	14.215.0	4705 km	LoTW trn 4 qso 73 s
2019-03-17 18:50	DL9IU (JO50KG)	FT8	14.074.4	12189 km	trn FT8 qso
2019-03-17 18:50	F8BNU (JO10K)	CW	14.032.0	6066 km	trn for qso.73 up
2019-03-17 18:49	TA5FA (KN90UX)	SSB	14.248.0	4397 km	
2019-03-17 18:46	EI5GSB (IO51WU)	SSB	14.218.0	5109 km	Thanks Lads La Fheile Pdraig
2019-03-17 18:44	K0DMW (EN35)	WSPR	14.097.1	6955 km	EN35<->JN04RJ WSPR SNR=-29
2019-03-17 18:44	OZ7IT (JO65DF)	WSPR	14.097.1	8649 km	JO65DF<->JG87 WSPR SNR=-22
2019-03-17 18:44	G4CUI (IO93FI)	WSPR	14.097.2	1019 km	IO93FI<->JN04RJ WSPR SNR=-25
2019-03-17 18:44	IZ0FKE (JN61FW)	WSPR	14.097.2	1472 km	JN61FW<->JO02BF WSPR SNR=-11
2019-03-17 18:44	OZ7IT (JO65DF)	WSPR	14.097.1	865 km	JO65DF<->JO02BF WSPR SNR=-23
2019-03-17 18:44	EA2AAE (IN82KU)	WSPR	14.097.1	1069 km	IN82KU<->JO02BF WSPR SNR=-24
2019-03-17 18:42	TA5FA (KN90UX)	SSB	14.248.0	4397 km	up5
2019-03-17 18:42	TR0TTEL (JJ40RL)	SSB	14.218.0	5361 km	
2019-03-17 18:41	DL7JAN (JN49IF)	SSB	14.248.0	5727 km	up5
2019-03-17 18:40	IW9GYL (JM77MN)	CW	14.022.0	7796 km	up 0.8 great ears!! Enjol 3Y0I
2019-03-17 18:36	EA7JZZ (IM87EC)	WSPR	14.215.0	3521 km	LoTW
2019-03-17 18:36	IK2WSO (JN45OL)	SSB	14.218.0	4401 km	5 to 10 up
2019-03-17 18:36	IV3OKO (JN66IB)	SSB	14.215.0	4694 km	LoTW
2019-03-17 18:35	IK2YDJ (JN55)	SSB	14.218.0	12580 km	trn for qso
2019-03-17 18:34	VK3KHZ (QF22PE)	WSPR	14.097.1	16524 km	QF22PE<->JN36FQ WSPR SNR=-25
2019-03-17 18:34	DL/PA0EHG (JO32SQ)	WSPR	14.097.1	2000 km	JO32SQ<->IM77AI WSPR SNR=-20
2019-03-17 18:34	OZ7IT (JO65DF)	WSPR	14.097.1	865 km	JO65DF<->JO02BF WSPR SNR=-20
2019-03-17 18:34	EA8BFK (IL38BO)	WSPR	14.097.2	2218 km	LoTW IL38BO<->JN04RJ WSPR SNR=-22
2019-03-17 18:34	EA8BFK (IL38BO)	WSPR	14.097.1	2774 km	LoTW IL38BO<->JO01DE WSPR SNR=-20
2019-03-17 18:34	SM4VEY (JO59WK)	WSPR	14.097.0	2765 km	JO59WK<->IM77AI WSPR SNR=-11
2019-03-17 18:34	DP0GVN (B59VI)	WSPR	14.097.1	13675 km	IB59UH<->JO02BF WSPR SNR=-26
2019-03-17 18:34	TF1VHF (HP84WL)	WSPR	14.097.0	3199 km	HP84WL<->IM77AI WSPR SNR=-22
2019-03-17 18:34	OZ7IT (JO65DF)	WSPR	14.097.0	2415 km	JO65DF<->IM77AI WSPR SNR=-2
2019-03-17 18:34	EA8BFK (IL38BO)	WSPR	14.097.1	2869 km	IL38BO<->JO02BF WSPR SNR=-3
2019-03-17 18:34	EA8BFK (IL38BO)	WSPR	14.097.1	3094 km	IL38BO<->JO22XF WSPR SNR=-21
2019-03-17 18:34	DK8FTJA (JN58OE)	WSPR	14.097.1	3860 km	LoTW JN58OE<->KL91 WSPR SNR=-24
2019-03-17 18:33	IK4ZGX (JN54KV)	CW	14.022.0	8640 km	trn
2019-03-17 18:33	5V7XRO (JJ06OF)	SSB	14.218.0	4035 km	LoTW a great dser..
2019-03-17 18:31	IK4SE (JN54PL)	SSB	14.218.0	4335 km	mondo pescatori...
2019-03-17 18:31	OE3IDE (JN78XK)	SSB	14.218.0	4867 km	NOT XR0ZRC
2019-03-17 18:31	IT8ZZ (JM68QD)	SSB	14.223.0	282 km	LoTW e ascolta.poi scrivi.
2019-03-17 18:31	F4WBL (JN25)	SSB	14.218.0	12163 km	
2019-03-17 18:30	IK8RQF (JN70FN)	SSB	14.218.0	12594 km	
2019-03-17 18:30	XR0ZRC (FF06)	SSB	14.218.0	12594 km	

<https://www.dxmaps.com>



# Cloud-to-cloud: VOACAP



## Voice of A Program V

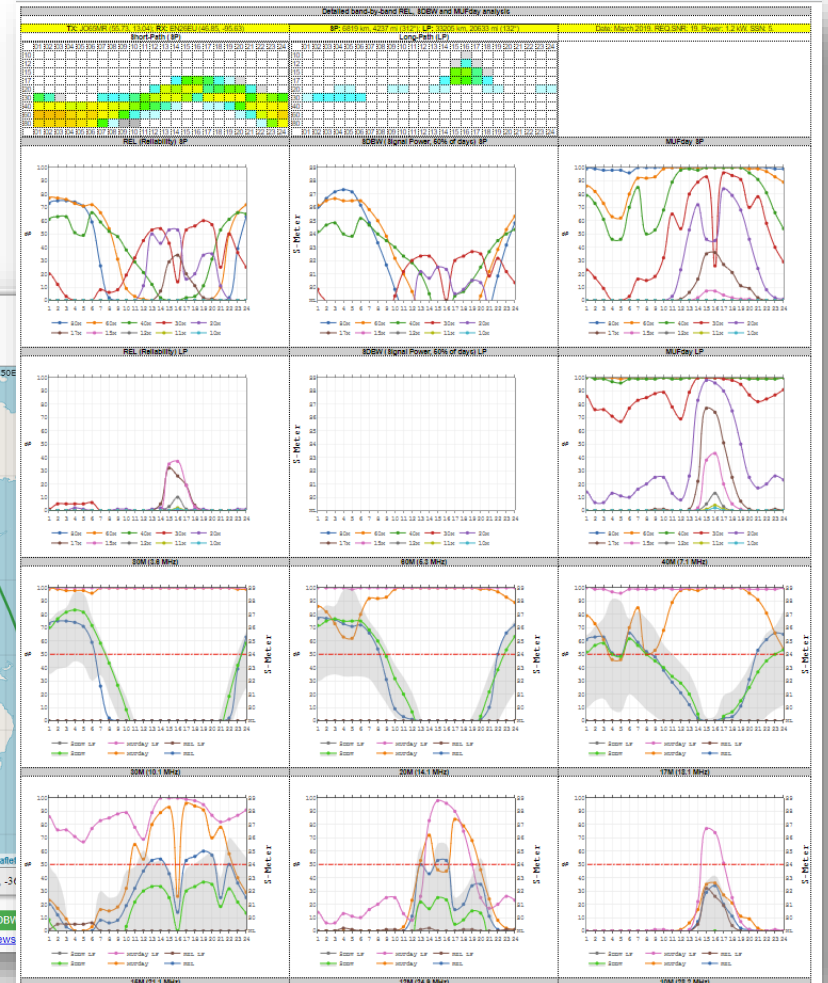
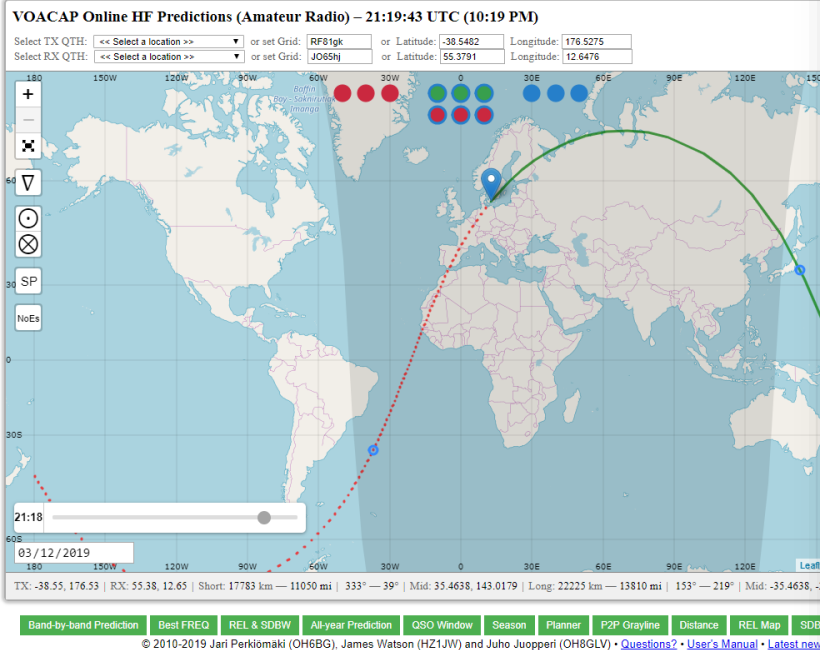
VOACAP is free propagation pre developed for V should get you

### Need a user ma

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

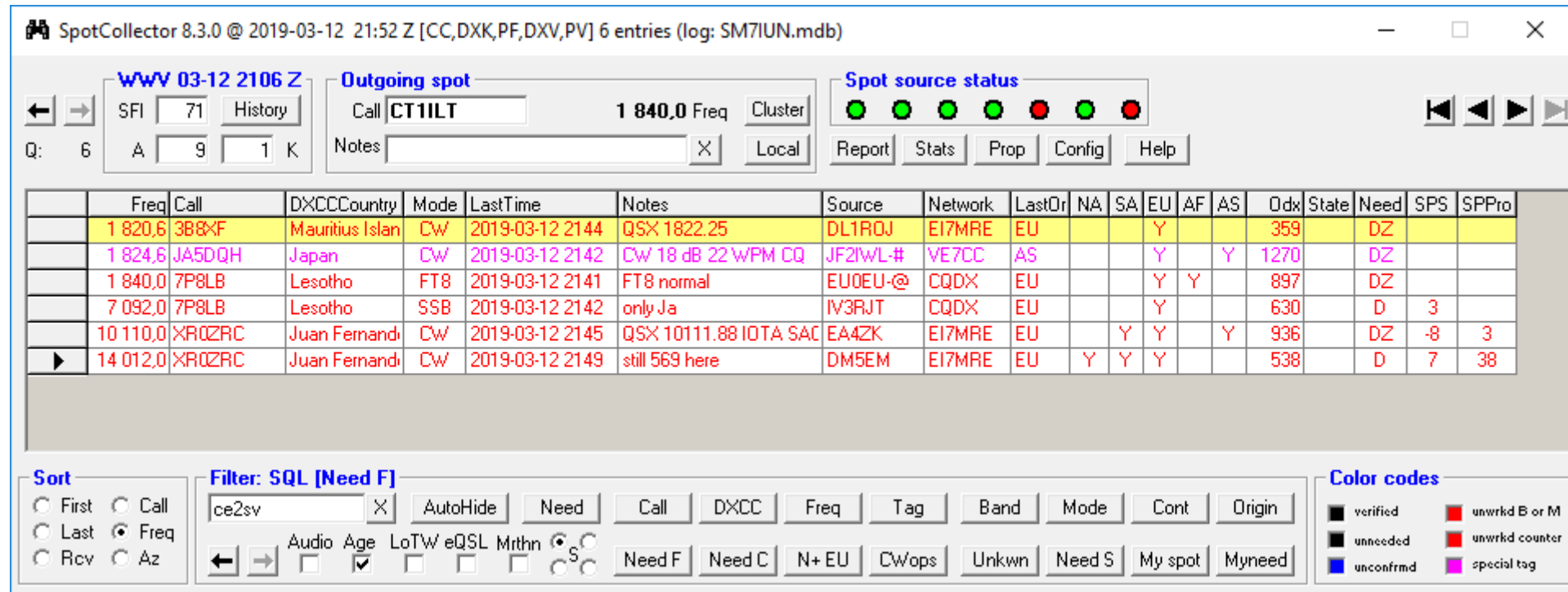
### Need standalor (Jim Watson).

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)

WV 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	SPPro
	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 Fernand	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 Fernand	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

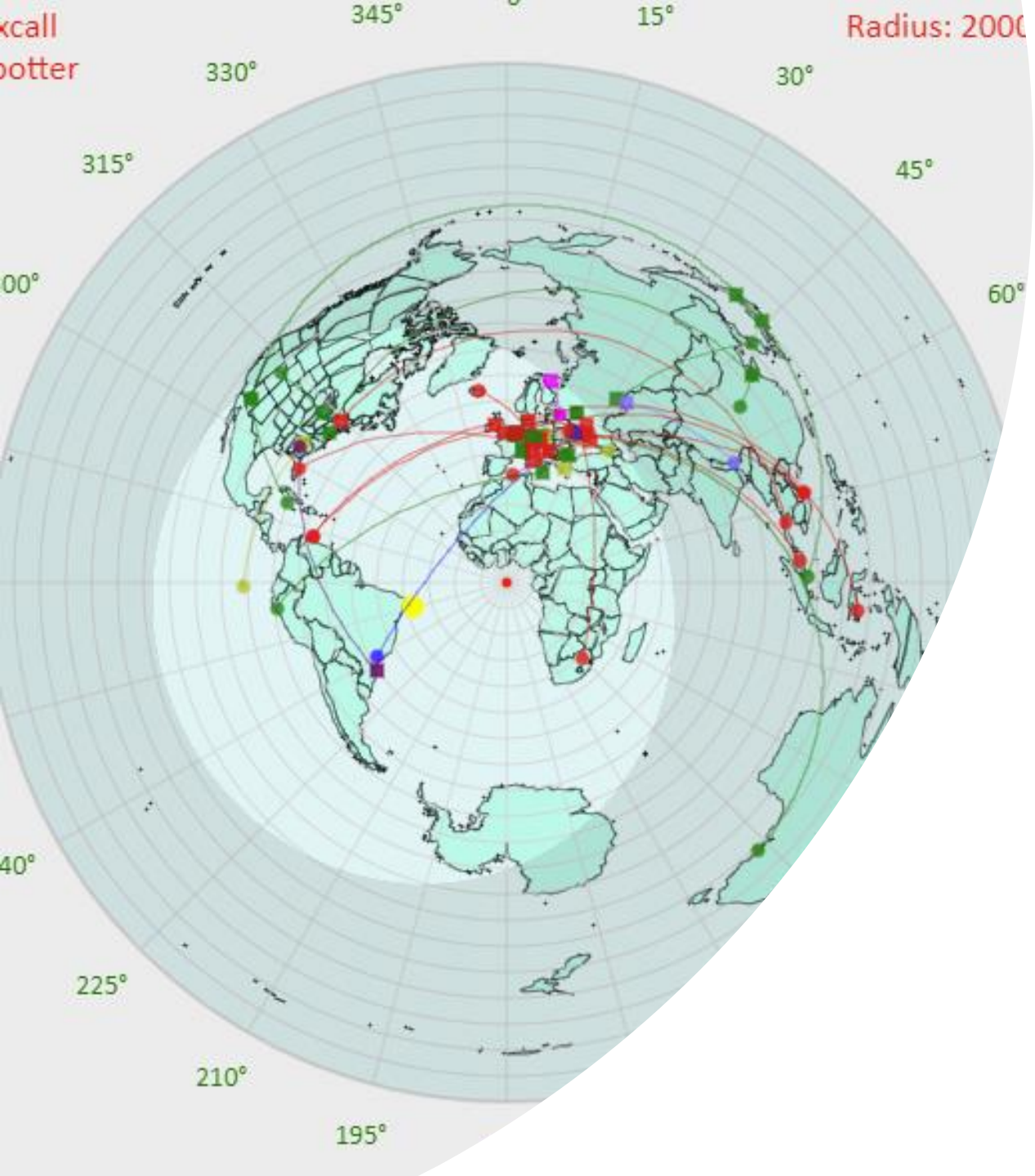


- Varseblivning
- Bandöppningar
- Utbredningsanalys
- Varningar

## Antenn- experiment



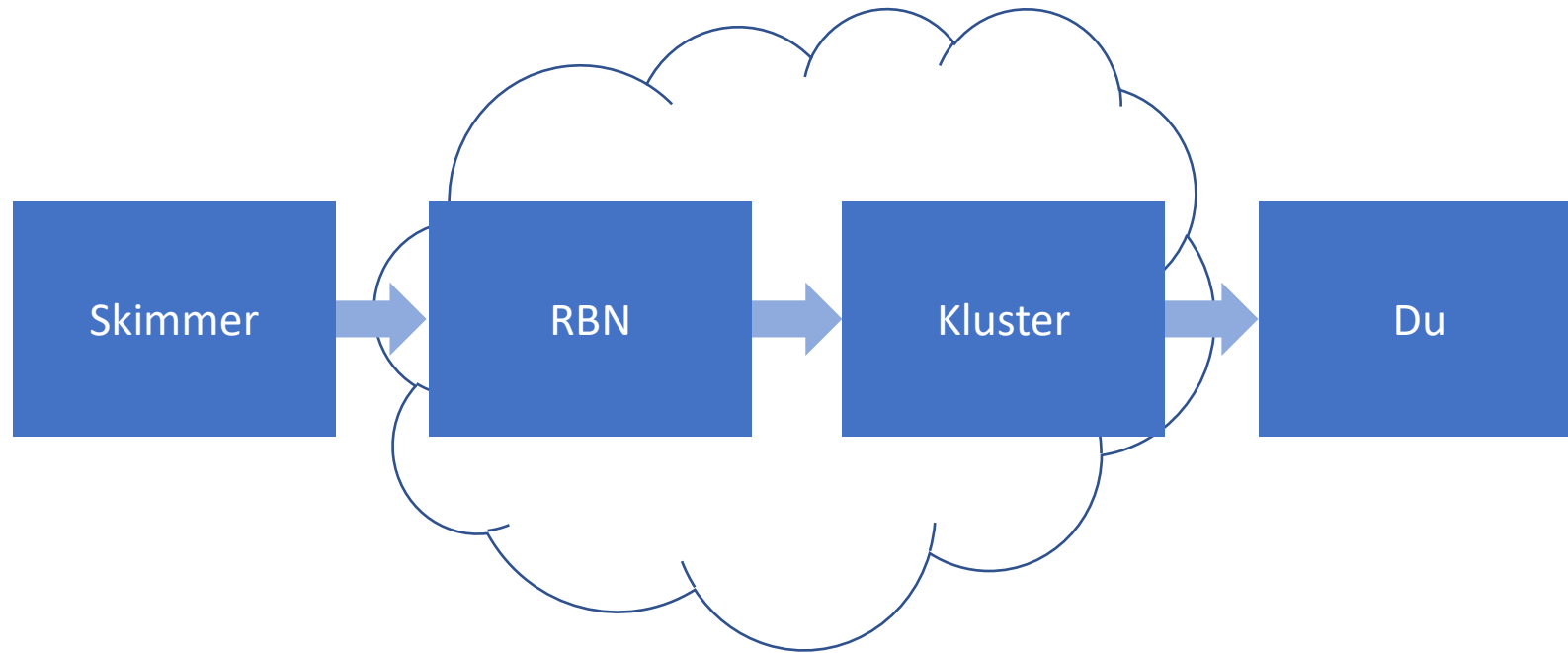
- Antennprestanda
- Riktverkan och utbredningsvinkel
- A-B tester



Tack



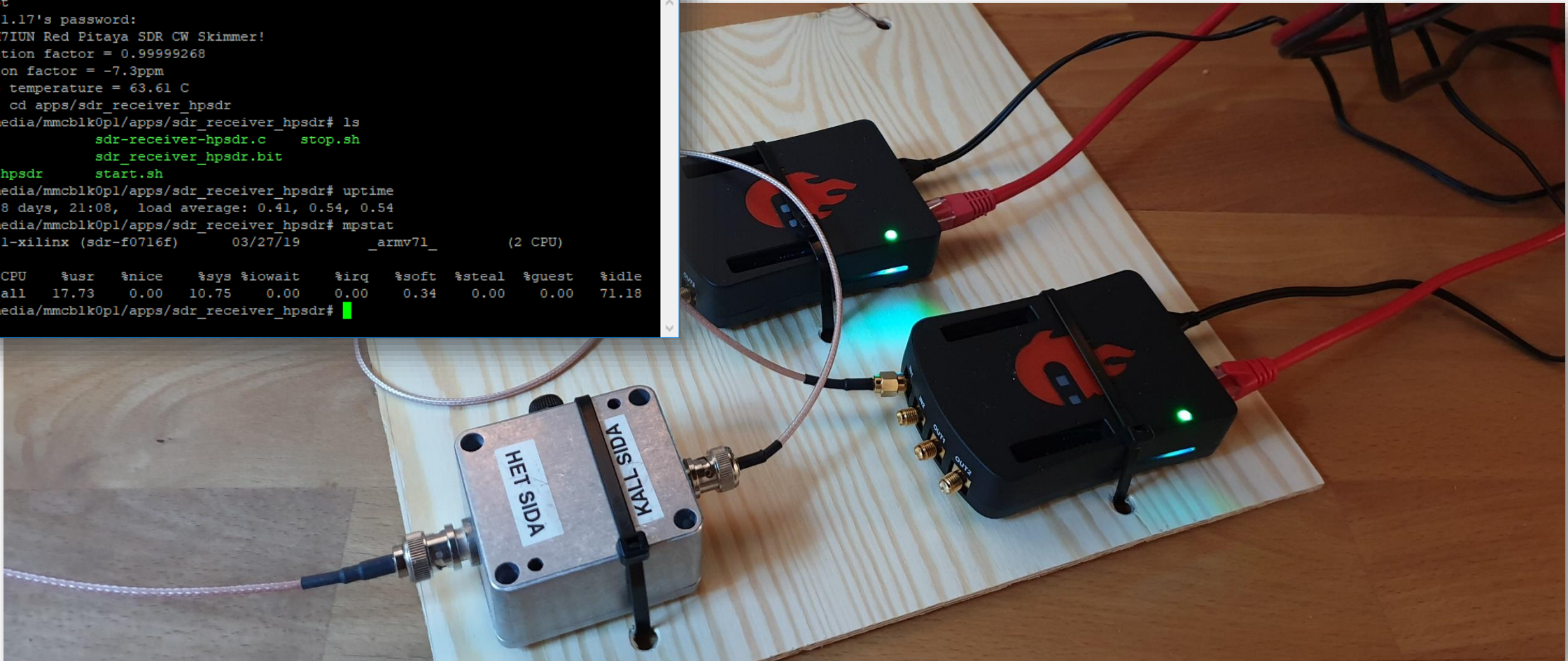
# Hela kedjan



# 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 bandcykling

