E-Mail With or Without the Internet

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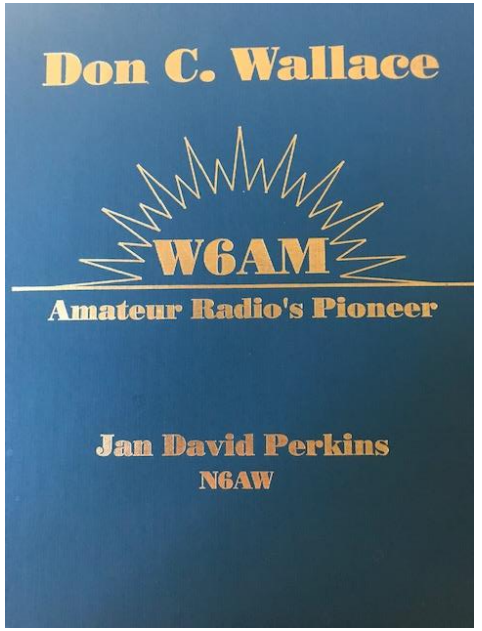
NOVEMBER 13, 2021

Would you like to have:

- E-mail with or without the internet with premade templates for ICS and other forms (NTS, Red Cross, USGS, etc.)?
- A dedicated point-to-point network for passing information?
- A system that is extendable by digipeaters or HF radio?
- A system that can be a permanent installation, mobile or portable?
- A station that can be built for very little money?
- A system that can be used by office staff because it looks like E-mail? (Under direct supervision of licensed Ham operator)
- A system that will function during a major disaster with no commercial power, telephone lines or internet?

History of Traffic Handling

- 1887 Spark Gap (Hand telegraphy) 40 KW was a smaller transmitter!
- 1913 Continuous Wave
- 1920-30s Hellschreiber, RTTY, ASCII
- 1973-76 Packet
- 1978 AMTOR (Mode A ARQ, Mode B FEC)
  - Error Correction
- 1991 PACTOR



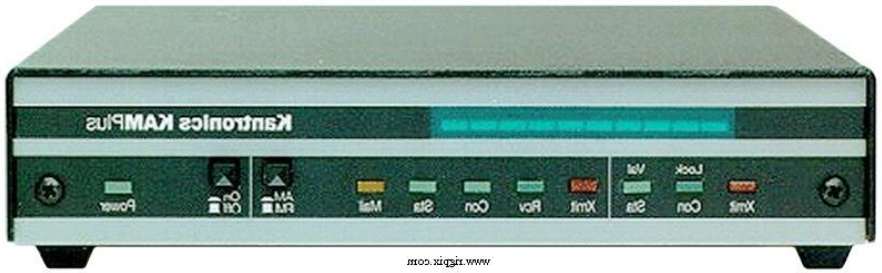
The HF-based E-mail system has existed in several forms for over 20 years!

- **Sail Mail**
  - Used by Yachts etc. on Marine HF (PART 80) and Amateur (PART 97) frequencies (PACTOR)
  - Relied on specialized TNC modems
  - E-mail, position reporting, maritime Wx and bulletins.
- **Air Mail**
  - Used by Amateur community as well as MARS and SHARES (Telnet, PACKET, PACTOR, then WINMOR)
  - Primarily TNC modems with some soundcard modems
  - Early Amateur success story
    - Hurricanes Katrina & Rita
    - US Army MARS (Operations Desert Shield & Desert Storm)
    - SHARES
    - NTSD
- **Winlink Express**
  - Incorporated Templates, active updates and improvements. (Telnet, PACKET, PACTOR, ARDOP (BPQ-32), VARA, WINMOR, Iridium)
  - Increased use of soundcard modems
  - No support of older TNC modems (pre-KISS mode)

TNC Modems


SÄNDAMATÖRS RADIOSAMBAND
Advanced Electronic Applications, Inc.
Model PK-232
THRESHOLD
DCD
TUNE
STATUS
MODE
RADIO 1
OFF


MFJ PACKET FACTOR CONTROLLER


Kantronics KAMPlus


SCS
PTC IIIBY

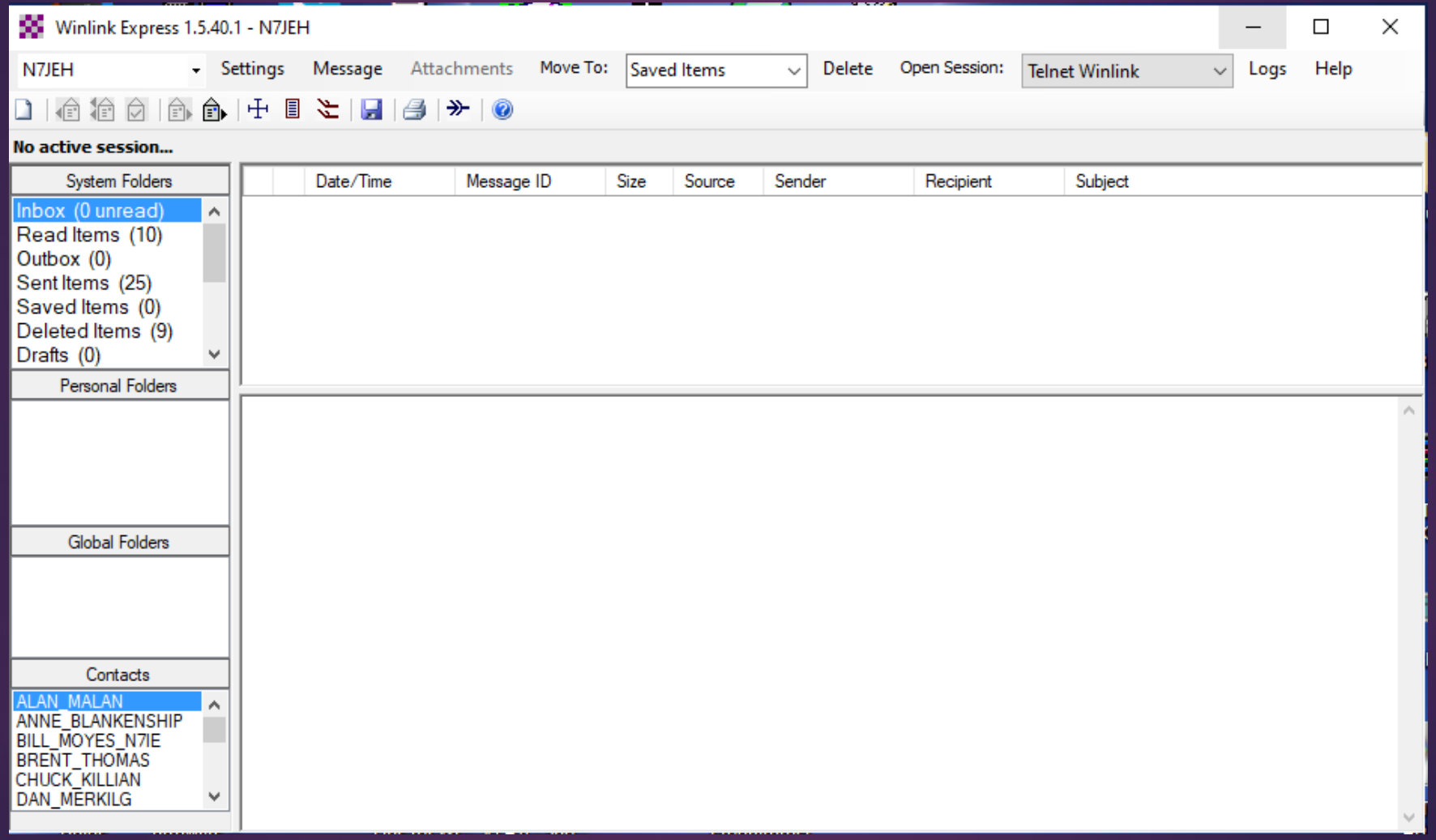
TNC vs Sound Card Modem Software

- Expense
- Upgradability
- Backward compatibility
- Portability
- New mode development and obsolescence
  - Anyone remember AMTOR, Clover ($1,000 modem) and other modes that have come and gone?

What's needed?

- Radio (mobile preferred but HT will work)
- Signal link computer/radio interface (~ $140)
- Computer
- Software (free except for high speed upgrade of VARA (~ $65 for lifetime license which covers both VARA FM and VARA HF)
  - Amateur Radio Safety Foundation (WINLINK) asks for a donation
- Antenna

Let's look at it!



A Caution

- Packet is a carrier sense, multiple access (CSMA) mode.
  - Multiple users can connect simultaneously.
- VARA is not. It is a frequency hog. **Listen, listen, listen** before initiating a VARA FM connection on a frequency shared with Packet.
- P2P VARA FM on a secondary frequency is less problematic.
- While VARA FM hogs a frequency, air time is less than Packet so there is a tradeoff.

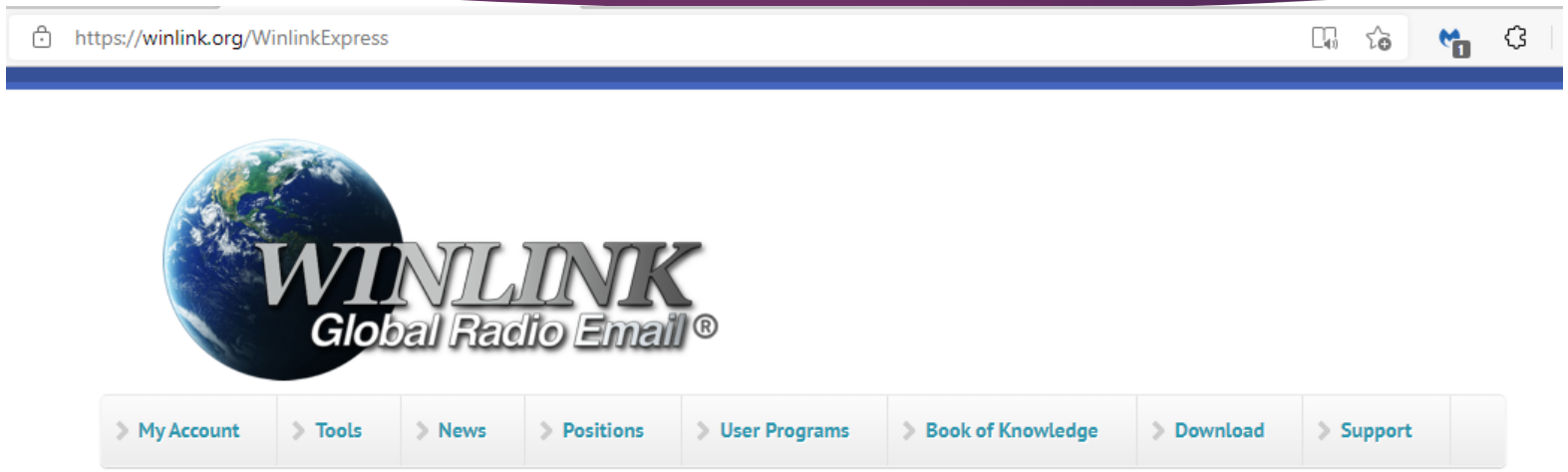
Where Could This Be of Value?

- Served Agency support exchanging information using standardized forms (ICS, Red Cross, State Agency, NTS etc.).
- Widespread disaster response where normal infrastructure is down. (P2P or HF operation).
- Special Events exchanging tabular information.
- Off-the-grid applications where commercial infrastructure is unavailable or expensive (Yachts at sea, remote cabin,

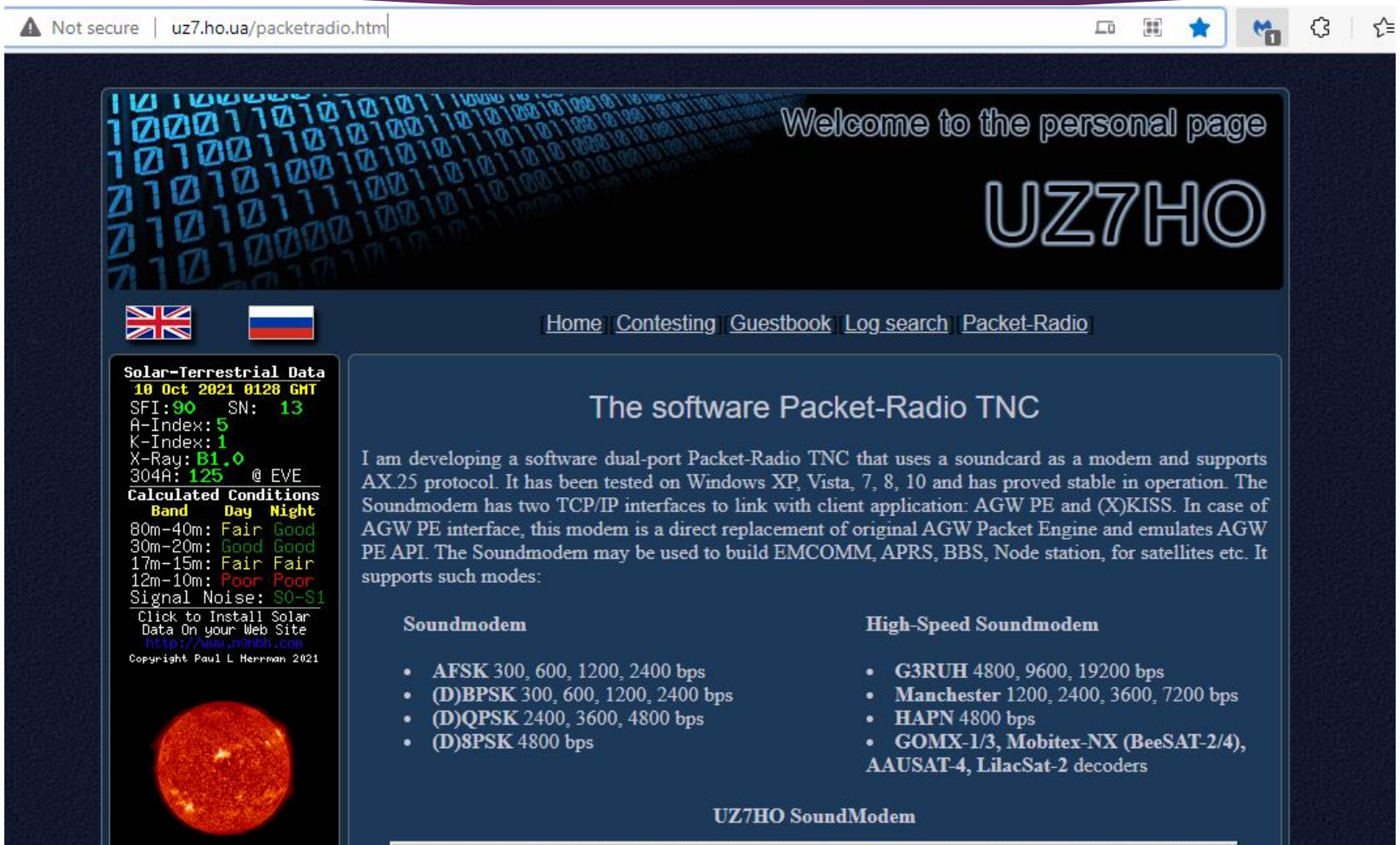
References

- **Winlink Express:**
  - Help file
  - Youtube, etc.
- **Sound Modem Packet Radio**
  - UZ7HO Personal page - Packet-Radio - English version
- **Vara FM / Vara HF**
- www.wavetaklers.com Los Angeles County (CA) ARES

Winlink Express



Soundmodem Packet Radio



Vara FM / Vara HF

https://www.winlink.org/content/vara_fm_version_401_released

WINLINK Global Radio Email®

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VARA FM Version 4.01 Released

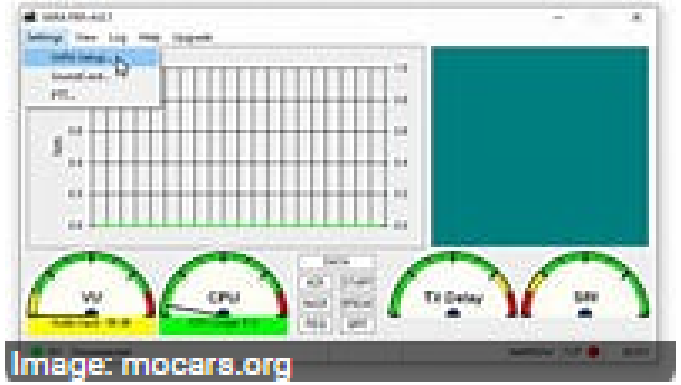
VARA FM v4.0.0
Speed Levels

	VARA FM WIDE				VARA FM NARROW			
Level	Symbol Rate	Carriers	Mod	Net Rate (bps)	Symbol Rate	Carriers	Mod	Net Rate (bps)
1	42	14	4PSK	566	42	14	4PSK	549
2	42	29	4PSK	1188	42	29	4PSK	1181
3	42	58	4PSK	2390	42	58	4PSK	2390
4	42	98	4PSK	4040	42	58	4PSK	3188
5	42	98	4PSK	5387	42	58	8QAM	4252
6	42	98	8QAM	7185	42	58	16QAM	5668
7	42	98	16QAM	9580	42	58	32QAM	7087
8	42	116	16QAM	11340	42	58	64QAM	8505
9	42	116	32QAM	14144	42	58	64QAM	9567
10	42	116	64QAM	16932	42	58	128QAM	11162
11	42	116	64QAM	19003	42	58	256QAM	12750
12	42	116	128QAM	22102				
13	42	116	256QAM	25210				

We are pleased to announce that Jose Alberto Nieto Pos EA5HVK has released VARA FM version 4.01 as of 1700UTC November 28, 2020. Highlights of this

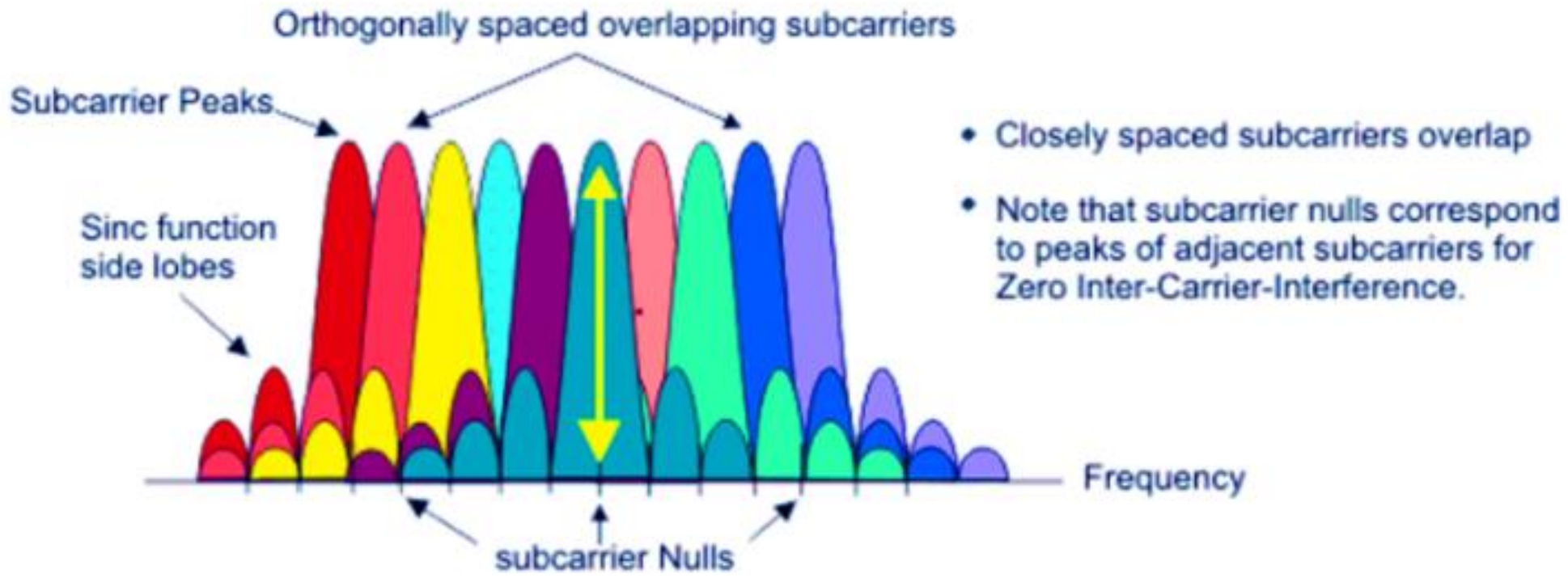
What is VARA?

VARA is a **software modem** using orthogonal frequency-division multiplexing (OFDM) modulation. VARA is capable of HF speeds comparable with Pactor 3. It does this using 52 carriers limited to 42 bps thus satisfying the FCC symbol rate requirements of 300 baud or less for any carrier.



VARA, a presentation by Tim, AD4CJ – WCARES
wcares.org/vara-a-presentation-by-tim-ad4cj/

VARA


Orthogonally spaced overlapping subcarriers
Subcarrier Peaks
Sinc function
side lobes
Frequency
subcarrier Nulls
• Closely spaced subcarriers overlap
• Note that subcarrier nulls correspond to peaks of adjacent subcarriers for Zero Inter-Carrier-Interference.

Gateways

- Gateways receive, store and re-transmit data
  - Vhf/Uhf PACKET/ARDOP/VARA
  - HF PACTOR/ARDOP/VARA/WINMOR
  - MESH
  - Internet
- Simple to build
  - Same process as building a station
- Like the PACKET NET-ROM and THE-NET systems of the past, they will find a path (self-healing)
- Closest Gateways
  - K7DAV (sheriff's office)
  - K2WWC West Valley
  - AC7II Paradise (down on Sundays)

What's Next?

- Build a station
  - Workshop / Elmering
  - www.wavetaklers.com Los Angeles County (CA) ARES
    - PowerPoint presentations
    - Zoom-based classes
    - Online help

- Build Gateways
  - Help fill the vhf/uhf coverage holes
  - Tie into DCARC MESH system
  - No more difficult than building a station
- Resources
  - Other DCARC Hams
  - YouTube and Google searches

Easy Questions?

- Careful, I'm not as smart as I look…