Technical overview

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Sep 21, 2022

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VarAC
HF Chat reinvented

About us

4Z1AC
Irad Deutsch

NC3Z
Gary Mitchelson

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The rational behind VarAC

What is VarAC?

- VarAC is a point-to-point digital chat application the provides a modern chat experience to the hamradio operator.

- VarAC uses the VARA protocol. Loss-less ARQ mode.

- Great speed under challenging SNR levels

- Ideal for QRP, Portable operations & EmCom

- VarAC can be used on HF, VHF/UHF (FM) and also Satellite (QQ-100)

- Over 6,000 registered users to date

Download link: https://www.varac-hamradio.com/download

Demetre, M0SUY/P, doing portable VarAC operation
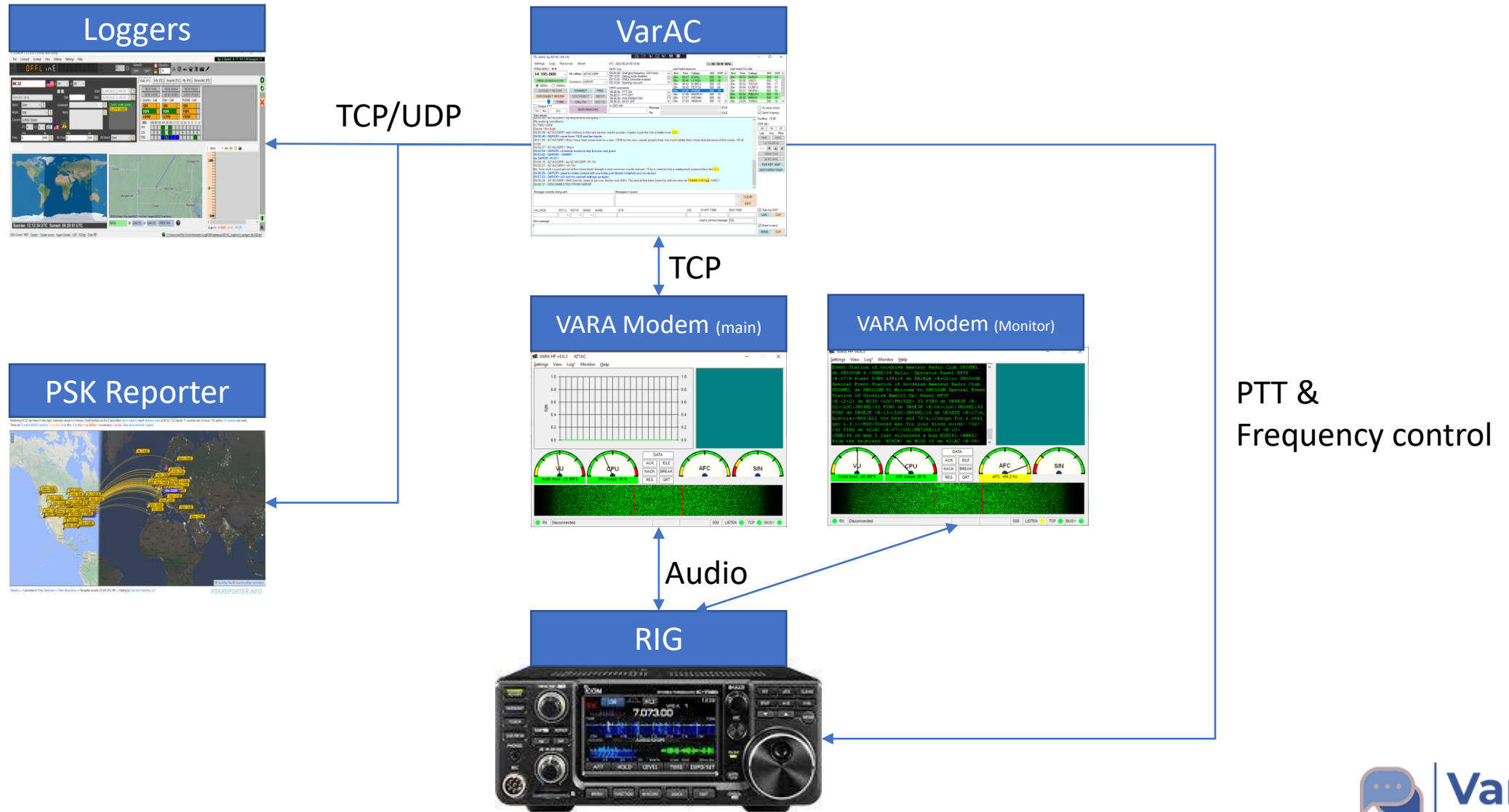

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What is VARA

- Created by Jose Alberto Nieto Ros, EA5HVK

- ARQ, error free protocol

- Available modems :

  - VARA HF - Up to 1,543 BPS at 500Hz BW / 7,050 BPS at 2300Hz BW

  - VARA SAT – Like HF but with additional latency handling

  - VARA FM – Up to 12,750 BPS Narrow / 25,210 BPS Wide

- Free license version available with speed limit of 170 BPS

Download link: https://rosmodem.wordpress.com/
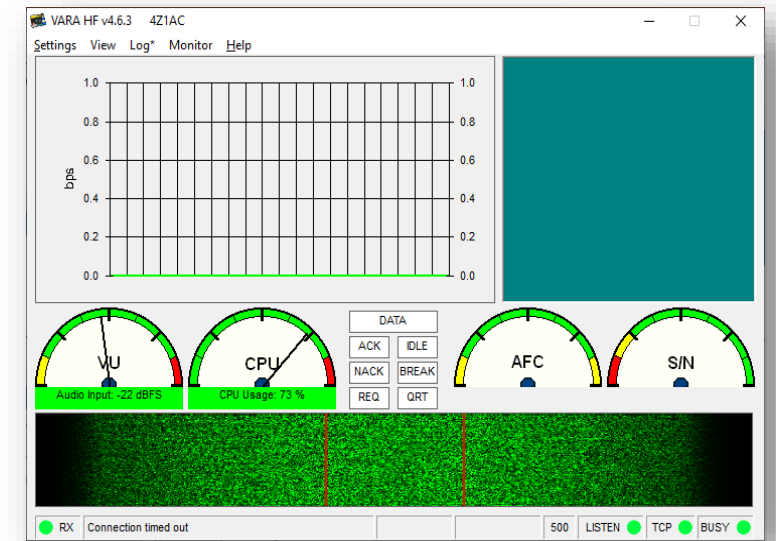
VarAC Basic Architecture

Basic VarAC setup

Things you MUST config:
- VARA modem connectivity
- PTT configuration

Supported RIG control:
- **CAT:** Direct CAT or through OmniRig
- **PTT:** Direct CAT or RTS/DTR

Other important configuration:
- Frequency control
- Vara monitor
- Beacon interval
- QSO logger integration
- PSK Reporter

You can customize CAT commands in **VarAC_cat_commands.ini**

Beacons

- Letting people know you are "Online"

- Great for propagation analysis (Spots also uploaded to PSK Reporter)

- Minimum beacon interval: 15 minutes

- Beacons fires only if the frequency is clear for at least 30 seconds

Ping

- Used to check connectivity with a station

- Exchanges SNRs so you know how you are being heard

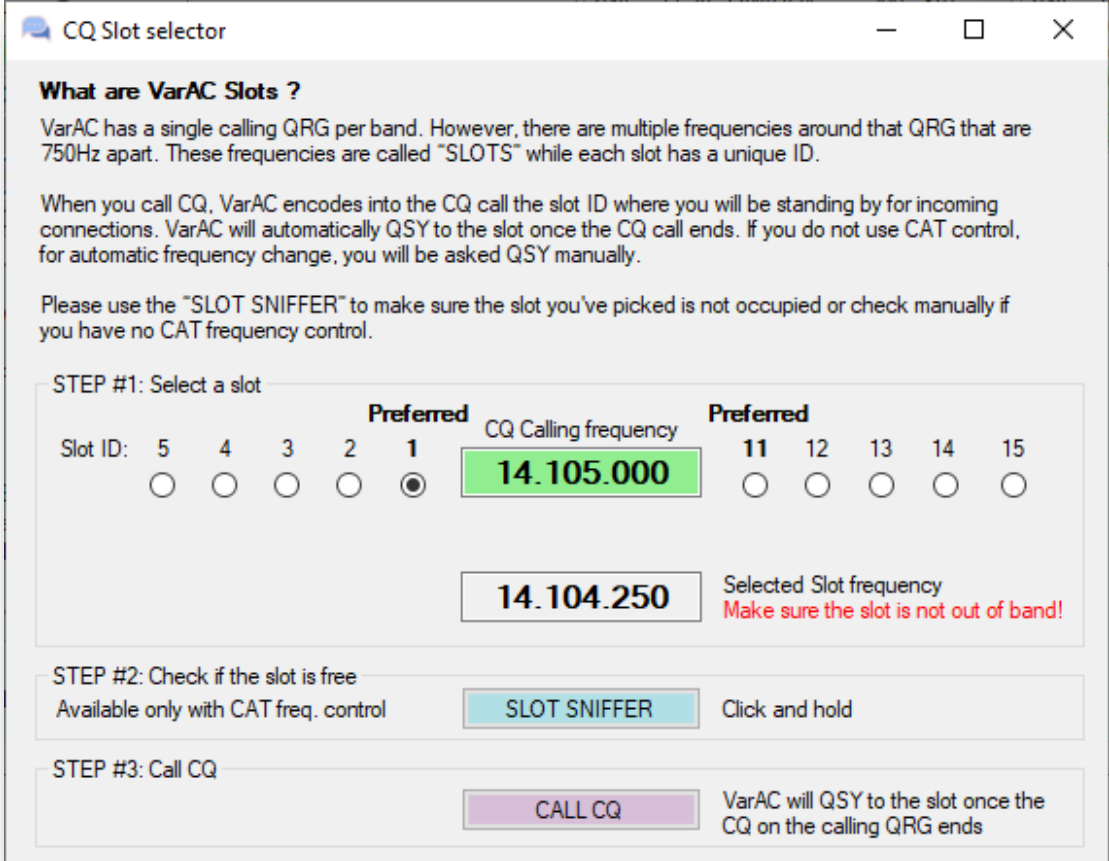- Disconnects immediately after SNR exchange.

CQ & The Slots system

Provides scale with a single calling frequency

- Main calling frequency (CF) per band

- 10 slots around it. 5 below and 5 above

- 750Hz steps each

CQ Flow:

1. Pick a slot

2. Making sure it's free (using the slot sniffer)

3. Call CQ on the CF

4. VarAC will auto QSY to the slot

5. Double clicking a CQ automatically QSY to the slot and connects

6. No answer? Your Rig will QSY back to the CF

CQ Slot selector

What are VarAC Slots ?

VarAC has a single calling QRG per band. However, there are multiple frequencies around that QRG that are 750Hz apart. These frequencies are called "SLOTS" while each slot has a unique ID.

When you call CQ, VarAC encodes into the CQ call the slot ID where you will be standing by for incoming connections. VarAC will automatically QSY to the slot once the CQ call ends. If you do not use CAT control, for automatic frequency change, you will be asked QSY manually.

Please use the "SLOT SNIFFER" to make sure the slot you've picked is not occupied or check manually if you have no CAT frequency control.

STEP #1: Select a slot

| | | Preferred | | | CQ Calling frequency | Preferred | | | | |
| Slot ID: 5 | 4 | 3 | 2 | 1 | 14.105.000 | 11 | 12 | 13 | 14 | 15 |

14.104.250 — Selected Slot frequency. Make sure the slot is not out of band!

STEP #2: Check if the slot is free
Available only with CAT freq. control — SLOT SNIFFER — Click and hold

STEP #3: Call CQ — CALL CQ — VarAC will QSY to the slot once the CQ on the calling QRG ends

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Calling Frequencies (CF)

- Use the Drop down to move between CFs

- You can use the Slot slider / little arrows to sniff around it.

- Add your own frequencies in **VarAC_frequencies.conf**

20m - 14.105 MHz (Primary - day time)
40m - 7.105 MHz (Primary - night time)
80m - 3.595 MHz
30m - 10.133 MHz
17m - 18.106 MHz
15m - 21.105 MHz
12m - 24.927 MHz
10m - 28.105 MHz
6m - 50.330 MHz

Conducting a QSO

- IS TYPING indicator!

- Fully multilingual support! (even 4-bytes languages)

- Emoji support

- Incoming message will unfold as its being received.

- Message queue

- Called ID is sent periodically to comply with local regulations

- A status bar shows the progress of sending/receiving a message.

- Tags & gestures that will show symbols & play sounds

- All chat history is stored in a log file and can be viewed in the "callsign history" screen.

- Bi directional SNR exchange

- Auto QSO logging

- And much more!

Callsign history

Aggregates all activity of a station including:

- History of logged QSOs

- Spotted Beacons & CQs

- Previous chats

PSK Reporter

- Every CQ and Beacon is reported to PSK Reporter

- Self reporting is also possible

- ~50,000 spots per day (to-date)

- Great tool to see how you are being heard

- You can customize your PSK reporter preferred view

QSO Logging

- VarAC has it's own ADIF log file that can be scanned by 3rd party loggers

- ADIF standard now includes VARA as a sub-mode of DYNAMIC.

- LOTW recently adopted this as well

- VarAC can send Logs (Using TCP/UDP) to:
  - DX Keeper
  - HRD log
  - Log4OM
  - N1MM
  - N3FJP
  - Swisslog
  - UcxLog

- Using those loggers you can automate uploads to

QRZ, LOTW, EQSL etc.
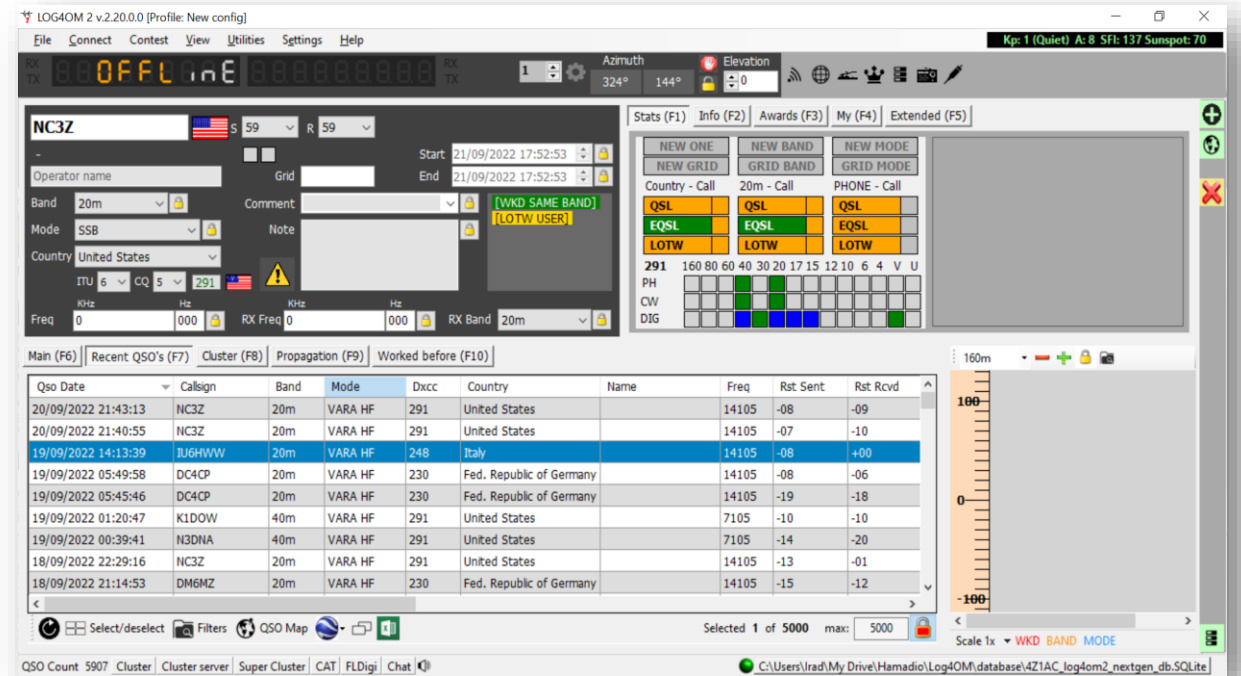
Vmail Mailbox

- VarAC has an internal mailbox system

- Connecting an "AWAY" station will ask you to leave a VMail

- You can relay a message to a 3rd party through a mediator

- You can queue VMails in your Outbox. Those VMails will be forwarded once connected
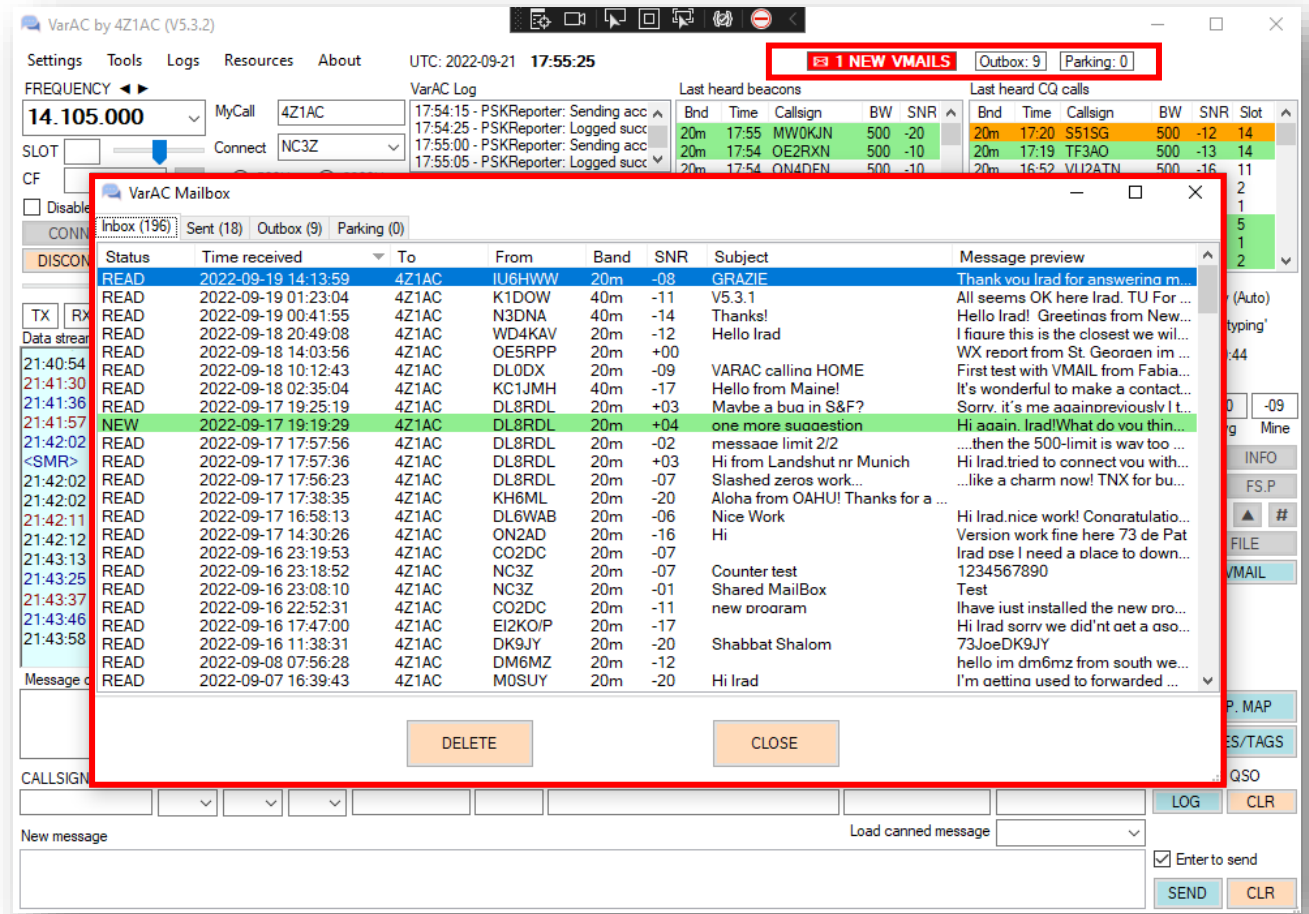
The QSY Protocol

VarAC provides seamless QSY mechanism while keeping an

ACTIVE LINK

- You can also QSY between bands during the QSO

- Mainly used when starting a QSO on the CF or in case of QRM

- Use the QSY sniffer prior to sending a QSY invitation.

2 Types of QSY:

- UP/DOWN QSY – moves 750Hz. (Right click to sniff)

- Free form QSY – select any frequency you want

Once you send a QSY invitation, both sides will have a popup

message asking for their acknowledge.

Both rigs will auto-QSY upon confirmation.
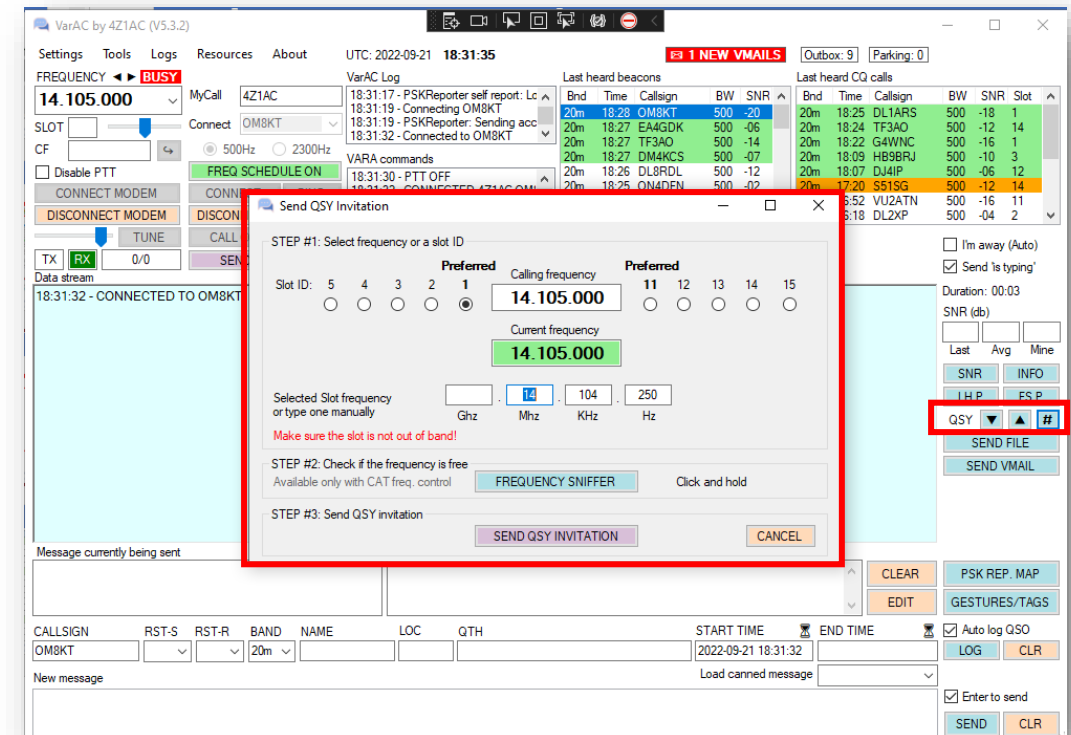
VarAC Tags & Gestures

Tag types:

- Embedding my/your data
- Request data
- Trigger events

Tags can be used to automate things when used in predefined messages

Gestures

- Play sounds on the other side
- Sending Emojis

Emojis

HIHI! - 😊😊
TU! - THANK YOU 🙏
LIKE! - 👍👍
BYE! - BYE BYE 👋👋
COOL! - 🆒
FB! - 👀👀

Main VarAC tags. More are listed in the VarAC interface

Tag	Operation
Sending my data tags	
<NAME>	Send your name
<QTH>	Send your QTH
<LOC>	Send your Location
<RIG>	Send your RIG info
Request data tags	
<LHR>	Last heard peeking request – List of stations your partner recently spotted on this band
<FSR>	Frequency scheduler peeking - know where your partner parks along the day
<QSYU>	Invite your partner to QSY UP 750hz
<QSYD>	Invite your partner to QSY DOWN 750hz
<QSF>XXXXX</QSYF>	Free form QSO invitation Example: <QSF>14105000</QSYF>
<VER>	Ask for your partner VarAC version number
<INFO>	Ask for your partner info (Name, QTH, LOC...)
Trigger events	
<AWAY>	Triggers "send message" at your partners side
<SND>	Automatically click "enter" to queue a message
<DISC>	automatically disconnect upon message delivery (usually used in final QSO message)

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File transfer

VarAC supports sending binary files of any kind

- Images (PNG/JPG/GIF) are shown in the chat stream

- Files are compressed before being sent

- You can limit incoming files size.

Live Demo

Monitoring VarAC QSOs

- Install a secondary VARA modem for monitoring
- VarAC will automatically configure and launch it upon VarAC launch.

VarAC code of behavior

✗ Don't jam the Calling Frequency (CF). Don't hold it for more then a few minutes or more then necessary.

☑ Started a QSO on the CF? It's OK, but QSY as soon as possible. You have QSY UP/Down buttons or a free-form QSY button where you can select your desired QSY frequency.

✗ Don't use the PING feature for DXCC/Grid hunting. This will jam the CF, and besides, upcoming versions will limit the SNR exchange during PINGS so it will be useless for DXCC.

☑ Use PING only as tool to check propagation.

✗ Don't use 2300Hz BW on the VarAC CF or on any of the slots.

☑ Use Only 500Hz on VarAC CF and slots to avoid QRM-ing nearby VarAC QSOs. Use 2300Hz only outside of the slot frequencies.

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VarAC code of behavior – Cont.

✗ Don't QSY to a frequency without checking if it is free.

☑ VarAC provides you with Sniffers. Right-click on the QSY Up/Down buttons will temporarily QSY to the destination frequency (without keying your PTT) so you can listen before QSY-ing. Same goes for calling CQs: Use the CQ slot sniffer.

✗ Don't try to send large files over HF. And if the link is slow - don't send files at all. It will never end. And PLEASE don't send files over the CF.

☑ Send files up to 5-10K in high speed and no more than 1-2K in low speed and always on non CF frequencies.

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Additional useful features

- Frequency scheduler – Auto QSY based on pre-defined times

- Canned (predefined) messages with Quick access buttons

- Listening mode – Disable PTT

- Appearance customization (Font size and colors) including dark mode

- Block list

- Block incoming pings

- Set auto-away

- Showing distance and bearing

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Community support & online resources

Super active Facebook group

https://www.facebook.com/groups/varahf

- 3.3K members to date.

- Hundreds of new discussions per month

VarAC forum:

https://www.varac-hamradio.com/forum

- Feature request submission

- Roadmap

- Bug reports

- Updated user manuals by Pat ON2AD

- Recent Rig control file
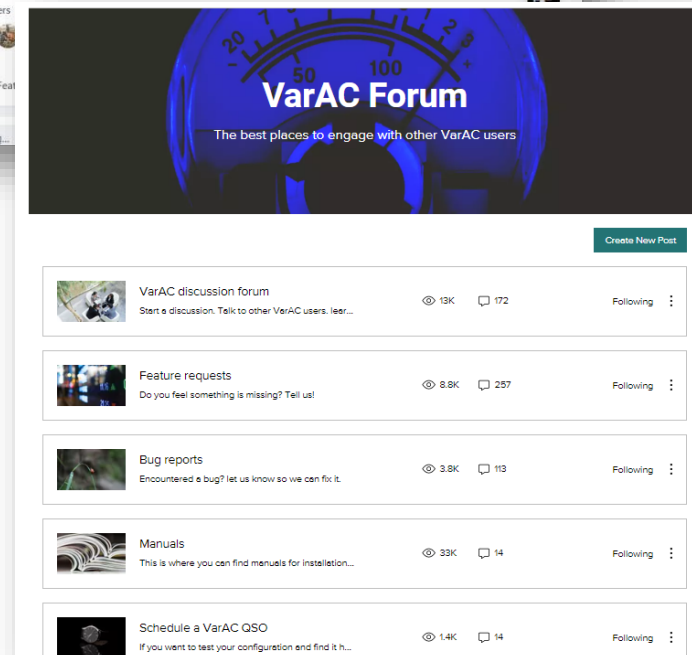
The VarAC Hall of Fame

NC3Z - Gary Mitchelson

Gary stepped forward when I started VarAC. He is investing his precious time in testing releases and advising on feature designs as well as supporting the VarAC community.

ON2AD - Pat Patrick De Wever

Pat masters the art of writing user manuals in 3 languages. Pat volunteered to do the hard work of documenting all VarAC features so you can have a smooth ride.

Our brave Beta Lab Team

The following brave hamradio operators have decided to risk their lives and rigs so you can have a safe VarAC experience.

Thank you guys for your continues support in this project!

DM7RO - Malte Röwekamp
HB9AVK - Paul King
GW4OZU - Peter Hyams
K1DOW - Russ Tower
LA5XTA - Erik Dahl
MW0RUH - Dave Thomas
M0SUY - Dimitrios Valaris
N8SDR - Rick Langford
PE1LUP - Marcel Tuerlings
SM7DUZ - Ingvar Eriksson
VA7RBP - Rick Paynter
W1IZZ - Lawrence Gray
W2JON - Jon Bruno
W3RED - Scott Redd

https://www.varac-hamradio.com/halloffame

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Thank you
Q&A

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