# Packet Radio

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# What is Packet Radio?

Packet radio is the connection of a computer to a radio for the transmission of digital data via amateur radio.

It is another mode of operation that has a multitude of uses, such as conferences, emergency communications, bulletin boards, and DX packet clusters.

Packet radio has been used by amateur radio operators since 1978, with much growth in the 1980s.

# What can you do with Packet Radio?

- Connect via RF to a DX Packet Cluster

- Connect to a BBS System

- Automatic Packet Reporting System (APRS)

- **Send and Receive Messages** ⬅

    * Virginia Digital Emergency Network

    * Winlink (Global Radio Email)

# What do you need for Packet Radio?

- VHF or UHF Radio

- Terminal Node Controller (TNC) or Sound Card

- Computer

- Software

*More about this in a few minutes…*

# How Packet Radio Works

- Wireless amateur radio messaging.

- Similar to internet email service.

- Working at 1200 or 9600 baud.

- Radio and TNC are the "modem".

- Bulletin Board Station (BBS) is the "server" that sends and receives messages.

# Call Signs and Packet BBS

Before sending packet traffic, you need to know the recipient's address.

You need to know:

Their callsign (*N4HOK, AK4PE, etc*)

The BBS they are using (*N4VEM, etc*)

Most of the time everyone will be using the same BBS station.

# Packet BBS Addresses

Addresses follow email format

callsign @ BBS callsign

Spaces before and after the @ sign.

Use small letters like an email address.

n4hok @ n4vem

kr4ma-1 is callsign for Earl Moore's BBS.

# Packet Radio Uses Commands

Must be in the command mode

Type Ctrl c to get cmd:

cmd:c bbs callsign

cmd:c n4vem

Space between c and callsign.

cmd: d does a hard disconnect.

# Packet BBS Commands

ENTER COMMAND: B,J,K,L,R,S, or Help >

B = bye to disconnect

J = Just Heard lists all stations the node heard

K = Kill or delete message

L = List all messages for you by callsign

R = Read messages for you by message number. R 1 (R space 1)

S = Send message, st or sp

# The Virginia Digital Emergency Network



*Thanks to:  Earl Moore, KR4MA; Tom Goyne, N4NSP, and Robert Strohmeyer, KO4FR*

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## Frequencies

VDEN uses several VHF and UHF amateur frequencies to interconnect Bulletin Board Stations (BBS), Personal BBS (PBBS) and various nodes that form the infrastructure of the statewide system.

- **145.730** MHz at **1200** baud as the primary user frequency

- **441.050** MHz at **9600** baud as a UHF 'high speed' backbone

- **446.075** MHz at **1200** baud as a 'low speed' backbone

- VDEN established on October 1, 1995

- Provide amateur radio-based digital communications for supported agencies during emergencies, exercises, and other public service events.

- VDEN is designed to route traffic to and from the Virginia Department of Emergency Management (VDEM) or the Virginia EOC (VAEOC) on behalf of supported EOC's and other agencies.

# Map of VDEN
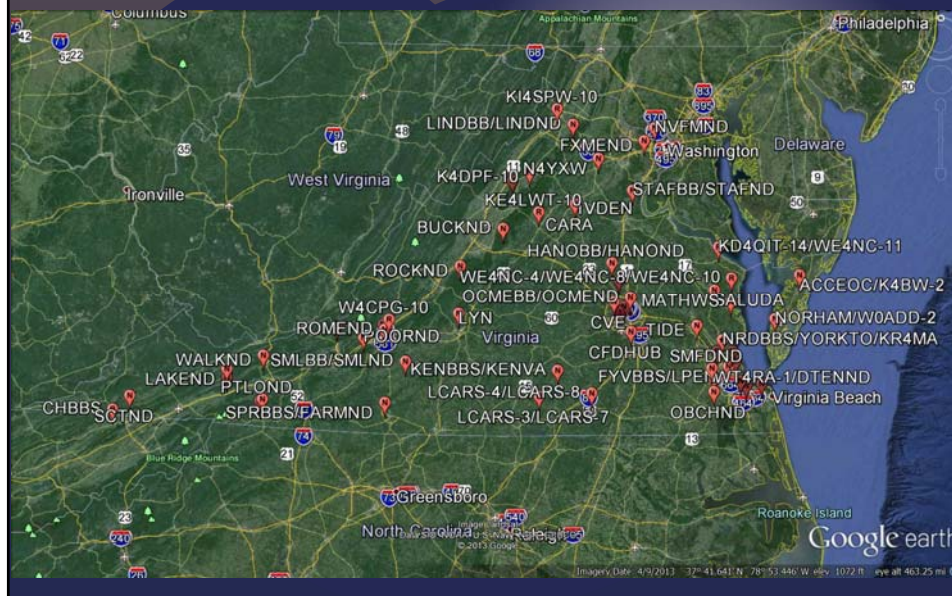
# VDEN in Central Virginia
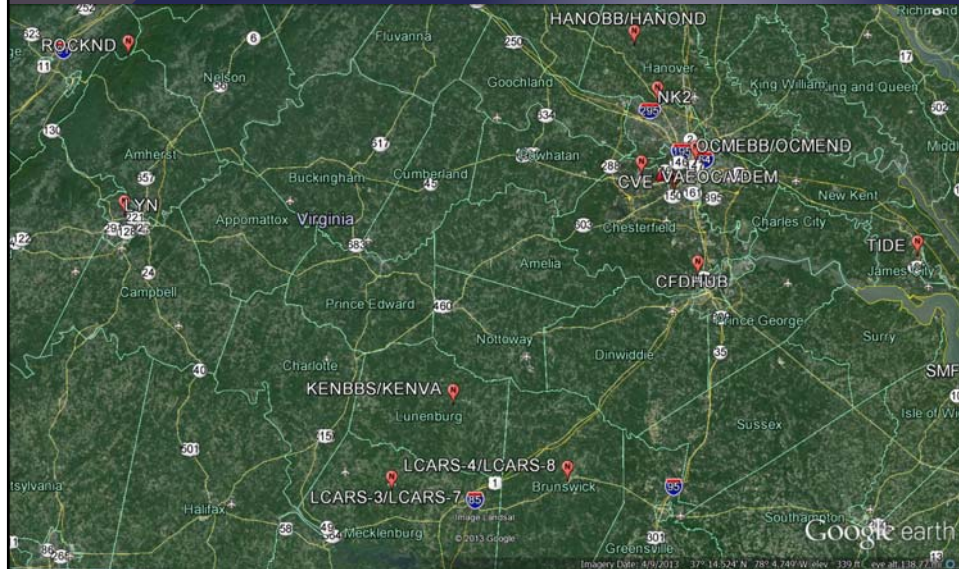


# How The VDEN System Works

- Local BBS systems route traffic throughout the state to and from local users.

- Nodes, at strategic locations, link BBS.

- BBS also provide node connections.

- 145.730 MHz is the user frequency.

- 441.050 is the high-speed backbone.

- Other high-speed links are used.

# Equipment needed for Packet Radio

- VHF or UHF Radio

- Terminal Node Controller (TNC) or Sound Card*

- Computer

- Software*

    - *Personal Preference*
    - *N4HOK uses TNC*

# Equipment needed for Packet Radio

VHF or UHF Radio

    Mobile Radio

    Base Radio

    HT/Portable

# Equipment needed for Packet Radio

Terminal Node Controller (TNC) or  Sound Card

- TNC's
    - Kantronics and MFJ are the most popular
    - Radio w/Built-in TNC (Kenwood, Alinco)

- Sound Cards
    - Internal Sound Card
    - SignaLink

# Equipment needed for Packet Radio

- Computer

- Software:
    - Basic Terminal Program (*Putty, HyperTerminal*)
    - WinPack (*Limited to WindowsXP and earlier*)
    - Outpost
    - Airmail
    - RMS Express
    - PacLink
    - Others

# Winlink

Global email via radio

Operates With or WITHOUT Internet

Uses a familiar interface

Standardized Forms are available

Winlink, also known as the Winlink 2000 Network, is a worldwide radio messaging system that mixes Internet technology and appropriate amateur radio radio frequency (RF) technologies. The system provides radio interconnection services including: email with attachments, position reporting, graphic and text weather bulletins, emergency relief communications, and message relay. The system is built and administered by volunteers without pecuniary interests.

The WL2K system uses three different client software programs

**Paclink** and **RMS-Express**, provided by the Winlink Development Team, and **AirMail** provided by KE6RK.

Additional software components aid in building networks capable of withstanding internet loss .

The WL2K network consists of a global set of mirrored **Central Message Servers** (CMS) which can be reached via Internet, local P**acket Gateways**, **HF WINMOR Gateways**, and **HF PacTor Gateways** throughout the country.
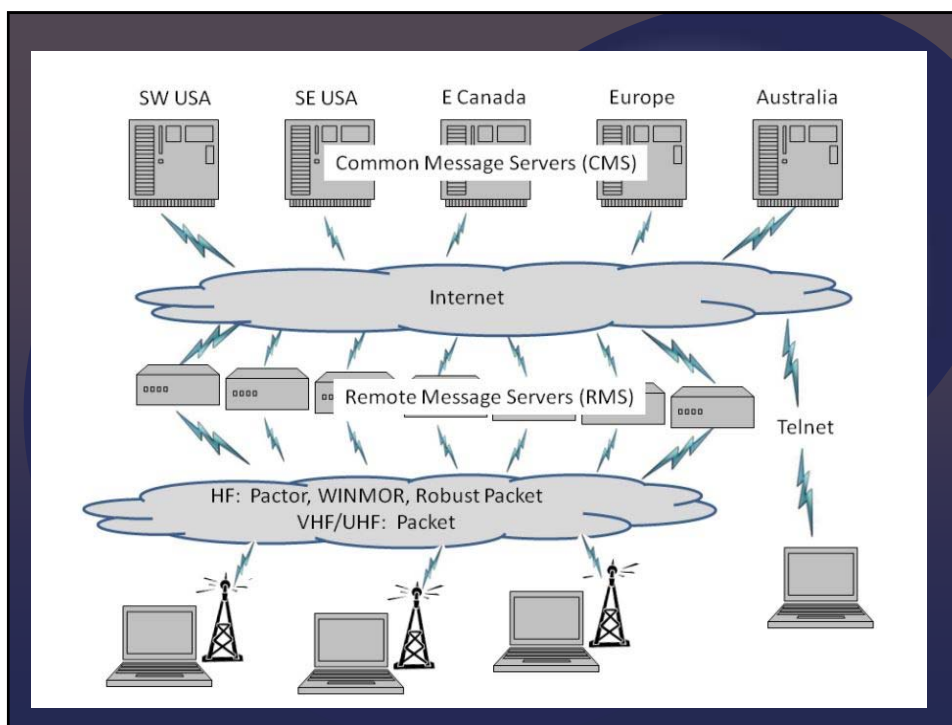
RMS Packet Gateways provide a packet radio link between client VHF/UHF stations and a telnet/Internet connection to the CMSs or an RMS-Relay module.

An RMS-Packet Gateway may be co-located at a **client station** or at a **separate secured site**, in order to provide AirMail, RMS-Express, and Paclink clients with access to the WL2K CMSs.

The **RMS-Relay** Module provides a means to continue client service in the local area during loss of Internet. The module is installed at an RMS-Packet Gateway site.

Clients connect via the RMS-Packet Gateway. RMS-Relay normally passes those connections through to the WL2K CMS via a telnet/Internet connection.

If the telnet/Internet connection from the RMS-Relay to the CMS fails, the RMS-Relay automatically reverts to a message server for all its known clients, i.e., it provides for fully automatic *Radio-email* service among all those clients connecting to it via packet.
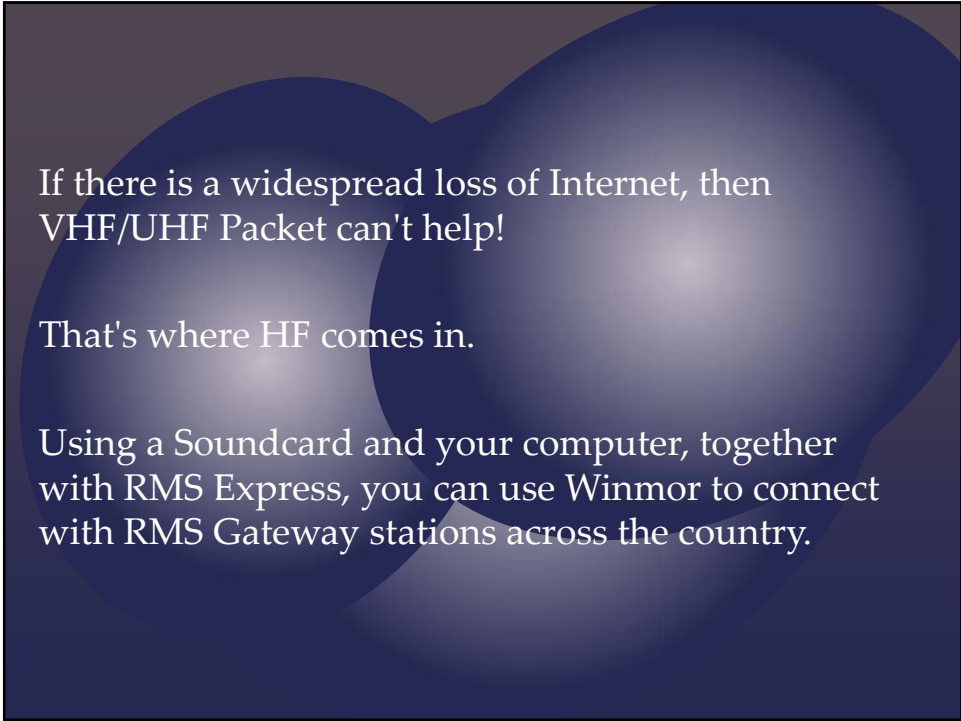
# Local Packet Gateways
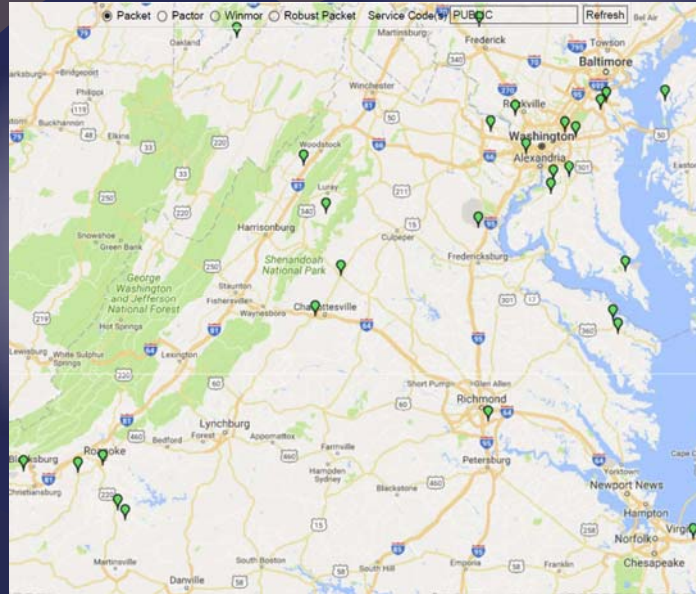


If you're not in direct range of a Packet Gateway, use the N4VEM-7 Node as an intermediary.

Example RMS Express script:

```
C N4VEM-7
CONN
!WAITFOR ?
C W4MEV-10
LINK
```
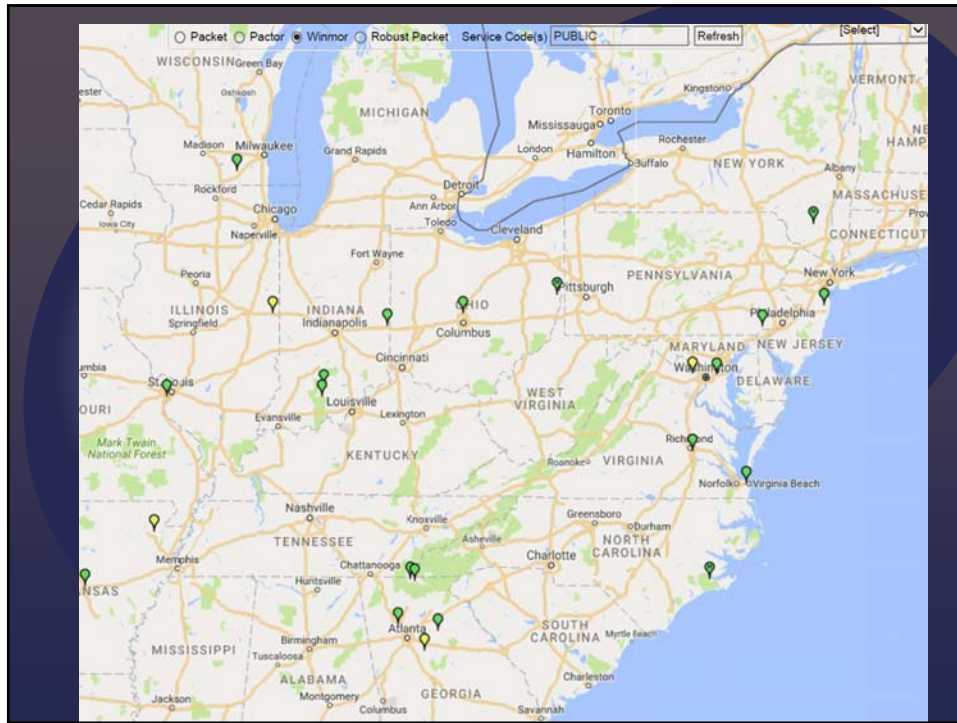
What if the entire State has no Internet?

If there is a widespread loss of Internet, then VHF/UHF Packet can't help!

That's where HF comes in.

Using a Soundcard and your computer, together with RMS Express, you can use Winmor to connect with RMS Gateway stations across the country.

# Additional Information

https://www.tapr.org/pr_intro.html

http://www.vden.org/

http://www.soundcardpacket.org/

http://www.winlink.org/

http://siriuscyber.net/airmail/

http://outpostpm.org/

Demonstration



Questions

*Thanks to: Terry Crabb, AK4PE (sk), Greg Butler, KW6GB, Anthony Harbour, KG4YXP; Earl Moore, KR4MA; Tom Goyne, N4NSP; and Robert Strohmeyer, KO4FR*