通訊韌性 HF

miaoski / 網路自由小聚

2025.1.16

OpenCulture Foundation

照片: 公視 2024.10.9

照片: 報導者 2022.4.29

https://www.twreporter.org/a/southern-cross-island-highway-reopen

題目範圍太大了

- 電源供應 (市電、電池[+]、再生能源[+])
- 天線架設
- 鏈路頻寬 / 功率計算
- 應用軟體 (業餘無線電操作人員、市民)

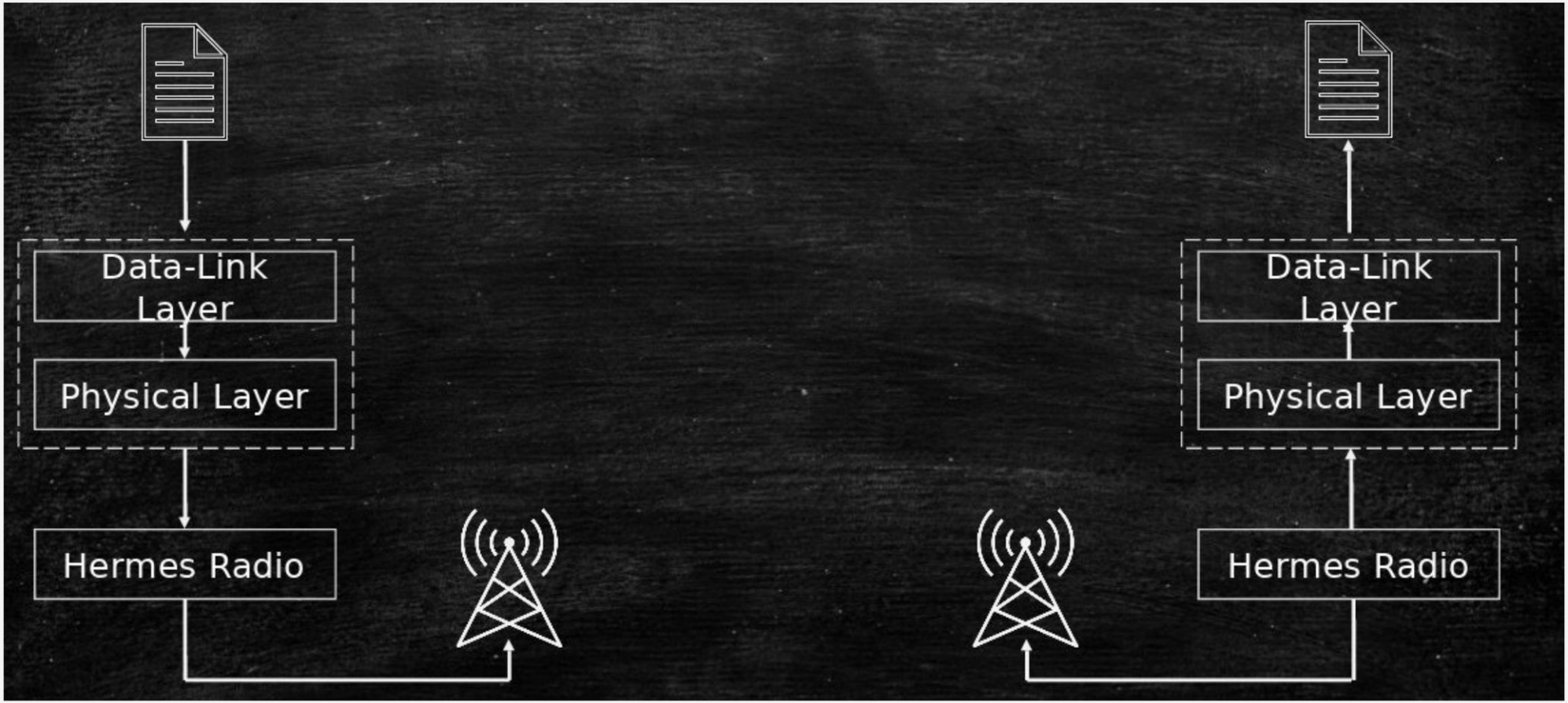
- [+] 都是 ARRL Field Day 的加分項目

先來介紹 Hermes

Hermes Project

- https://www.rhizomatica.org/hermes/
- 為巴西雨林、中非民眾提供通訊方法
- HF (高頻) 3 MHz – 10 MHz 頻道，使用 NVIS 傳播
- 在城市裡設轉播站
- 使用 UUCP, DeltaChat, VARA

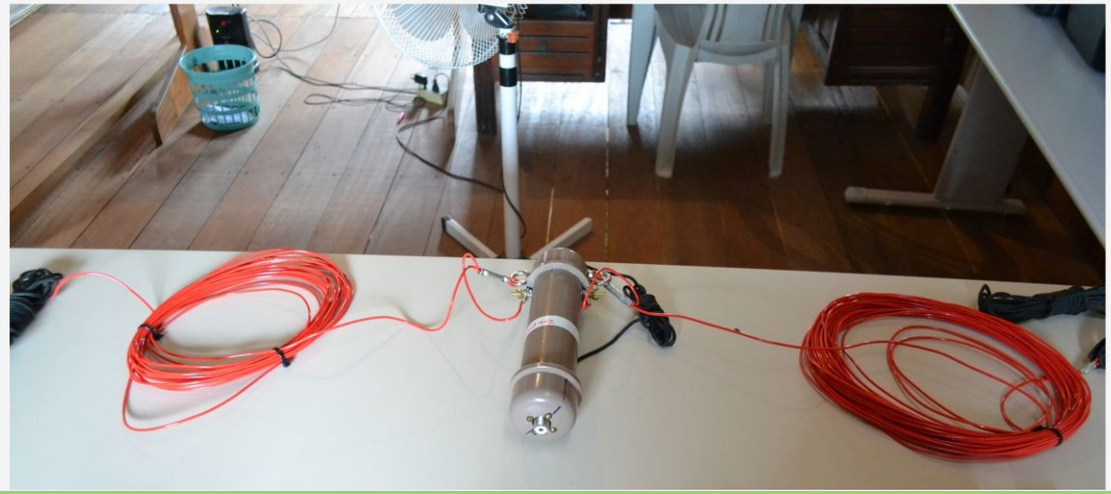
引用自 Rafael Diniz, SplinterCon, Dec 2023



Introduction - HF Antenna

引用自 Rafael Diniz, SplinterCon, Dec 2023

- Frequencies: between 3 MHz and 10 MHz typical for regional coverage
- Antennas: dipole or folded dipole typical, in horizontal or inverted V layout



HERMES History

引用自 Rafael Diniz, SplinterCon, Dec 2023

- Fonias Juruá (2015): Stock HF SSB transceiver connected to a box with radio interface, Rasperry Pi and touch screen. Modem used is HamDRM (DRM narrowband).

HERMES History

引用自 Rafael Diniz, SplinterCon, Dec 2023

- HERMES v1.1 (2021-2022): HF Transceiver with integrated GPS for accurate time and PLL frequency syntesis and redesigned lambda bridge. Improved email compression. Focus on email service and the use of DeltaChat at communities.

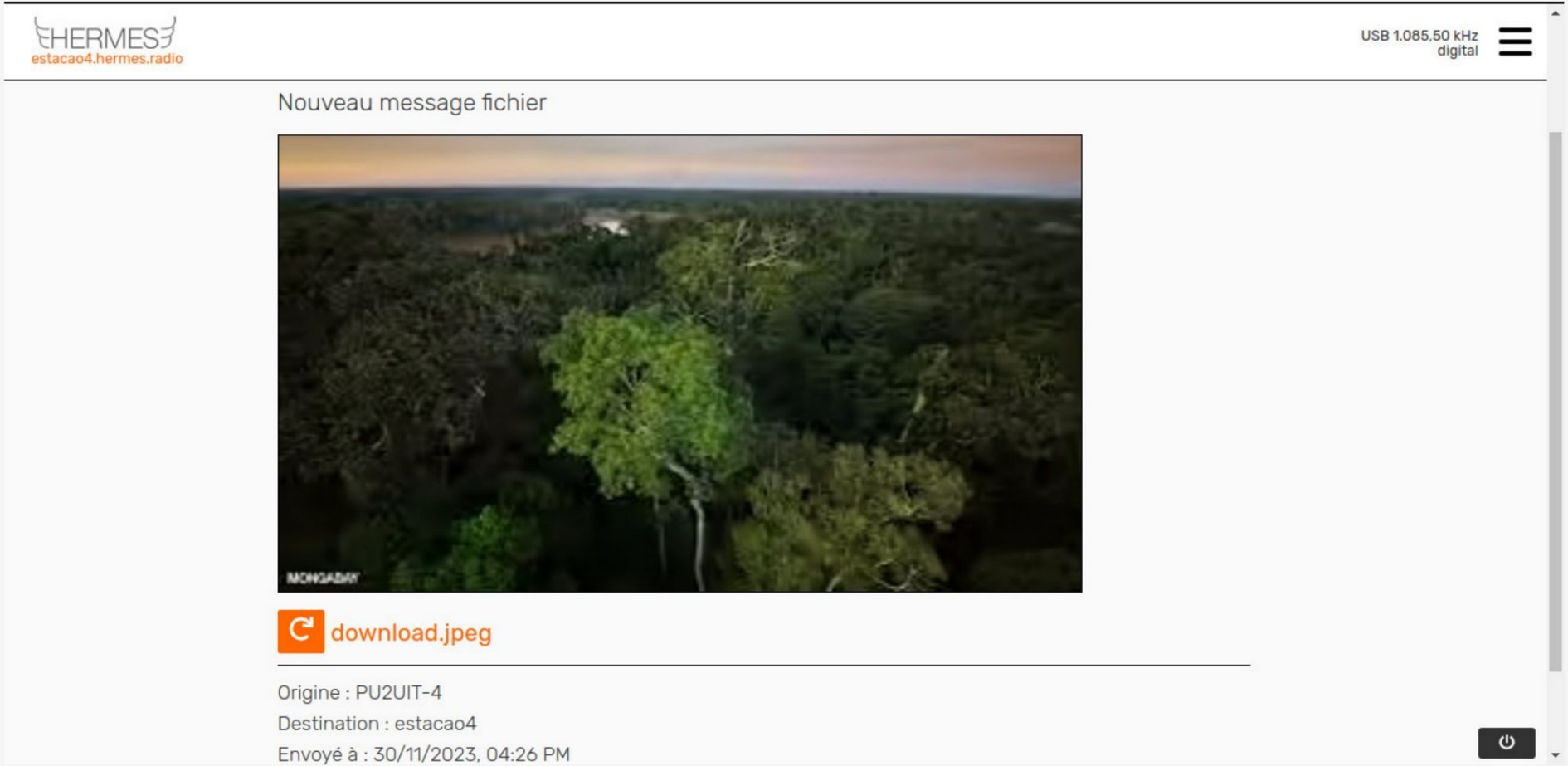
HERMES History

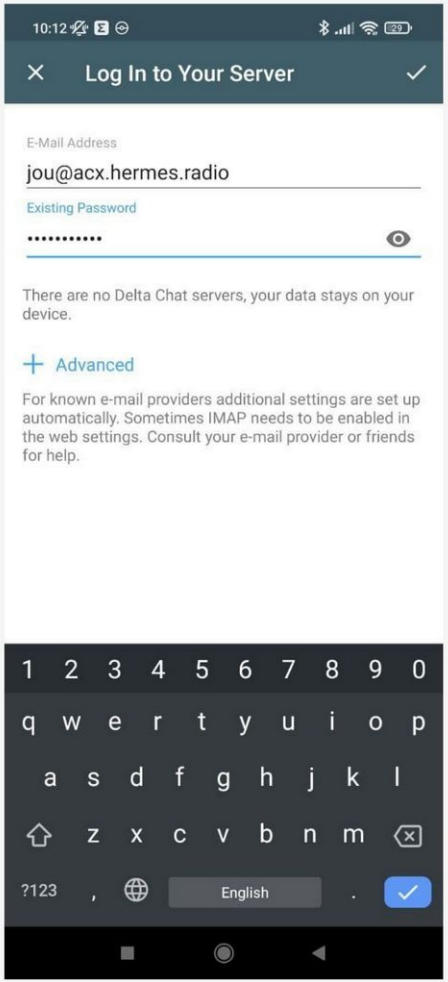
引用自 Rafael Diniz, SplinterCon, Dec 2023

- HERMES v2 (2023-): Adopted another open source wideband HF transceiver: the sBitx. Much reduced size and has native voice support (mic+ptt+speaker). Development ongoing of the Mercury modem for high-speed wideband capability.

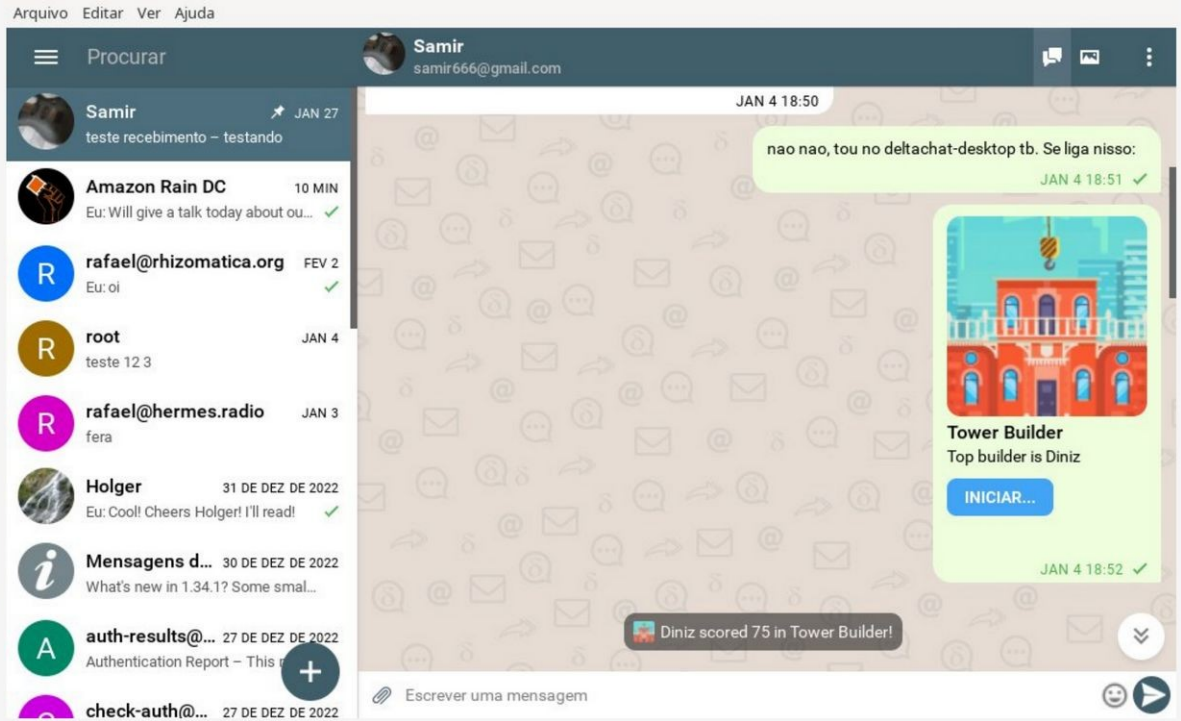
User interface - WEB Frontend

引用自 Rafael Diniz, SplinterCon, Dec 2023




Log In to Your Server
E-Mail Address
jou@acx.hermes.radio
Existing Password
There are no Delta Chat servers, your data stays on your device.
Advanced
For known e-mail providers additional settings are set up automatically. Sometimes IMAP needs to be enabled in the web settings. Consult your e-mail provider or friends for help.
English


Hermes root cast
15 members
Nov 21, 09:43
Teste texto 5
Nov 21, 09:46
00:03
Nov 21, 16:47
00:01
Nov 21, 16:48
Nov 21, 16:48
Today
This group messages the root users for all stations
Now
Message


Arquivo Editar Ver Ajuda
Procurar
Samir
samir666@gmail.com
Samir JAN 27
teste recebimento – testando
Amazon Rain DC 10 MIN
Eu: Will give a talk today about ou...
rafael@rhizomatica.org FEV 2
Eu: oi
root JAN 4
teste 12 3
rafael@hermes.radio JAN 3
fera
Holger 31 DE DEZ DE 2022
Eu: Cool! Cheers Holger! I'll read!
Mensagens d... 30 DE DEZ DE 2022
What's new in 1.34.1? Some smal...
auth-results@... 27 DE DEZ DE 2022
Authentication Report – This
check-auth@... 27 DE DEZ DE 2022
JAN 4 18:50
nao nao, tou no deltachat-desktop tb. Se liga nisso:
JAN 4 18:51
Tower Builder
Top builder is Diniz
INICIAR...
JAN 4 18:52
Diniz scored 75 in Tower Builder!
Escrever uma mensagem

Hermes 很棒，可是...

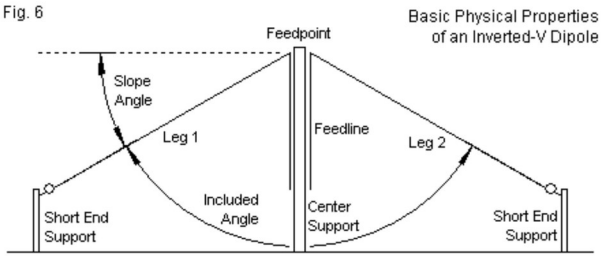
- 天線 (很大)
- 功率 (待機消耗 / 發射消耗 / 發射功率)
- 頻寬 (很小)
- 軟體 (Open Source, 沒問題)

- 此外...

天線

- 每邊約 λ/4 的天線
- 高 762cm 二端高度 259cm
  每邊長 868cm
- 有 Dipole, EFHW 等常見方式

Cf. http://on5au.be/content/a10/wire/n4.pdf

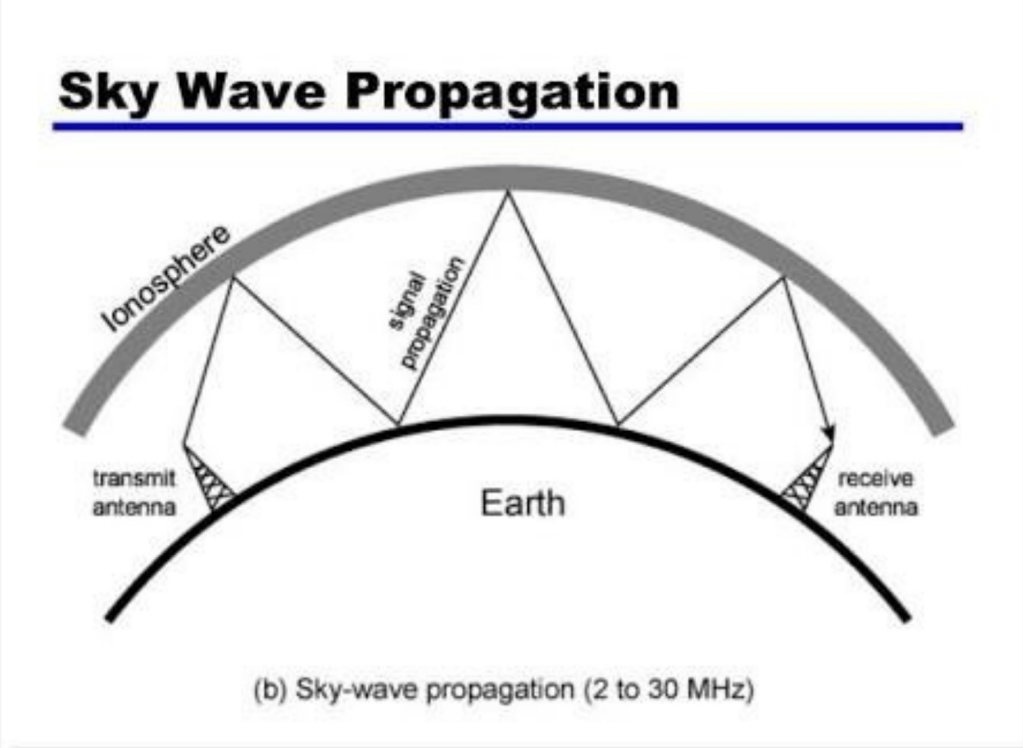


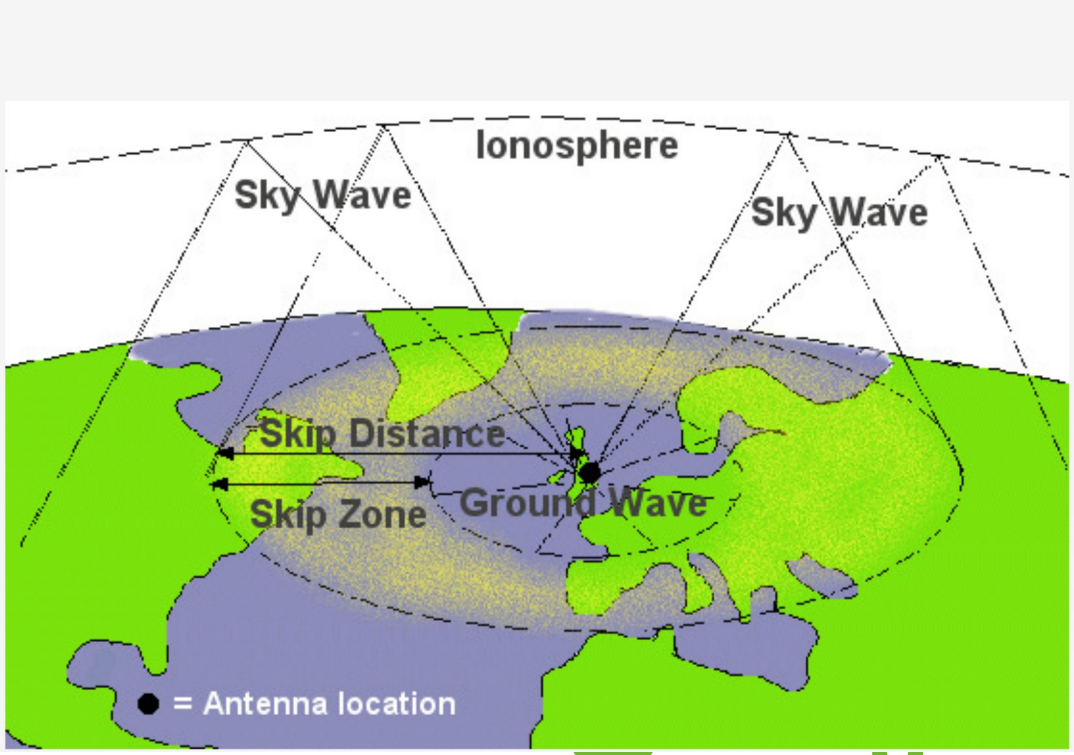
The 75-meter center height options are 60' and 45', while the 40-meter options are 35' and 25'. **Table 2** provides the modeled data for all of these options over the standard three types of ground quality.

Inverted-Vs		AWG #14 Copper Wire							Table 2
Band M	Height ft	Length ft	Soil	Zen Gain	BS BW	EW BW	BW Ratio	Feed R	Feed X
75	60	122.10	Vy Good	6.42	112.2	78.6	1.43	62.09	7.37
3.9 MHz	End ht	29.48	Average	5.50	118.0	77.4	1.52	66.05	-0.19
	End len	52.87	Vy Poor	4.26	127.2	76.2	1.67	66.96	-10.73
	45	121.30	Vy Good	5.93	101.8	81.4	1.25	46.76	6.53
	End ht	14.68	Average	4.59	107.2	80.4	1.33	57.05	-0.35
	End len	52.52	Vy Poor	3.14	116.4	79.8	1.46	65.95	-13.10
40	35	66.22	Vy Good	6.17	117.8	78.8	1.49	67.93	7.55
7.2 MHz	End ht	18.45	Average	5.24	123.8	76.8	1.61	67.41	-0.40
	End len	28.67	Vy Poor	4.11	131.2	75.6	1.74	65.48	-8.70
	25	65.76	Vy Good	5.67	104.0	80.8	1.29	50.85	9.87
	End ht	8.50	Average	4.27	109.6	79.0	1.39	58.66	-0.20
	End len	28.47	Vy Poor	2.94	118.4	78.8	1.50	63.93	-11.89
Notes:	End ht = height above ground in feet of each end of inverted-V								
	End len = distance in feet from V center to wire end parallel to ground								
	Zen Gain = maximum zenith gain in dBi								
	BS BW; EW BW = broadside and endwise beamwidths in degrees								
	Feed R; Feed X = feedpoint resistance and reactance in Ohms								

引用自 Rafael Diniz, SplinterCon, Dec 2023

NVIS?





功率 (IC-705)

- 13.8V DC 3A (10W 發射)
- 7.4V – 13.8V DC 0.3 (4W 待機)
- 1.1 kg
- 太陽能板? Jackery 100W = 4.7 kg

Screenshot from 猫と冬のこたつ車中泊
https://youtu.be/ivAeSnlOwSs

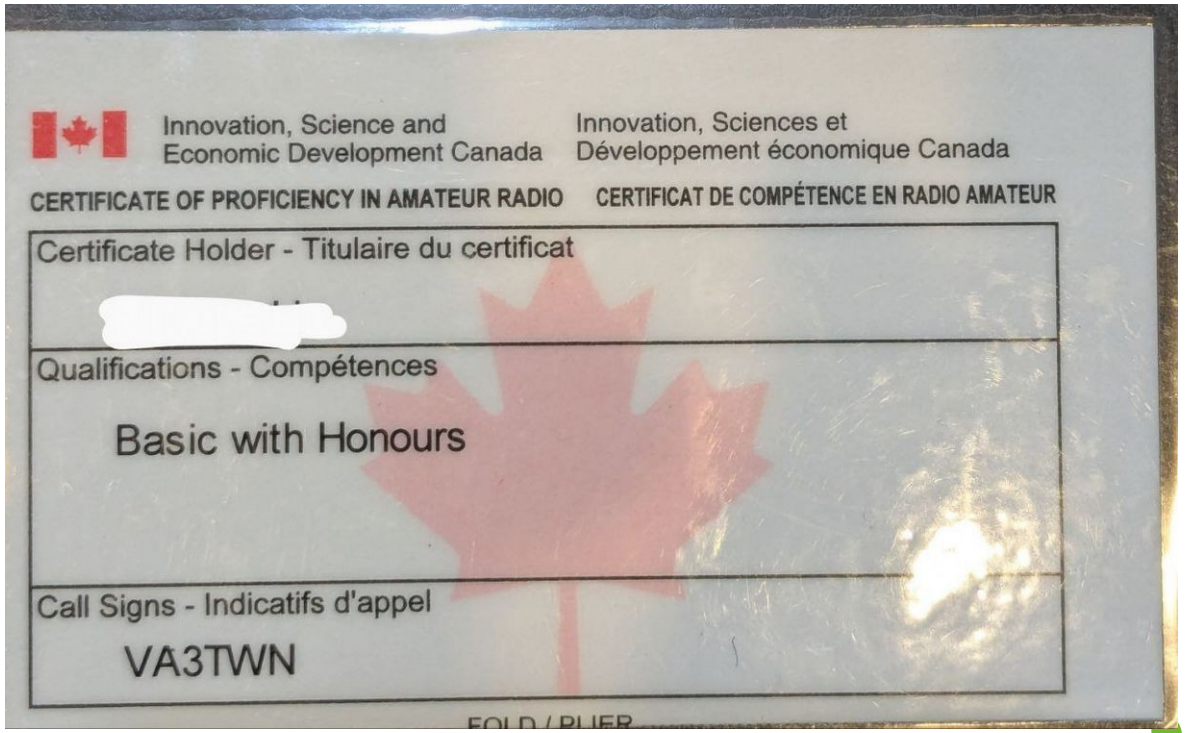
圖片取自 Jackery 商品頁

在台灣你需要

- 業餘無線電執照 (二等或一等)
- NCC 審核過的機器
- 業餘無線電台執照
- ~~鄉親的支持~~

我們來參考一下(太平洋)對岸

你只需要執照



Innovation, Science and Economic Development Canada

Innovation, Sciences et Développement économique Canada

CERTIFICATE OF PROFICIENCY IN AMATEUR RADIO

CERTIFICAT DE COMPÉTENCE EN RADIO AMATEUR

Certificate Holder - Titulaire du certificat

[redacted]

Qualifications - Compétences

Basic with Honours

Call Signs - Indicatifs d'appel

VA3TWN

FOLD / PLIER

The Amateur Radio community provides a large pool of experienced telecommunications operators and equipment. In addition, frequency diversity available to ARES far exceeds anything available on commercial or government radio systems.

YOUR PARTICIPATION

Should you become an ARES participant?

Becoming an ARES participant means:

- Having a genuine desire to assist
- Reading all the literature about ARES
- Attending ARES meetings
- Participating in public service events and simulated exercises
- Checking into nets
- Getting involved in training others
- Taking on a specific role

WHAT ARES EXPECTS FROM YOU

What is expected from you when you volunteer with ARES? Answer: Whatever you want to offer.

ARES is a flexible, volunteer-centric organization. It serves as an envelope that the Amateur community can use to deliver emergency communications services to the community. There is no minimum level of participation. All our documented procedures, protocols and rules are guidelines, intended to facilitate cooperative communications and to communicate best practices.

You should not feel pressured to participate to a greater extent than you are comfortable. Your work with ARES is not a job, or an obligation. We do ask that you show respect and consideration for other ARES participants, who are also volunteers. We're all in this together.

WHAT YOU CAN EXPECT FROM ARES

ARES "management", including your Emergency Coordinator, Assistant Emergency Coordinators, Trainers, and most of the RAC organization, are also volunteers. Their work with ARES is not a job. They do not get paid, and they donate their time to benefit the community.

However, even though ARES is an all-volunteer organization, there are certain things you can expect from ARES:

- Your privacy will be protected with respect to any information that is not in the public domain and may be sensitive or confidential.
- Your time and effort will be respected. ARES will try not to waste either.
- Your effort during exercises and emergencies will be recognized and acknowledged.
- ARES will do its best to protect your safety and security during operations. That being said, the final responsibility is yours and you must be cautious of your safety at all times. Refuse any assignments or duties that you feel may be too hazardous to your safety.
- You will have an input into how ARES is run, and the practices that are used. While ARES groups try to use best practices garnered from other ARES groups and Emergency Communication (EmComm) organizations and operations, remember that your ARES group is your organization and will also reflect your views and preferences.

For additional information on the Amateur Radio Emergency Service, please visit the RAC website at http://wp.rac.ca/ares/ and the ARRL website at http://www.arrl.org/ares.

Radio Amateurs of Canada is a national organization representing the interests of Amateur Radio all across Canada. Speaking on behalf of Canadian Radio Amateurs, RAC provides liaison with government agencies and carries the Amateur voice about regulatory and spectrum issues to the discussion table with government and industry leaders, nationally and internationally. With its headquarters in Ottawa, RAC is the Canadian voting member society of the International Amateur Radio Union (IARU). For more information please visit http://wp.rac.ca.

Amateur Radio Emergency Service (ARES)

Fast-moving floodwaters surround High River Hospital in High River, Alberta on June 20, 2013. (Photo by Marian Bryan, AHS; courtesy of Vince d'Eon, VE6LK)

WHAT IS ARES?

ARES is a public service organization that delivers communications services during emergencies.

ARES (pronounced AIR-EEZ) provides qualified communications personnel who establish ad-hoc radio communications links where and when they are needed.

ARES may be defined as the emergency public service arm of Radio Amateurs of Canada (RAC), and the Amateur Radio Relay League (ARRL) in the United States.

Its purpose is to advance the public interest and the interests of Amateur Radio by providing a volunteer emergency telecommunications service to federal, provincial, municipal or other local government departments and agencies, designated non-government organizations (NGO) and critical public utilities during an emergency or disaster, including necessary training and incidental activities.

MORE TOPICS

Volunteers

- Search and rescue
- Emergency Support Services
- Radio communications
- PEP Air
- Road rescue
- Self-assessment and self-care
- Registration and ID
- Awards and recognition

Emergency radio communication volunteers

Last updated on February 21, 2024

During emergency situations, emergency radio communications, also known as “amateur” or “ham” radio, is a reliable means of communication.

What volunteers do

Licensed amateur radio operators volunteer throughout the province to assist with communications between individuals, and emergency operation centres when communications are down. Volunteers also assist in searches for people who may be lost or injured.

- Provincial Emergency Radio Communications Service (PERCS) website.

How to join?

The Provincial Emergency Radio Communications Service (PERCS), links the Provincial Emergency Operations Centres (PREOC) with hundreds of volunteer amateur radio operators who are available to assist with communications in the event of an emergency.

National HF Emergency Communications Frequencies

The following frequencies and modes have been pre-determined for suggested use of the Amateur Radio Emergency Service during a declared emergency, or a disaster declared or otherwise, occurring anywhere in Canada. These frequencies have been registered with the International Amateur Radio Union (IARU) for its listings of Canadian national emergency frequencies in IARU Region 2.

These are suggested frequencies and should not be construed as meaning that other HF frequencies may not be considered for Emcomm operations.

No Amateur Radio operator or group has exclusive ownership of any particular frequency on any band and, while common sense and courtesy logically would dictate that other Radio Amateurs should keep clear of frequencies being used for emergency or disaster operations, the affected ARES Net Control Station (NCS) must be prepared to move up or down from the pre-determined frequency, as required, in order to conduct operations. Entering into an on-air argument must be avoided.

	Single Sideband		CW		Digital	
Band	**Frequency**	**Tactical**	**Frequency**	**Tactical**	**Frequency**	**Tactical**
80 M	3.675 MHz LSB	Alfa	3.535 MHz	Golf	3.596 MHz	Mike
40 M	7.135 MHz LSB	Bravo	7.035 MHz	Hotel	7.096 MHz	November
20 M	14.135 MHz USB	Charlie	14.035 MHz	India	14.096 MHz	Oscar
17 M	18.135 MHz USB	Delta	18.075 MHz	Juliet	18.096 MHz	Papa
15 M	21.235 MHz USB	Echo	21.035 MHz	Kilo	21.096 MHz	Quebec
10 M	28.235 MHz USB	Foxtrot	28.035 MHz	Lima	28.096 MHz	Romeo

RAC Auxiliary Communications (AUX-C) Communicator Course

Course Overview and Outline | Registration Information

Upcoming courses:

York Region

Date: September 21–22

Time: 9 am to 5 pm each day

Place:

RAC Auxiliary Communications (AUX-C) Communicator Course

Radio Amateurs of Canada continues to actively engage in discussions with various Emergency Management agencies and non-governmental organizations to facilitate training programs in Canadian provinces and territories. These initiatives have the potential to significantly enhance our emergency communication capabilities.

As a result of these discussions, RAC is excited to introduce a new **Auxiliary Communications (Aux-Comm) Training Program**, designed to enhance our communication capabilities during emergencies.

As a Non-Governmental Organization (NGO), Radio Amateurs of Canada understands the importance of effective coordination and communication during crises. The training is based on the All-Hazards Risk Assessment methodology, ensuring we can effectively mitigate communication failures and collaborate with other organizations during a disaster.

Successful Pilot Program

In partnership with **Emergency Management Ontario**, Radio Amateurs of Canada initiated a successful pilot program in Sudbury, Ontario on September 7 and September 8 and has now added two new locations in York Region and in the Niagara Region. Please see the information on the left for dates and time.

加拿大的 EmComm 演練

- 每年一次 Field Day (六月底)
  https://www.rac.ca/field-day-2024/
- 每年一次參加 USGS Drill Day (10月19日)
- 自願人員發給 Emergency Drop Kit
  - Starlink
  - 數位語音通訊 (D-Star)
  - HF (備用)

Field Day 規則

- 與 ARRL / RAC 會員站通聯才算分
- 0000UTC 後才可以開始架設，1800UTC 開始連續24小時通聯。
- 可使用 CW、SSB 語音、數位通訊 (如 FT8) 分別計分。
- 加分項目
  - 電池(發電機)
  - 再生能源
  - GOTA 電台
  - 衛星電台
- 詳閱 https://www.arrl.org/field-day-rules

localhost:8080/api/forms?formPath=USGS%2FUSGS DYFI.html

Earthquake: Did You Feel it?

Did You Feel It? (DYFI) collects information from people who felt an earthquake and helps create maps that show what people experienced and the extent of damage.

The USGS email address is filled when clicking SUBMIT below.
Send the DYFI report to USGS via Winlink Telnet or via RF through any internet connected RMS.

Use this Winlink form to submit **EXERCISE and REAL EVENT earthquake reports** to USGS.

Learn more about earthquake hazards at the USGS Earthquake Hazards Website (available online only).

What is DYFI & More

>>>> This Earthquake report is a(n) (•) EXERCISE ( ) REAL EVENT

Optional Exercise ID: (If known, e.g. SHAKEOUT, etc.)

Did you feel it? (REQUIRED)

( ) Yes ( ) No

通常在10月19日本地時間10:19

Time of earthquake: (REQUIRED) Local Date and Time Format: 1/31/2020 09:15

Date: 1/09/2025 Time: 22:40 Click Date or Time Field to Modify

(Opening this form inserts your current Date & Time, you may manually change by click in the field)

Your location - street address, city, and state when the earthquake occurred: (REQUIRED)

STREET ADDRESS , CITY, STATE

For accurate mapping of your location enter GPS coordinates in the following format: 32.504892 -116.982466

LAT Example: 32.504891 LON Example: -116.982466

If you have a Winlink Express connected GPS device, the LAT/LON in decimal degrees will be entered for you.

The remainder of this form is optional. If you indicated NO, then do not answer the questions below. If you indicated YES, then the answers below will help to create intensity info for the USGS.

DYFI Automatic Entry - Winlink EXERCISE

Action

Date: 2023-10-19T22:32:00+08:00
From: VA3TWN
To: dyfi_reports_automated@usgs.gov
Cc: QUAKE-23

--- BEGIN json ---


```
{
  "eventType": "EXERCISE",
  "exercise_id": "2023SHAKEOUT",
  "fldSituation_felt": "1",
  "ciim_time": "10/19/2023 10:19",
  "ciim_mapAddress": "1630 Queen St E, Toronto ON, Canada",
  "ciim_mapLat": "43.66668",
  "ciim_mapLon": "-79.31848",
  "fldSituation_situation": "inside",
  "fldSituation_floor": "ground",
  "fldSituation_structureStories": "other",
  "howTallPleaseDescribe": "6 Stories",
  "fldSituation_sleep": "no",
  "fldSituation_others": "5",
  "fldExperience_shaking": "4",
  "fldExperience_reaction": "2",
  "fldExperience_response": "duck",
  "fldExperience_stand": "0",
  "fldEffects_doors": "1 slight",
  "fldEffects_sounds": "1 loud",
  "fldEffects_shelved": "0 rattled_loudly ",
  "fldEffects_pictures": "1 did_not_fall ",
  "fldEffects_furniture": "0",
  "fldEffects_appliances": "0",
  "fldEffects_walls": "on",
  "d_text": "_crackmin ",
  "mapmmscale": "5",
  "BuildingDamage": "YES",
  "comments": "Telnet",
  "language": "en",
  "timestamp": "1697725191382",
  "user_id": "VA3TWN",
  "user_id_type": "Callsign",
  "form_version": "DYFI Winlink form Ver 11.0.2 en"
}
```


使用 Winlink 的 DYFI template 發信

台灣也有 ARES

- http://www.ctarl.org.tw/bv5ya/aresru1.htm
- 由中華~~台北~~民國業餘無線電協會主辦
- Check-in 145.00 MHz 及 431.00 MHz 再行 QSY
- 狀況一及二，需災區斷電，且一般大眾電話系統無法通達使用，本會指揮系統應主動給於支援。
- 如921大地震(中央)、各地風災水災(地方)等。

數位HF通訊

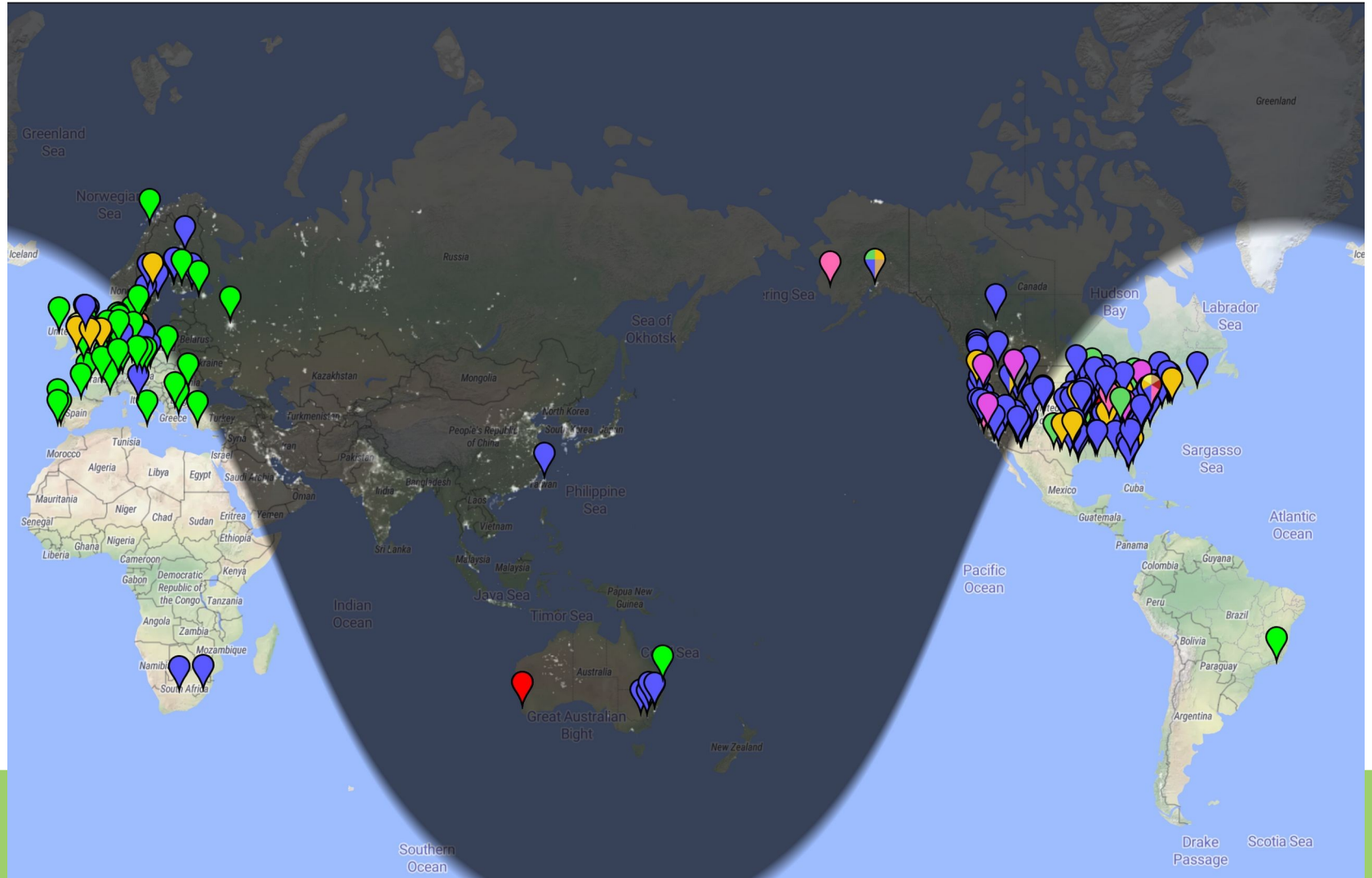
~~小孩子才~~做選擇

- 通訊模式 (頻寬、鏈路品質、速度)
- 通訊距離 (島內 / 鄰近國家 / 跨洲)
- 通訊內容 (文字、語音、圖片)
- JS8, FreeDV, VARAC, Winlink (現代)
- Hellschreiber, TTY, CW (古典)

show signals sent/rcvd by the callsign using JS8 over the last 24 hours Go! Display options Permalink

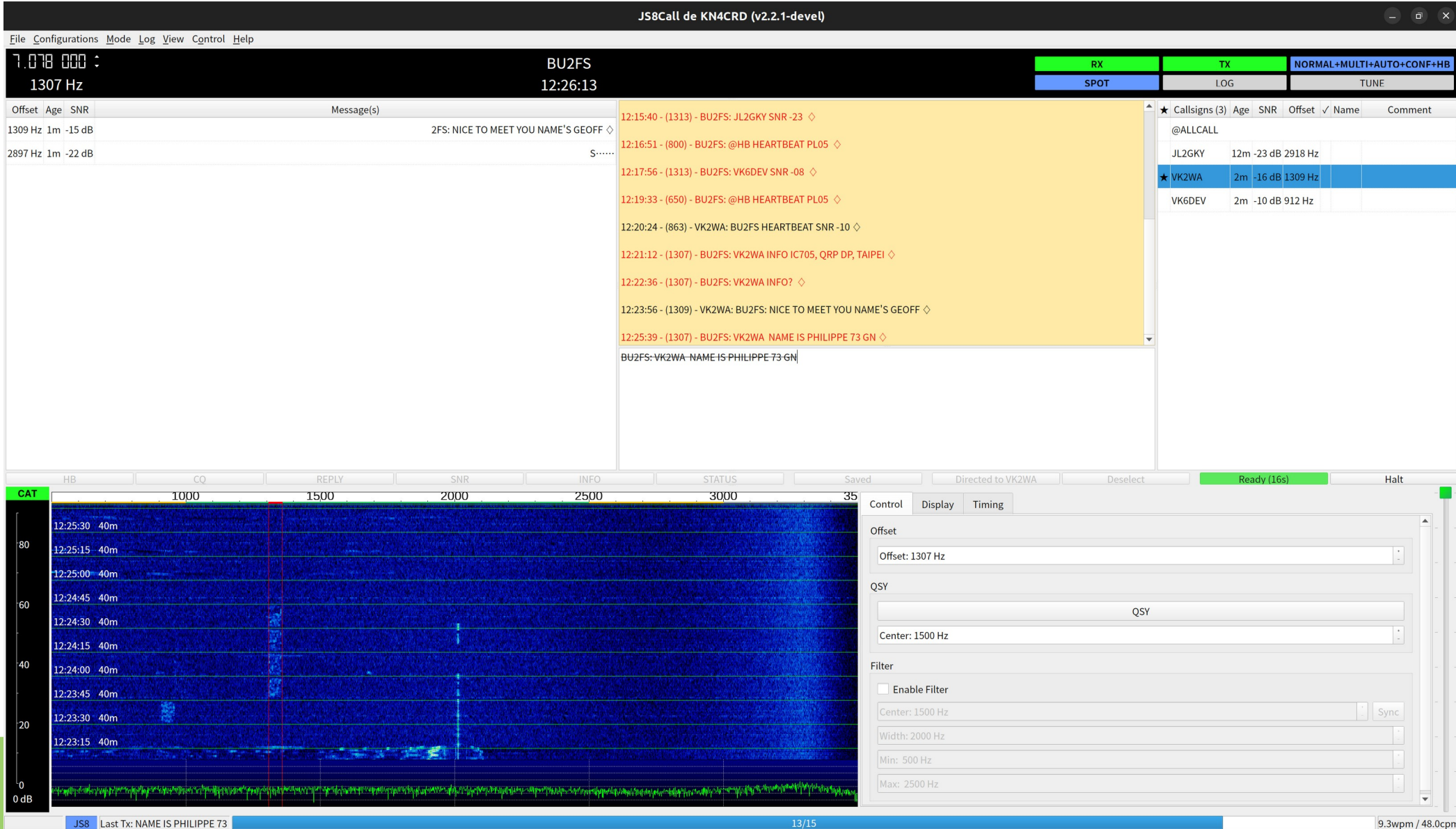
ı 5 minutes. Large markers are monitors.

e JS8 monitors: **162 on 40m**, **64 on 11m**, **25 on 20m**, **12 on 30m**, **9 on 80m**, **7 on 10m**, **3 on 12m**, **3 on 15m**, **3 on 17m**, **3 on 6m**, **2 on 2.4Ghz**, **1 on 600m**, **1 on invalid**. Show all on all ban



JS8 / VARAC

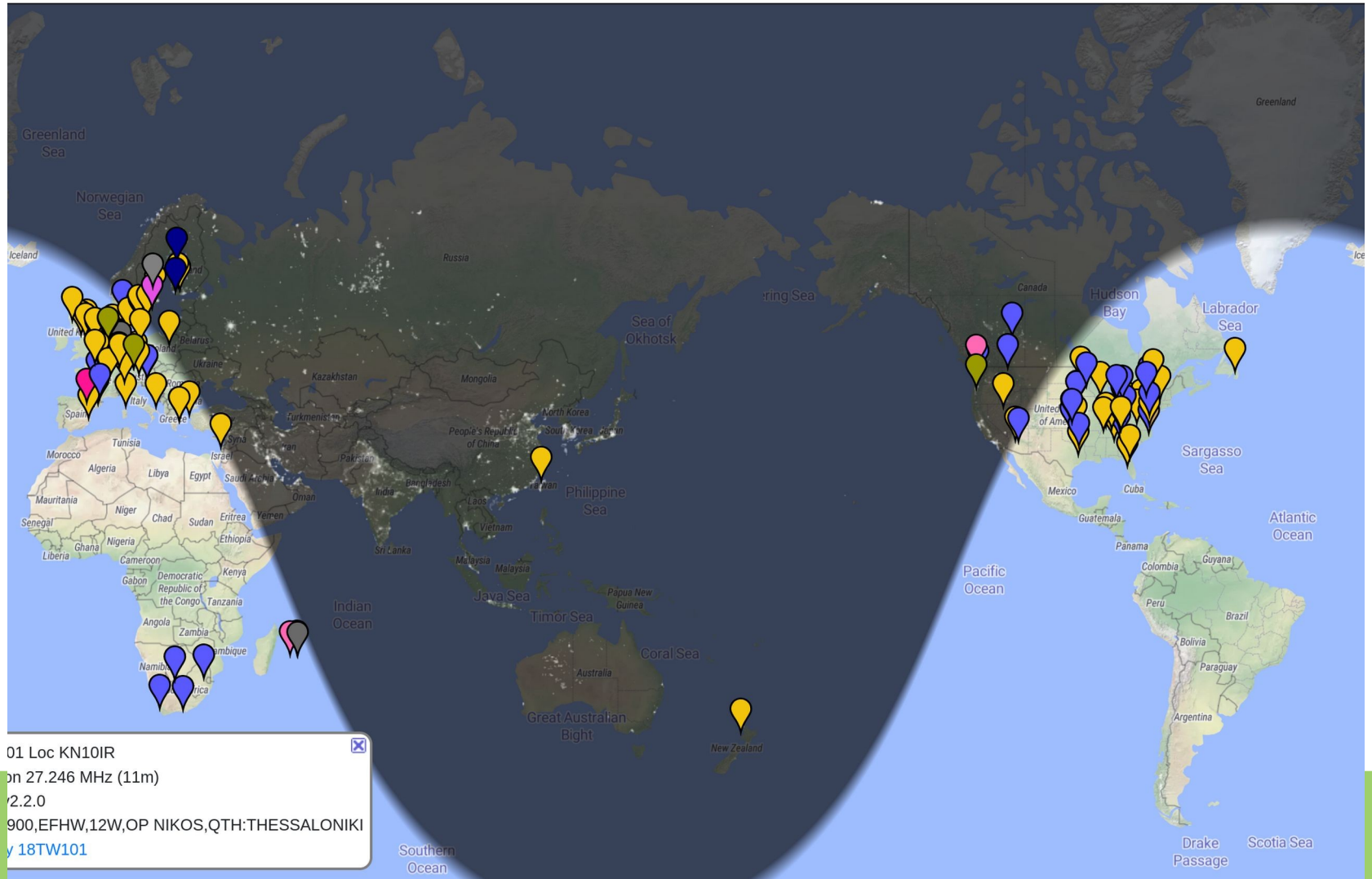
- 低頻寬、長時間、長距離的文字通訊
- 可以(自動) QSY 到旁邊聊天
- 可以自動 CQ / ACK (需注意法規!)
- VARAC 還有好多功能...


JS8Call de KN4CRD (v2.2.1-devel)
File Configurations Mode Log View Control Help
7.078 000
1307 Hz
BU2FS
12:26:13
RX
TX
NORMAL+MULTI+AUTO+CONF+HB
SPOT
LOG
TUNE
Offset Age SNR Message(s)
1309 Hz 1m -15 dB 2FS: NICE TO MEET YOU NAME'S GEOFF ♢
2897 Hz 1m -22 dB S·····
12:15:40 - (1313) - BU2FS: JL2GKY SNR -23 ♢
12:16:51 - (800) - BU2FS: @HB HEARTBEAT PL05 ♢
12:17:56 - (1313) - BU2FS: VK6DEV SNR -08 ♢
12:19:33 - (650) - BU2FS: @HB HEARTBEAT PL05 ♢
12:20:24 - (863) - VK2WA: BU2FS HEARTBEAT SNR -10 ♢
12:21:12 - (1307) - BU2FS: VK2WA INFO IC705, QRP DP, TAIPEI ♢
12:22:36 - (1307) - BU2FS: VK2WA INFO? ♢
12:23:56 - (1309) - VK2WA: BU2FS: NICE TO MEET YOU NAME'S GEOFF ♢
12:25:39 - (1307) - BU2FS: VK2WA NAME IS PHILIPPE 73 GN ♢
BU2FS: VK2WA NAME IS PHILIPPE 73 GN
★ Callsigns (3) Age SNR Offset ✓ Name Comment
@ALLCALL
JL2GKY 12m -23 dB 2918 Hz
★ VK2WA 2m -16 dB 1309 Hz
VK6DEV 2m -10 dB 912 Hz
HB CQ REPLY SNR INFO STATUS Saved Directed to VK2WA Deselect Ready (16s) Halt
CAT
1000 1500 2000 2500 3000
12:25:30 40m
12:25:15 40m
12:25:00 40m
12:24:45 40m
12:24:30 40m
12:24:15 40m
12:24:00 40m
12:23:45 40m
12:23:30 40m
12:23:15 40m
80 60 40 20 0
0 dB
Control Display Timing
Offset
Offset: 1307 Hz
QSY
QSY
Center: 1500 Hz
Filter
Enable Filter
Center: 1500 Hz
Sync
Width: 2000 Hz
Min: 500 Hz
Max: 2500 Hz
JS8
Last Tx: NAME IS PHILIPPE 73
13/15
9.3wpm / 48.0cpm

show signals sent/rcvd by the callsign using VARAC over the last 24 hours Go! Display options Permalink

ı 5 minutes. Large markers are monitors.

e VARAC monitors: 71 on 20m, 30 on 40m, 5 on 70cm, 2 on 10m, 2 on 10Ghz, 2 on 2m, 2 on 60m, 1 on 2.4Ghz, 1 on 15m, 1 on 80m, 1 on invalid. Show all on all bands. Legend

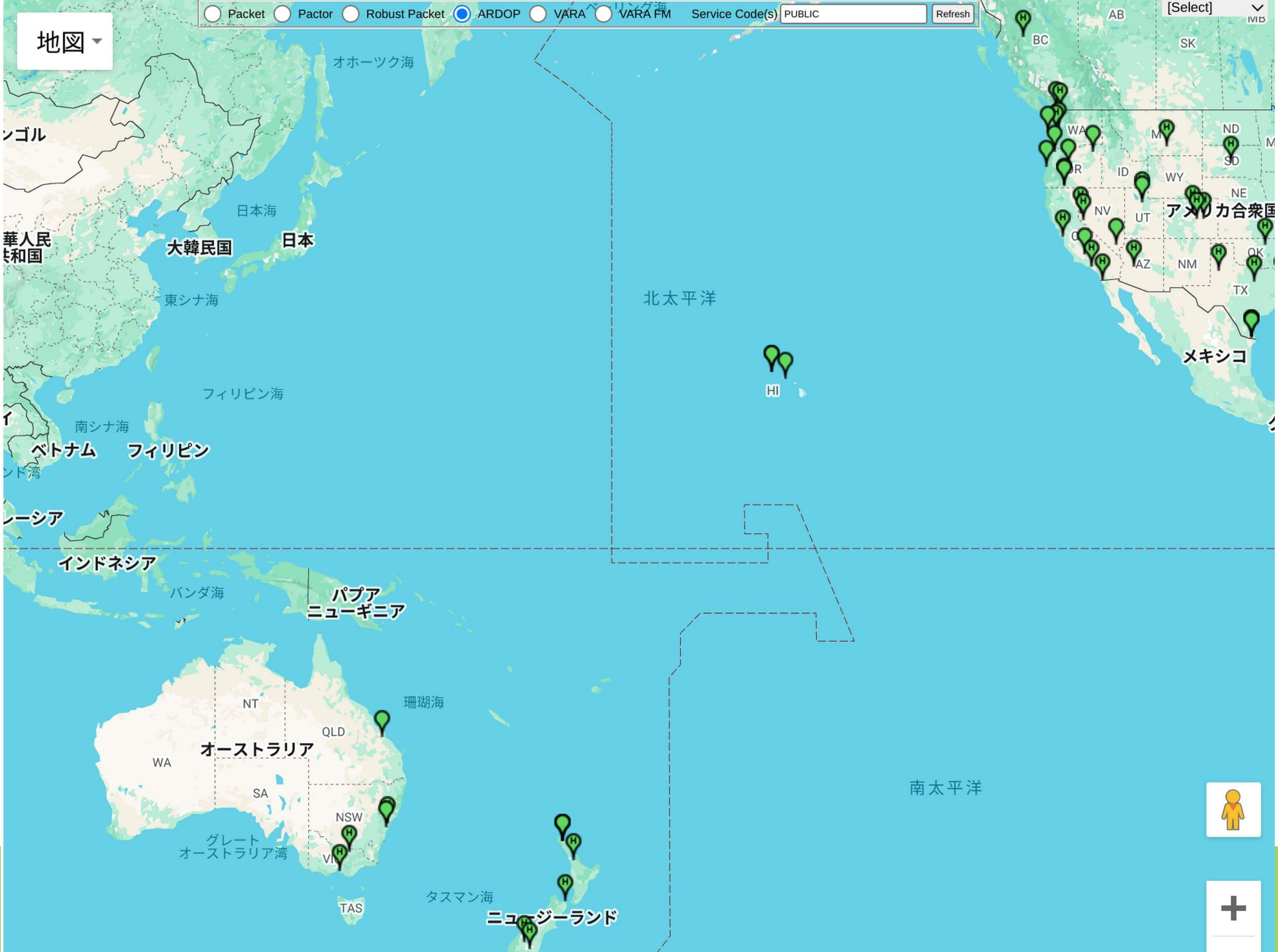


01 Loc KN10IR
on 27.246 MHz (11m)
2.2.0
900,EFHW,12W,OP NIKOS,QTH:THESSALONIKI
y 18TW101

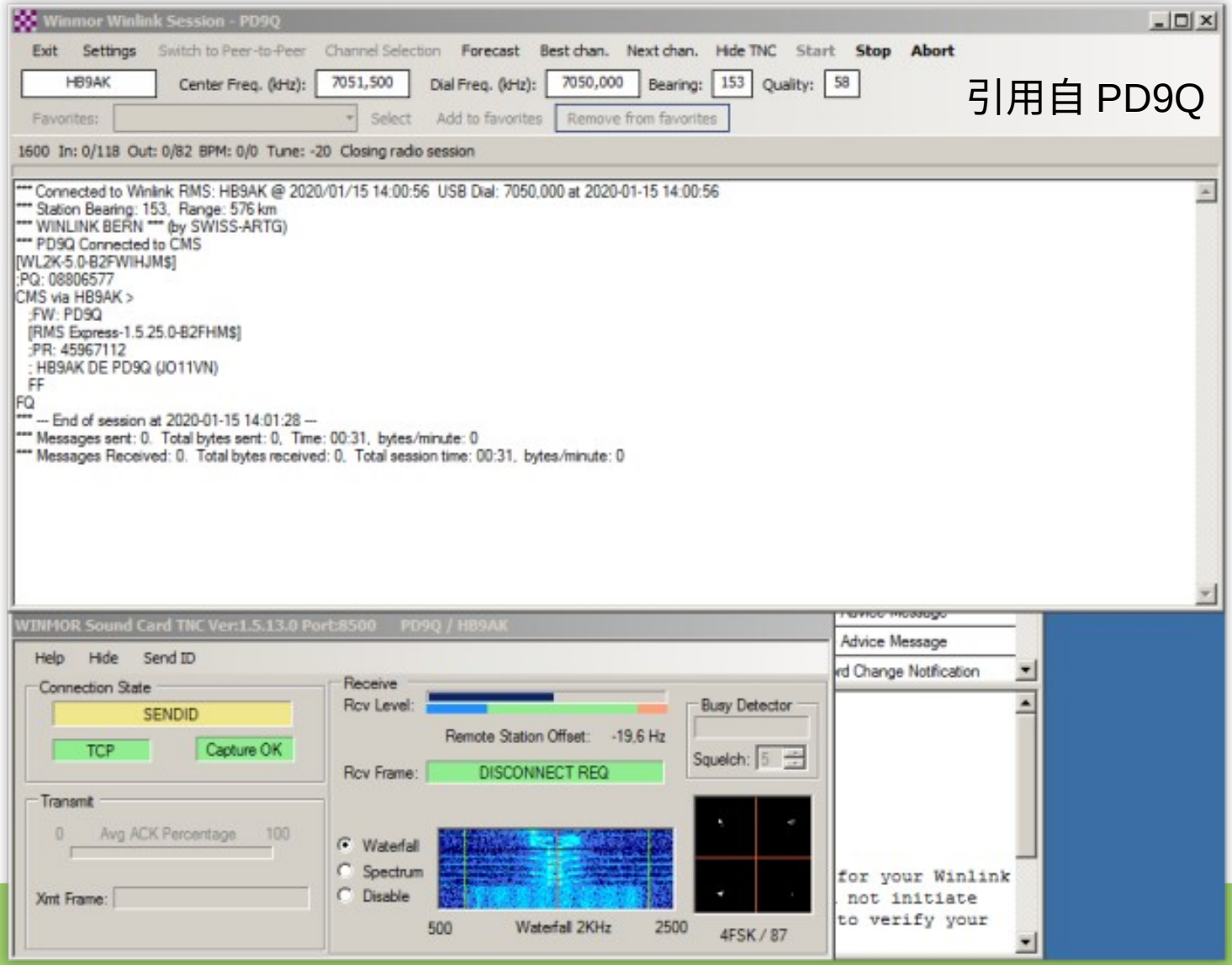

Activities
VARA
Jan 14 07:50
VarAC by 4Z1AC (V10.2.1)
Settings Tools Logs Resources About
UTC: 2025-01-14 12:50:08
FREQUENCY < >
7.104.250
Profile: VarAC
FREQ SCHEDULE OFF
SLOT 1
500Hz 2300Hz
CF 7.105.000 X
VA3RTG
CONNECT MODEM
CONNECT PING
DISCONNECT MODEM
DISCONNECT ABORT
TUNE
CALL CQ END CQ
SEND BEACONS
PTT Disabled
VarAC Log
12:46:55 - Switching to Slot 11
12:48:12 - Resetting to Slot 0
12:48:21 - Calling CQ
12:48:42 - Switching to Slot 1
VARA Log
12:49:47 - BUSY ON
12:49:49 - BUSY OFF
12:49:50 - BUSY ON
12:49:52 - BUSY OFF
In QSO with Duration:
Bnd Time From To SNR Broadcast message
VARA HF v4.8.9 BU2FS BU2FS-T
Settings View Log* Monitor Help Upgrade
bps
1.0
0.8
0.6
0.4
0.2
0.0
VU
Audio Input: -25 dB
CPU
%CPU not available
DATA
ACK IDLE
NACK BREAK
REQ QRT
AFC
S/N
RX Disconnected 500 LISTEN TCP DCD
Time Callsign Datastream message Reply
01:15:55 VA3TWN Hi Rob. Still here
VarAC on Wine is not always stable. I'm sorry.
01:16:03 VA3RTG Gr8! Good to QSO!
01:16:12 VA3RTG No problem!
01:17:31 VA3TWN <QSYF>000014101250</QSYF>
01:17:39 VA3RTG QSY- yes!
01:18:21 VA3TWN <TL>
01:18:34 VA3RTG <QSYR>
01:18:34 VA3RTG ACCEPTED YOUR QSY INVITATION
01:21:05 QSO SUMMARY: Frequency: 14.101.250 (20m) Duration: 00:07:01
01:21:05 DISCONNECTED FROM VA3RTG
01:22:44 CONNECTED TO VA3RTG (BANDWIDTH 500)
01:23:13 VA3TWN Now I see why people want to pay for VARA
It's so slow at 500bps
Luckily truSDX works well at 500bps.
01:23:19 VA3RTG Good job w/VarAC!
Ha ha!! Yes, it's good if u use it a lot.
Waiting on slot for reply
Returning calling freq in 214 sec
Click here to return now
Currently sending
CLR
In queue
CLR EDIT
CALLSIGN SNR-S SNR-R BAND NAME LOC QTH MyPWR START TIME END TIME
Auto log QSO
LOG CLR
SPOT (DXCluster)
Enter to send
SEND CLR
New message
Gestures/Tags
Load canned message:
TX RX 0/0 IDLE BU2FS PL05SA
ALERT NO NEW VMAIL RELAY Outbox: 0 Parking: 0

Winlink

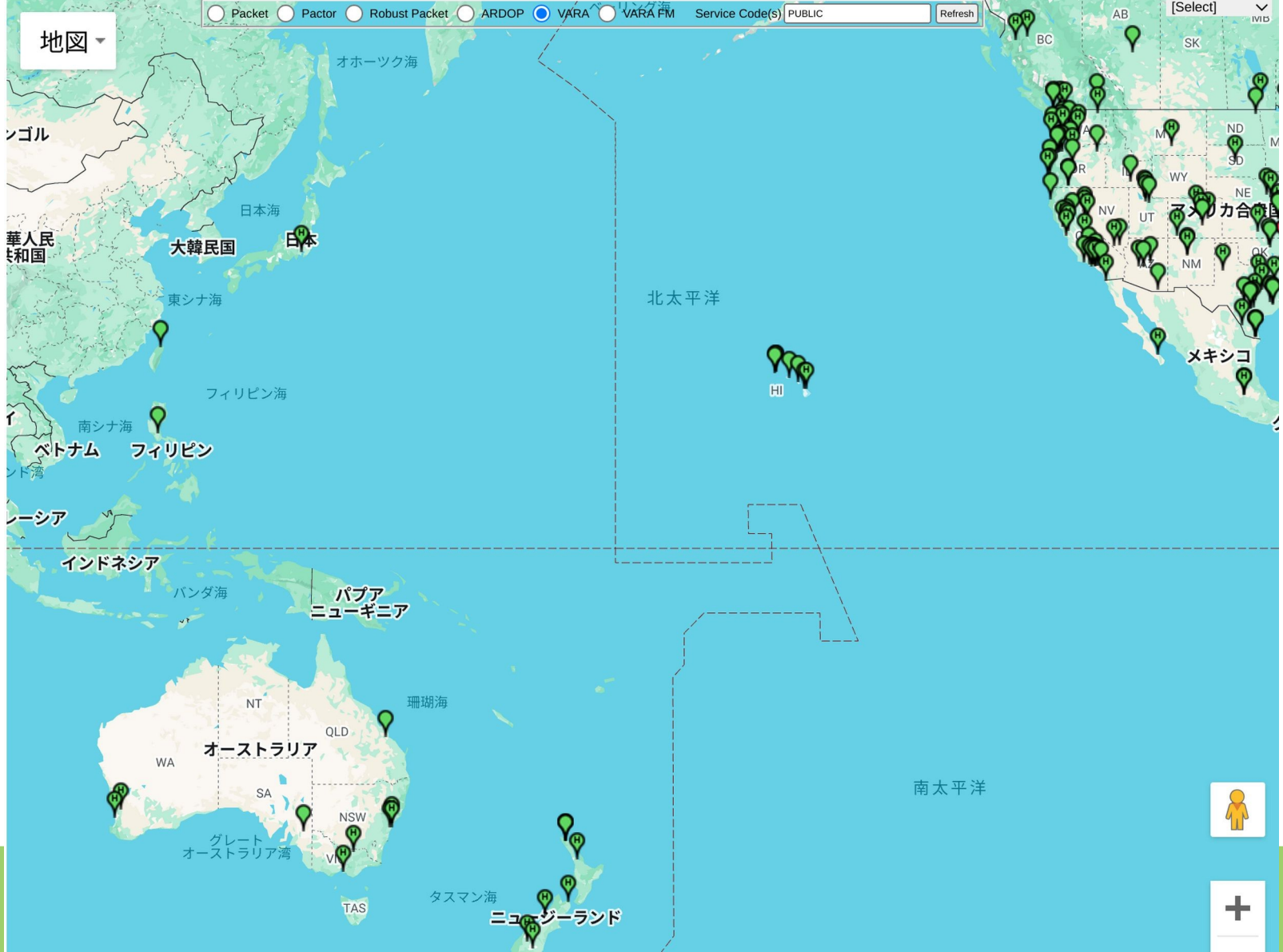
- ~~銀版快信~~ Email Gateway
- 可以 relay, 可以寄信到 GMail 等等
- 支援 VARA, ARDOP 等多種協定，甚至有 Telnet
- 不只有 RMS Winlink, 還有 Go 寫的 PAT (open source!)

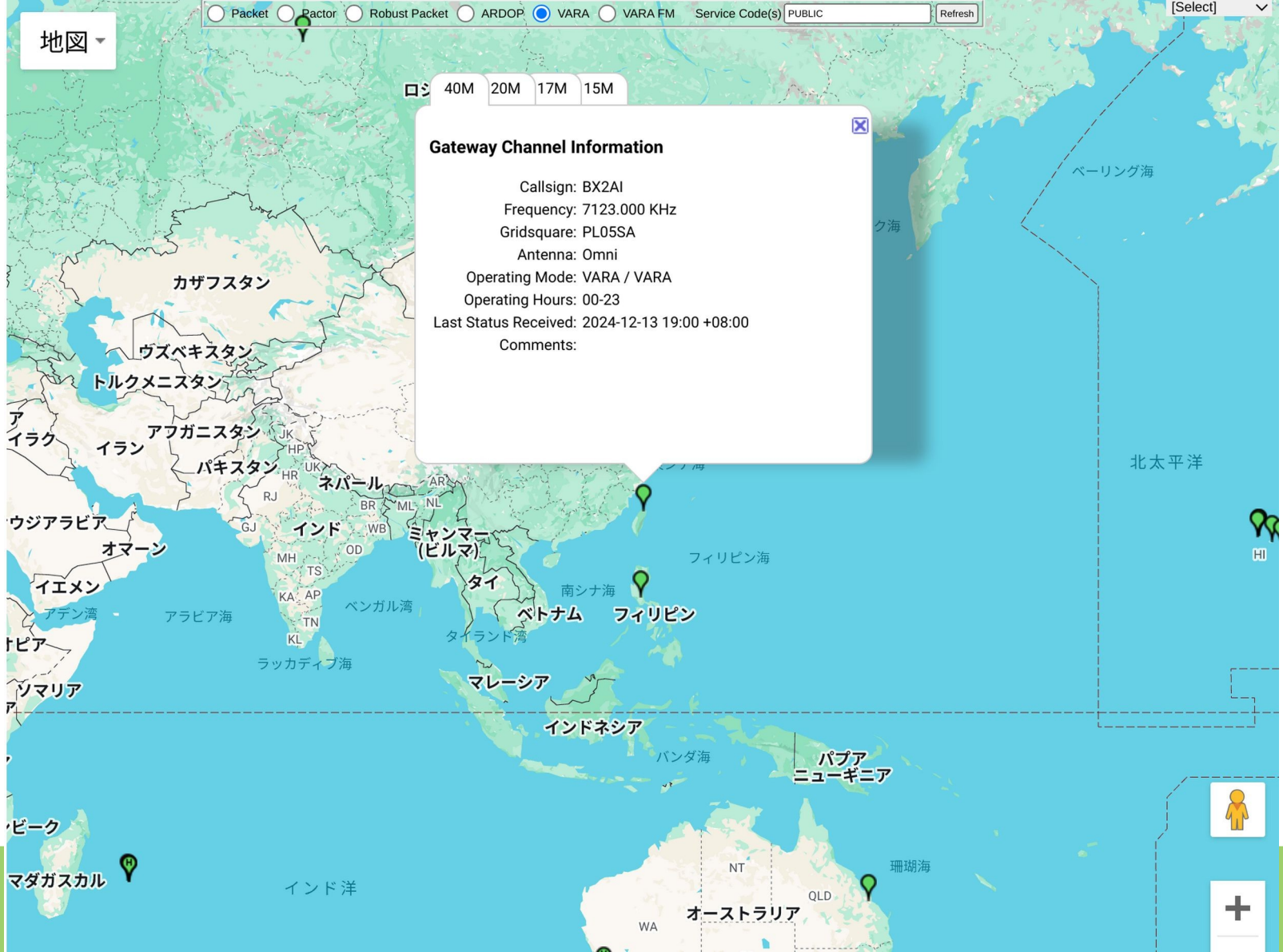


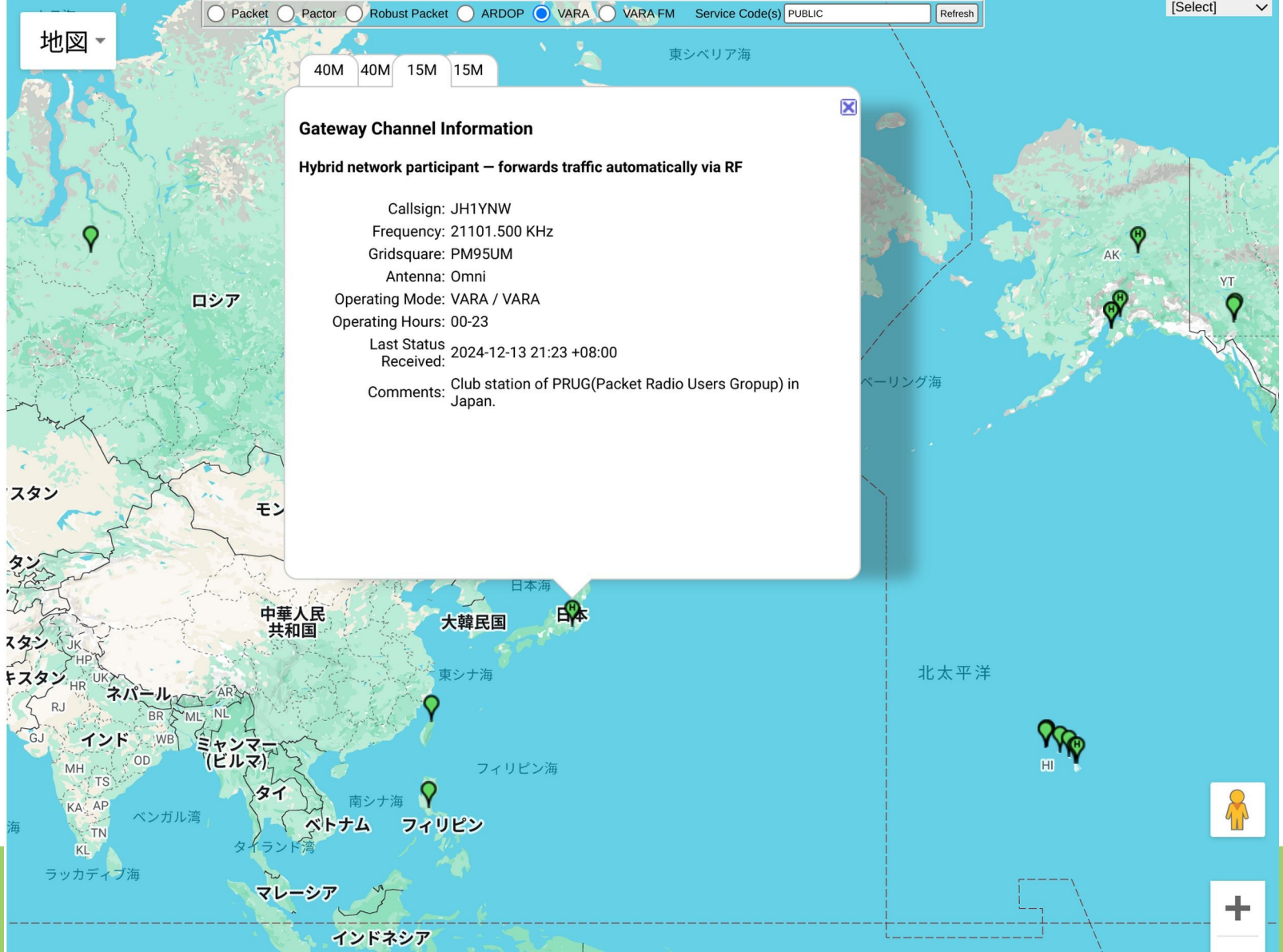
地図
Packet
Pactor
Robust Packet
ARDOP
VARA
VARA FM
Service Code(s)
PUBLIC
Refresh
[Select]
オホーツク海
日本海
大韓民国
日本
東シナ海
北太平洋
フィリピン海
南シナ海
ベトナム
フィリピン
インドネシア
バンダ海
パプア
ニューギニア
珊瑚海
オーストラリア
NT
QLD
WA
SA
NSW
グレート
オーストラリア湾
TAS
タスマン海
ニュージーランド
南太平洋
HI
BC
AB
SK
ND
SD
ID
WY
NE
NV
UT
AZ
NM
TX
OK
メキシコ


Winmor Winlink Session - PD9Q
Exit Settings Switch to Peer-to-Peer Channel Selection Forecast Best chan. Next chan. Hide TNC Start Stop Abort
HB9AK
Center Freq. (kHz): 7051,500
Dial Freq. (kHz): 7050,000
Bearing: 153
Quality: 58
Favorites:
Select
Add to favorites
Remove from favorites
1600 In: 0/118 Out: 0/82 BPM: 0/0 Tune: -20 Closing radio session
*** Connected to Winlink RMS: HB9AK @ 2020/01/15 14:00:56 USB Dial: 7050.000 at 2020-01-15 14:00:56
*** Station Bearing: 153. Range: 576 km
*** WINLINK BERN *** (by SWISS-ARTG)
*** PD9Q Connected to CMS
[WL2K-5.0-B2FWIHJM$]
;PQ: 08806577
CMS via HB9AK >
;FW: PD9Q
[RMS Express-1.5.25.0-B2FHM$]
;PR: 45967112
: HB9AK DE PD9Q (JO11VN)
FF
FQ
*** --- End of session at 2020-01-15 14:01:28 ---
*** Messages sent: 0. Total bytes sent: 0. Time: 00:31. bytes/minute: 0
*** Messages Received: 0. Total bytes received: 0. Total session time: 00:31. bytes/minute: 0
WINMOR Sound Card TNC Ver:1.5.13.0 Port:8500 PD9Q / HB9AK
Help Hide Send ID
Connection State
SENDID
TCP
Capture OK
Transmit
0 Avg ACK Percentage 100
Xmt Frame:
Receive
Rcv Level:
Remote Station Offset: -19.6 Hz
Rcv Frame: DISCONNECT REQ
Waterfall
Spectrum
Disable
500 Waterfall 2KHz 2500
Busy Detector
Squelch: 5
4FSK / 87
Advice Message
rd Change Notification
for your Winlink
not initiate
to verify your

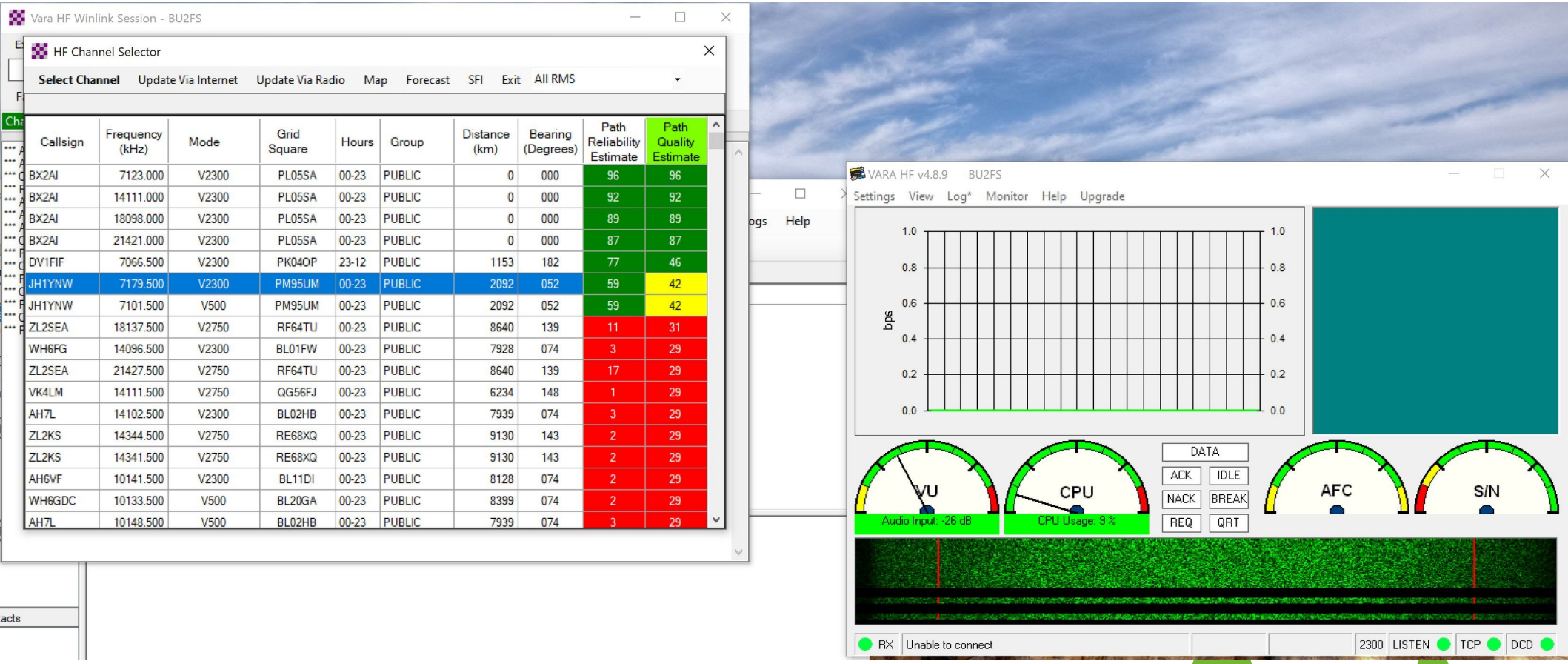
引用自 PD9Q


Packet
Pactor
Robust Packet
ARDOP
VARA
VARA FM
Service Code(s)
PUBLIC
Refresh
[Select]
地図
オホーツク海
日本海
大韓民国
日本
東シナ海
北太平洋
フィリピン海
南シナ海
ベトナム
フィリピン
インドネシア
パプア
ニューギニア
バンダ海
珊瑚海
オーストラリア
NT
QLD
WA
SA
NSW
VIC
TAS
グレート
オーストラリア湾
タスマン海
ニュージーランド
南太平洋
メキシコ
HI
AB
BC
SK
ND
SD
WY
NE
NV
UT
NM
OK


地図
Packet
Pactor
Robust Packet
ARDOP
VARA
VARA FM
Service Code(s)
PUBLIC
Refresh
[Select]
40M
20M
17M
15M
Gateway Channel Information
Callsign: BX2AI
Frequency: 7123.000 KHz
Gridsquare: PL05SA
Antenna: Omni
Operating Mode: VARA / VARA
Operating Hours: 00-23
Last Status Received: 2024-12-13 19:00 +08:00
Comments:
ベーリング海
カザフスタン
ウズベキスタン
トルクメニスタン
アフガニスタン
イラク
イラン
パキスタン
ネパール
インド
ミャンマー
(ビルマ)
タイ
ベトナム
フィリピン
南シナ海
フィリピン海
北太平洋
オマーン
イエメン
アラビア海
ベンガル湾
タイランド湾
ラッカディブ海
マレーシア
インドネシア
バンダ海
パプア
ニューギニア
マダガスカル
インド洋
オーストラリア
NT
QLD
WA
珊瑚海


Packet
Pactor
Robust Packet
ARDOP
VARA
VARA FM
Service Code(s)
PUBLIC
Refresh
[Select]
地図
40M
40M
15M
15M
Gateway Channel Information
Hybrid network participant — forwards traffic automatically via RF
Callsign: JH1YNW
Frequency: 21101.500 KHz
Gridsquare: PM95UM
Antenna: Omni
Operating Mode: VARA / VARA
Operating Hours: 00-23
Last Status Received: 2024-12-13 21:23 +08:00
Comments: Club station of PRUG(Packet Radio Users Groupup) in Japan.
東シベリア海
ロシア
AK
YT
ベーリング海
日本海
中華人民共和国
大韓民国
日本
東シナ海
北太平洋
ネパール
インド
ミャンマー(ビルマ)
タイ
ベトナム
フィリピン
フィリピン海
南シナ海
ベンガル湾
タイランド湾
ラッカディブ海
マレーシア
インドネシア
HI


地図
Packet
Pactor
Robust Packet
ARDOP
VARA
VARA FM
Service Code(s)
PUBLIC
Refresh
[Select]
80M
40M
Gateway Channel Information
Callsign: DV1FIF
Frequency: 7066.500 KHz
Gridsquare: PK04OP
Antenna: Omni
Operating Mode: VARA / VARA
Operating Hours: 23-12
Last Status Received: 2024-12-13 21:05 +08:00
Comments: DR7400, AH710
カザフスタン
ウズベキスタン
トルクメニスタン
アフガニスタン
イラン
イラク
パキスタン
ネパール
インド
オマーン
イエメン
アラビア海
ベンガル湾
ラッカディブ海
タイ
ベトナム
フィリピン
南シナ海
タイランド湾
フィリピン海
マレーシア
インドネシア
バンダ海
パプア
ニューギニア
オーストラリア
NT
QLD
WA
SA
NSW
珊瑚海
グレート
オーストラリア湾
インド洋
マダガスカル
ベーリング海
北太平洋
HI

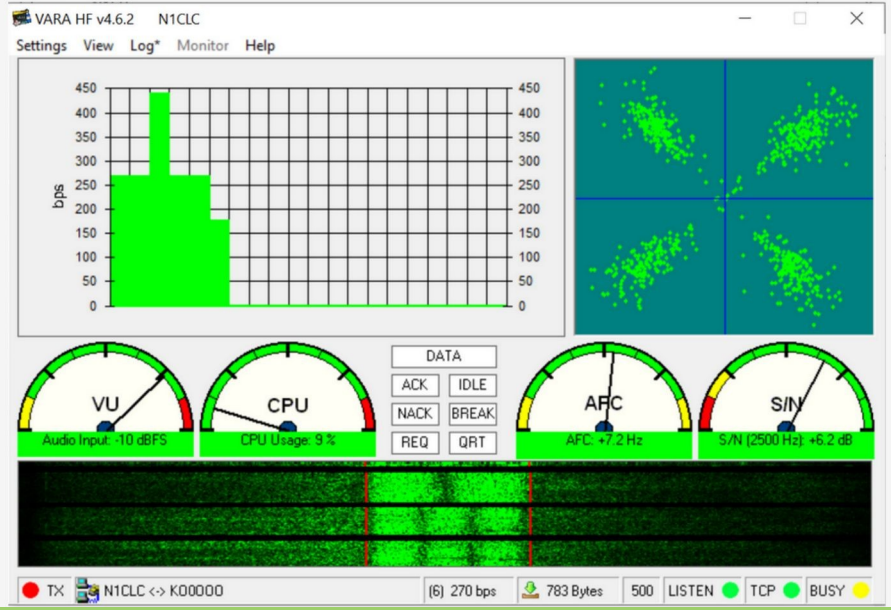

Vara HF Winlink Session - BU2FS
HF Channel Selector
Select Channel
Update Via Internet
Update Via Radio
Map
Forecast
SFI
Exit
All RMS
Callsign | Frequency (kHz) | Mode | Grid Square | Hours | Group | Distance (km) | Bearing (Degrees) | Path Reliability Estimate | Path Quality Estimate
BX2AI | 7123.000 | V2300 | PL05SA | 00-23 | PUBLIC | 0 | 000 | 96 | 96
BX2AI | 14111.000 | V2300 | PL05SA | 00-23 | PUBLIC | 0 | 000 | 92 | 92
BX2AI | 18098.000 | V2300 | PL05SA | 00-23 | PUBLIC | 0 | 000 | 89 | 89
BX2AI | 21421.000 | V2300 | PL05SA | 00-23 | PUBLIC | 0 | 000 | 87 | 87
DV1FIF | 7066.500 | V2300 | PK04OP | 23-12 | PUBLIC | 1153 | 182 | 77 | 46
JH1YNW | 7179.500 | V2300 | PM95UM | 00-23 | PUBLIC | 2092 | 052 | 59 | 42
JH1YNW | 7101.500 | V500 | PM95UM | 00-23 | PUBLIC | 2092 | 052 | 59 | 42
ZL2SEA | 18137.500 | V2750 | RF64TU | 00-23 | PUBLIC | 8640 | 139 | 11 | 31
WH6FG | 14096.500 | V2300 | BL01FW | 00-23 | PUBLIC | 7928 | 074 | 3 | 29
ZL2SEA | 21427.500 | V2750 | RF64TU | 00-23 | PUBLIC | 8640 | 139 | 17 | 29
VK4LM | 14111.500 | V2750 | QG56FJ | 00-23 | PUBLIC | 6234 | 148 | 1 | 29
AH7L | 14102.500 | V2300 | BL02HB | 00-23 | PUBLIC | 7939 | 074 | 3 | 29
ZL2KS | 14344.500 | V2750 | RE68XQ | 00-23 | PUBLIC | 9130 | 143 | 2 | 29
ZL2KS | 14341.500 | V2750 | RE68XQ | 00-23 | PUBLIC | 9130 | 143 | 2 | 29
AH6VF | 10141.500 | V2300 | BL11DI | 00-23 | PUBLIC | 8128 | 074 | 2 | 29
WH6GDC | 10133.500 | V500 | BL20GA | 00-23 | PUBLIC | 8399 | 074 | 2 | 29
AH7L | 10148.500 | V500 | BL02HB | 00-23 | PUBLIC | 7939 | 074 | 3 | 29
VARA HF v4.8.9 BU2FS
Settings
View
Log*
Monitor
Help
Upgrade
bps
VU
CPU
Audio Input: -26 dB
CPU Usage: 9 %
DATA
ACK
IDLE
NACK
BREAK
REQ
QRT
AFC
S/N
RX
Unable to connect
2300
LISTEN
TCP
DCD

(software-defined) Modem

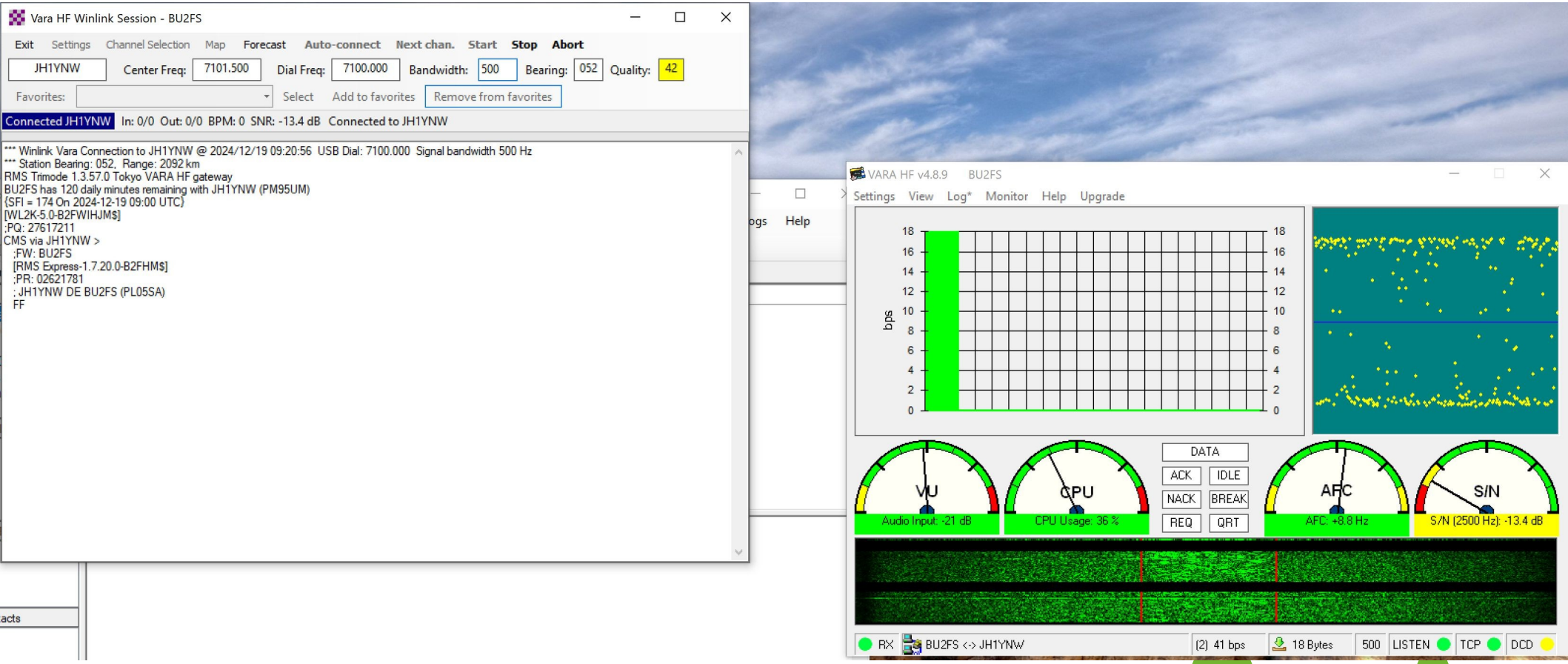
引用自 Rafael Diniz, SplinterCon, Dec 2023 理想

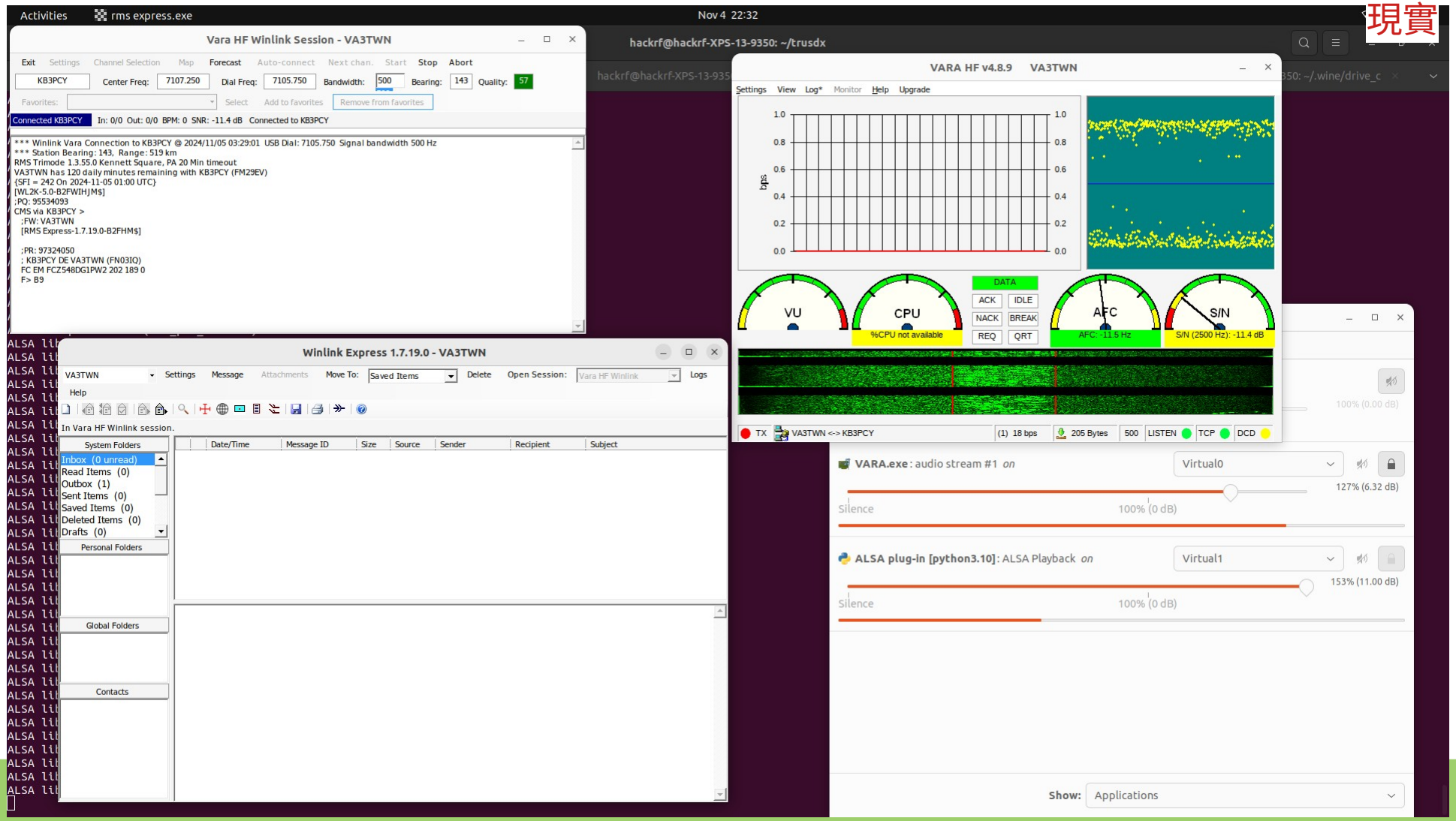
Currently using VARA HF

- 2300 Hz BW, ARQ, Adaptive Modulation
- Modes range from 16 bps up to 5 kbps
- Proprietary Visual Basic 6 application (runs well on Hangover-Wine)



現實


Vara HF Winlink Session - BU2FS
Exit Settings Channel Selection Map Forecast Auto-connect Next chan. Start Stop Abort
JH1YNW Center Freq: 7101.500 Dial Freq: 7100.000 Bandwidth: 500 Bearing: 052 Quality: 42
Favorites: Select Add to favorites Remove from favorites
Connected JH1YNW In: 0/0 Out: 0/0 BPM: 0 SNR: -13.4 dB Connected to JH1YNW
*** Winlink Vara Connection to JH1YNW @ 2024/12/19 09:20:56 USB Dial: 7100.000 Signal bandwidth 500 Hz
*** Station Bearing: 052, Range: 2092 km
RMS Trimode 1.3.57.0 Tokyo VARA HF gateway
BU2FS has 120 daily minutes remaining with JH1YNW (PM95UM)
{SFI = 174 On 2024-12-19 09:00 UTC}
[WL2K-5.0-B2FWIHJM$]
;PQ: 27617211
CMS via JH1YNW >
;FW: BU2FS
[RMS Express-1.7.20.0-B2FHM$]
;PR: 02621781
; JH1YNW DE BU2FS (PL05SA)
FF
VARA HF v4.8.9 BU2FS
Settings View Log* Monitor Help Upgrade
bps
VU
Audio Input: -21 dB
CPU
CPU Usage: 36 %
DATA
ACK IDLE
NACK BREAK
REQ QRT
AFC
AFC: +8.8 Hz
S/N
S/N (2500 Hz): -13.4 dB
RX BU2FS <-> JH1YNW (2) 41 bps 18 Bytes 500 LISTEN TCP DCD


Activities
rms express.exe
Nov 4 22:32
現實
Vara HF Winlink Session - VA3TWN
Exit Settings Channel Selection Map Forecast Auto-connect Next chan. Start Stop Abort
KB3PCY Center Freq: 7107.250 Dial Freq: 7105.750 Bandwidth: 500 Bearing: 143 Quality: 57
Favorites: Select Add to favorites Remove from favorites
Connected KB3PCY In: 0/0 Out: 0/0 BPM: 0 SNR: -11.4 dB Connected to KB3PCY
*** Winlink Vara Connection to KB3PCY @ 2024/11/05 03:29:01 USB Dial: 7105.750 Signal bandwidth 500 Hz
*** Station Bearing: 143, Range: 519 km
RMS Trimode 1.3.55.0 Kennett Square, PA 20 Min timeout
VA3TWN has 120 daily minutes remaining with KB3PCY (FM29EV)
{SFI = 242 On 2024-11-05 01:00 UTC}
[WL2K-5.0-B2FWIHJM$]
;PQ: 95534093
CMS via KB3PCY >
;FW: VA3TWN
[RMS Express-1.7.19.0-B2FHM$]
;PR: 97324050
; KB3PCY DE VA3TWN (FN03IQ)
FC EM FCZ548DG1PW2 202 189 0
F> B9
hackrf@hackrf-XPS-13-9350: ~/trusdx
VARA HF v4.8.9 VA3TWN
Settings View Log* Monitor Help Upgrade
bps
VU
CPU
%CPU not available
DATA
ACK IDLE
NACK BREAK
REQ QRT
AFC
AFC: -11.5 Hz
S/N
S/N (2500 Hz): -11.4 dB
TX VA3TWN <-> KB3PCY (1) 18 bps 205 Bytes 500 LISTEN TCP DCD
Winlink Express 1.7.19.0 - VA3TWN
VA3TWN Settings Message Attachments Move To: Saved Items Delete Open Session: Vara HF Winlink Logs
Help
In Vara HF Winlink session.
System Folders
Inbox (0 unread)
Read Items (0)
Outbox (1)
Sent Items (0)
Saved Items (0)
Deleted Items (0)
Drafts (0)
Personal Folders
Global Folders
Contacts
Date/Time Message ID Size Source Sender Recipient Subject
VARA.exe: audio stream #1 on
Virtual0
127% (6.32 dB)
Silence
100% (0 dB)
ALSA plug-in [python3.10]: ALSA Playback on
Virtual1
153% (11.00 dB)
Silence
100% (0 dB)
Show: Applications

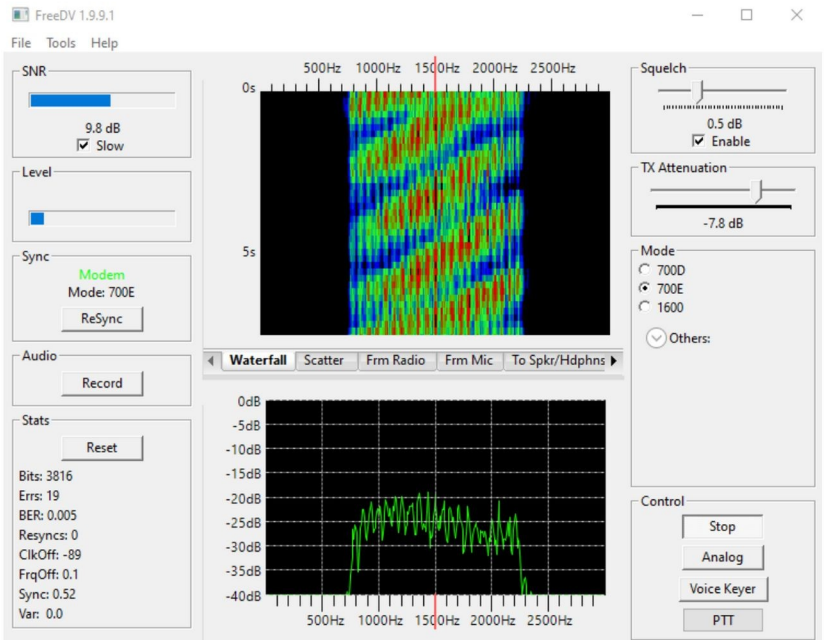
FREEDV

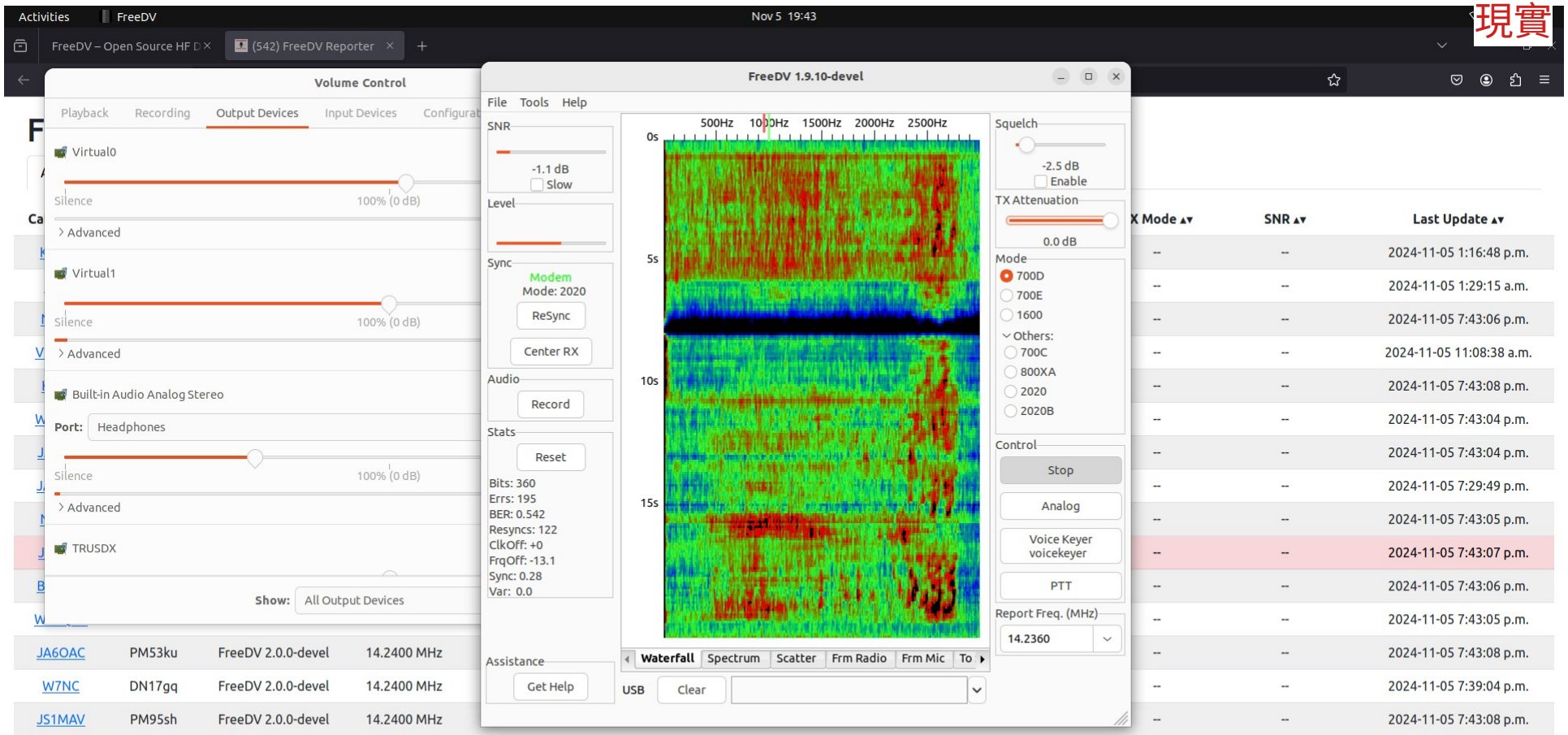
Open Source HF Digital Voice for Amateur Radio

理想

引用自 FreeDV 首頁

INTRODUCTION

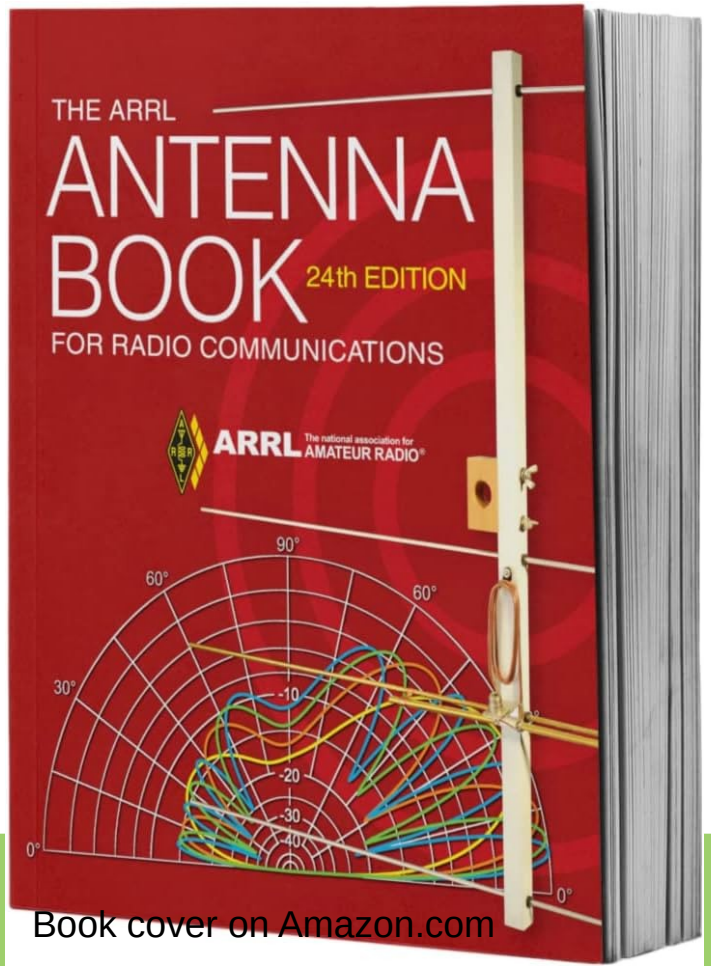



Activities
FreeDV
Nov 5 19:43
現實
FreeDV – Open Source HF D
(542) FreeDV Reporter
Volume Control
Playback
Recording
Output Devices
Input Devices
Virtual0
Silence
100% (0 dB)
Advanced
Virtual1
Built-in Audio Analog Stereo
Port:
Headphones
TRUSDX
Show:
All Output Devices
FreeDV 1.9.10-devel
File
Tools
Help
SNR
-1.1 dB
Slow
Level
Sync
Modem
Mode: 2020
ReSync
Center RX
Audio
Record
Stats
Reset
Bits: 360
Errs: 195
BER: 0.542
Resyncs: 122
ClkOff: +0
FrqOff: -13.1
Sync: 0.28
Var: 0.0
Assistance
Get Help
500Hz
1000Hz
1500Hz
2000Hz
2500Hz
0s
5s
10s
15s
Waterfall
Spectrum
Scatter
Frm Radio
Frm Mic
USB
Clear
Squelch
-2.5 dB
Enable
TX Attenuation
0.0 dB
Mode
700D
700E
1600
Others:
700C
800XA
2020
2020B
Control
Stop
Analog
Voice Keyer
voicekeyer
PTT
Report Freq. (MHz)
14.2360
X Mode
SNR
Last Update
-- -- 2024-11-05 1:16:48 p.m.
-- -- 2024-11-05 1:29:15 a.m.
-- -- 2024-11-05 7:43:06 p.m.
-- -- 2024-11-05 11:08:38 a.m.
-- -- 2024-11-05 7:43:08 p.m.
-- -- 2024-11-05 7:43:04 p.m.
-- -- 2024-11-05 7:43:04 p.m.
-- -- 2024-11-05 7:29:49 p.m.
-- -- 2024-11-05 7:43:05 p.m.
-- -- 2024-11-05 7:43:07 p.m.
-- -- 2024-11-05 7:43:06 p.m.
-- -- 2024-11-05 7:43:05 p.m.
JA6OAC PM53ku FreeDV 2.0.0-devel 14.2400 MHz -- -- 2024-11-05 7:43:08 p.m.
W7NC DN17gq FreeDV 2.0.0-devel 14.2400 MHz -- -- 2024-11-05 7:39:04 p.m.
JS1MAV PM95sh FreeDV 2.0.0-devel 14.2400 MHz -- -- 2024-11-05 7:43:08 p.m.
Display times in UTC
Show only for band:
20m

開放原始碼的 在

開放原始碼是 HAM 精神

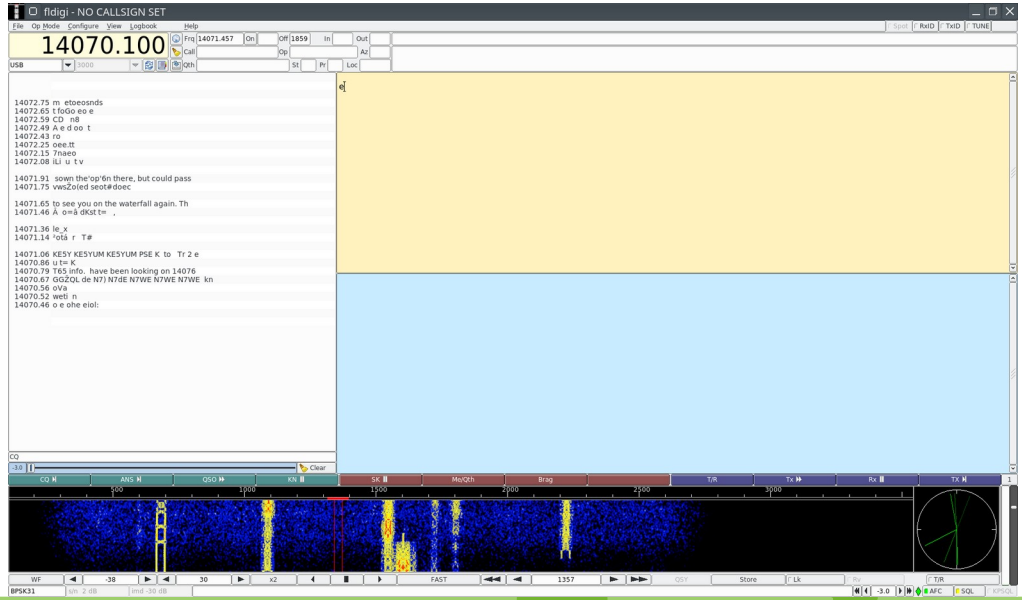
- ARRL 與各大業餘無線電雜誌
- 開放原始碼軟體
- 開放通訊協定



Book cover on Amazon.com

fldigi

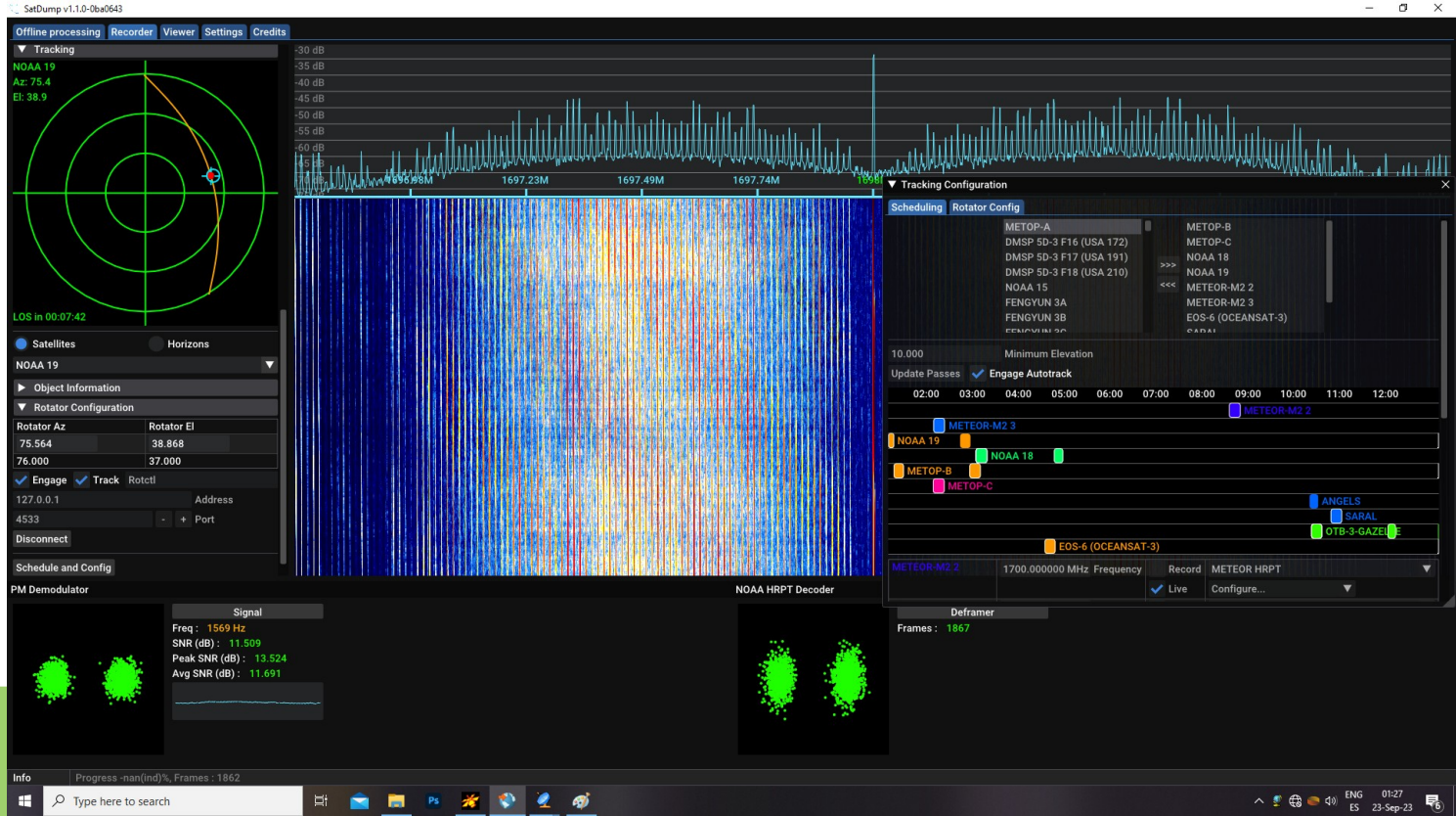
- Dave (W1HKJ) et al.
- https://en.wikipedia.org/wiki/Fldigi
- 幾乎所有的古典數位模式



SatDump

- 可以解調許多衛星使用的數位模式
- GitHub

Courtesy of SatDump Github



Hellschreiber

- 至少通訊協定本身是開放的
- 協定可以在這裡找到，截圖引用自 https://www.qsl.net/zl1bpu/DOCS/Hellspec.pdf

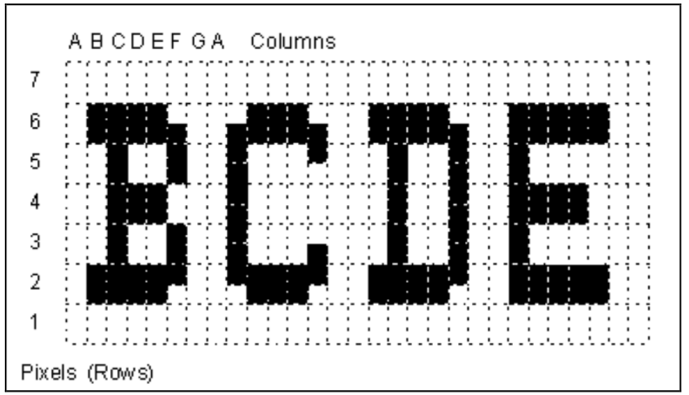


Fig. 1 Character Matrix

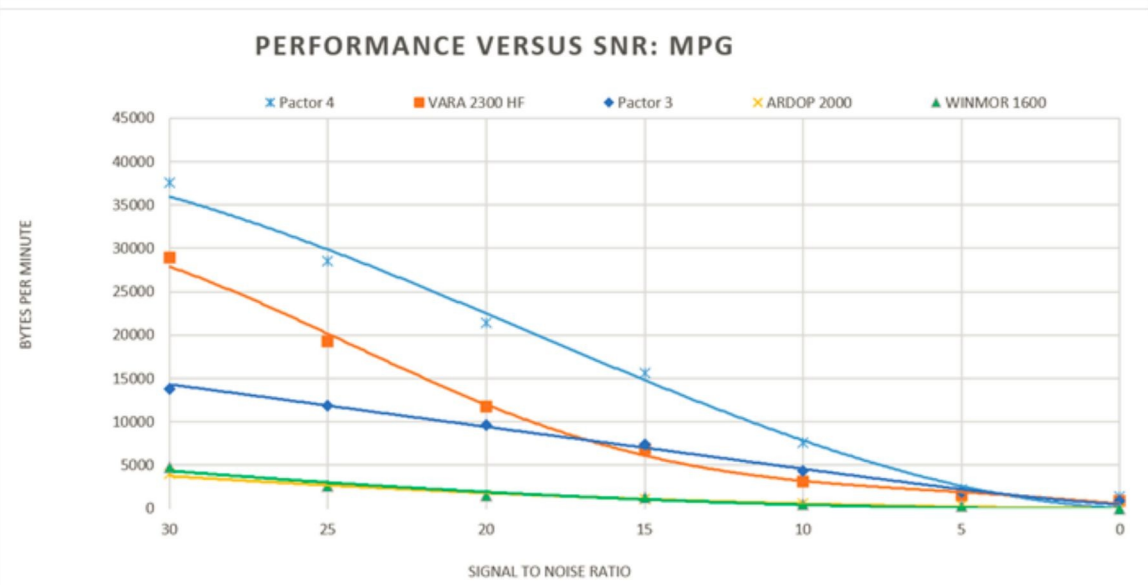
s are limited to transmitting upper case text and a limited range of punctuat
s very nature, will however portray any transmitted character faithfully. It is
equately define lower case characters in a 5 x 5 matrix, however there is no
non-printing dot time slot below the text (row 1 in Fig. 1) cannot be used fo
he traditional Feld-Hell font did this for characters "Q" and "7", and above
" and “6”:

In Development - Mercury

引用自 Rafael Diniz, SplinterCon, Dec 2023

https://github.com/Rhizomatica/mercury

- Open source configurable software-defined modem (layers 0 and 1)
- Modulation BPSK, QPSK, 8QAM, 16QAM, 32QAM and 64QAM
- LDPC code rate 2/16, 8/16 and 14/16



Codec 2 & RADE

- https://github.com/drowe67/codec2
- 700 – 3200 bit/s

- https://github.com/drowe67/radae
- 1500 Hz BW

開放原始碼的 不在

EA5HVK

Weak signals Software

VARA Modem

10 January, 2011

- VARA HF v4.8.9 (High Performance HF Modem)
- VARA FM v4.3.8 (VARA for FM transceivers)
- VARA SAT v4.4.4 (VARA for QO-100 geostationary SAT)
- VARA Chat v1.4.1 (Easy Text and File transfer chat)
- VARA Terminal v1.2.2 (VARA dumb terminal for BBS's)

Buy a VARA License 64€ / 10€

Email: nietoros@hotmail.com

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Winlink, VARA : Le S… on VARA HF Modem

Courtesy of VARA Homepage

G.729

- ITU-T 持有專利，專利已到期
- 可支付授權費使用 (1996-2017)
- 把語音壓縮至 8 Kbit/s

AMBE

- Codebook-based vocoder
- 2 – 9.6 kbit/s
- Inmarsat, Iridium, D-STAR 都使用的數位語音協定
- IMBE, AMBE 專利已到期
- AMBE2+ (DMR, P25) 仍有專利

增加通訊韌性，你可以做什麼?

請採取行動!

- 考業餘無線電執照 – 必須要二等或以上
- 架設行動台
- 參加 ARES 或各項演習
- 將 ARRL 與 USGS 的演習引進台灣
- 使用開放原始碼軟/硬體