TAPR Forum

Dayton Hamvention 2010

The *Winlink 2000* Network and it RF Portals

by

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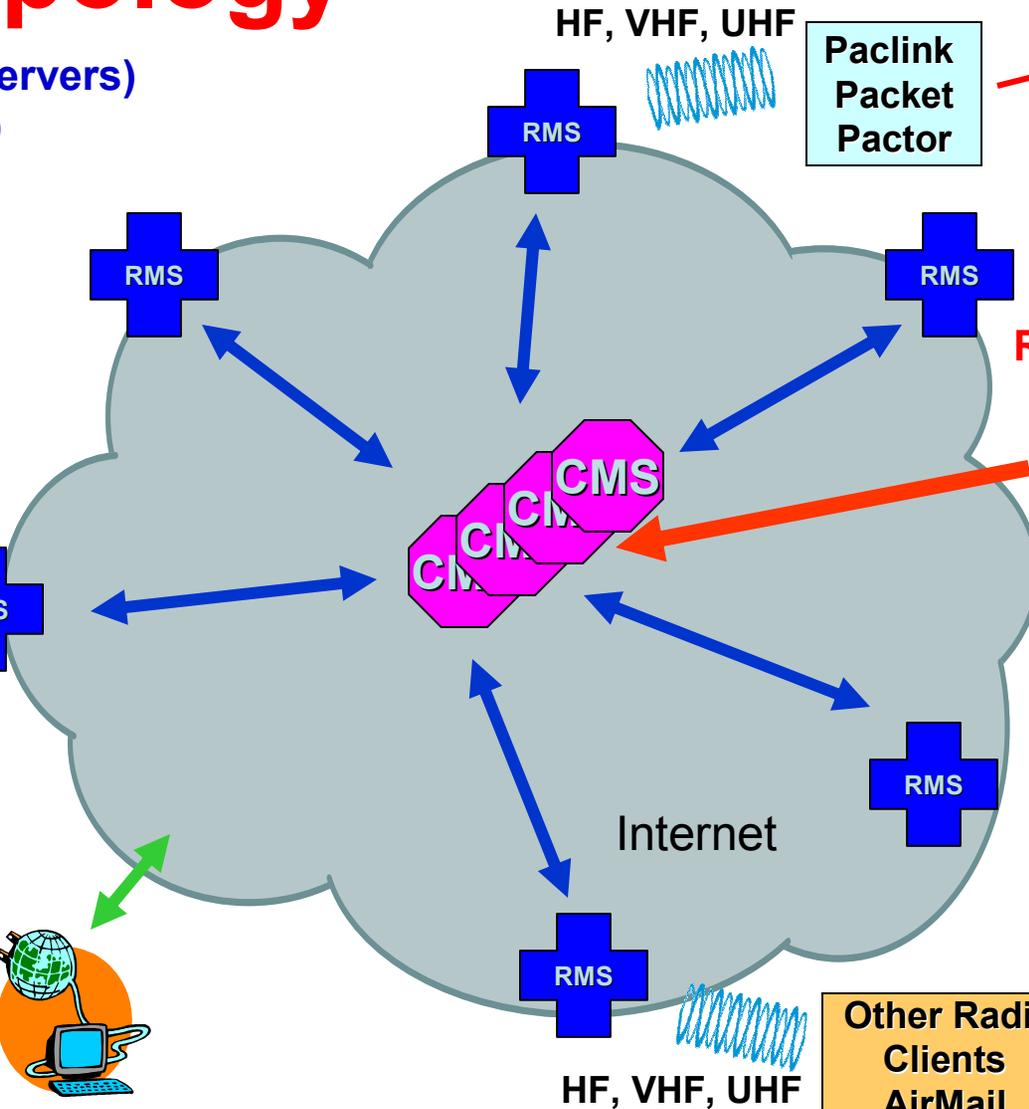
WL2K Network Topology

WINLINK 2000
Global Radio Email System ON AIR

(Radio Message Servers)
- HF Pactor (1,2,3)
- VHF/UHF Packet
- D-Star
- RMS Relay
- HF WINMOR
- APRSLink

HF, VHF, UHF

Paclink
Packet
Pactor
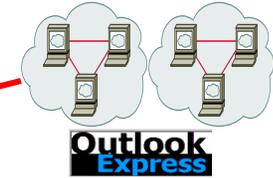
Outlook Express

RMS

RMS

RMS

CMS

Redundant, Hardened
CMS Servers
(no radios)
Secure locations
Backup Power
Commercial Servers
& Routers
3 Continents

HF, VHF, UHF

RMS

RMS Express
Pactor
Packet
WINMOR

RMS

Internet

RMS

Any ONE CMS
can run the
WL2K system!

WL2K Telnet
& WebMail

HF, VHF, UHF

Other Radio
Clients
AirMail,
BPQ32 etc

WL2K Network Current Portals

Radio Ports:

HF Pactor (1, 2, 3)   47 Public, 19 EMCOMM, 43 MARS

HF WINMOR 16 Public, 21 MARS   Need Sysop Volunteers!

VHF/UHF Packet 271 Public, 232 EMCOMM, 32 MARS

Internet Portals:
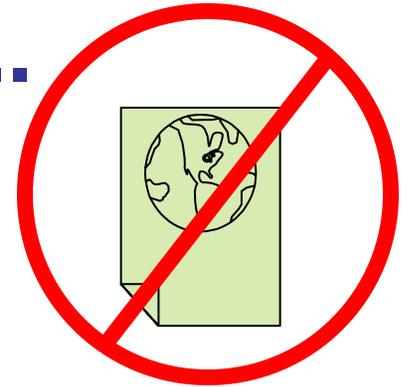
Telnet (4 Telnet servers)

SMTP Mail (4 Mail servers)

Winlink WEB server   as of 5/11/2010

Real time status: http://www.winlink.org/SystemTraffic

But what if the Internet fails?...

Experience has shown most internet outage is local…
a few miles to a few hundred miles

CMSs have global redundancy (3 continents)

HF spans a wide range …up to thousands of miles:
Connect to a WL2K HF portal station that *HAS* internet connectivity.
(Range & Throughput enhanced near the MUF).

VHF/UHF Packet (Limited Range….)
RMS Relay provides local store and forward capability:
Buffers and distributes messages to local users.
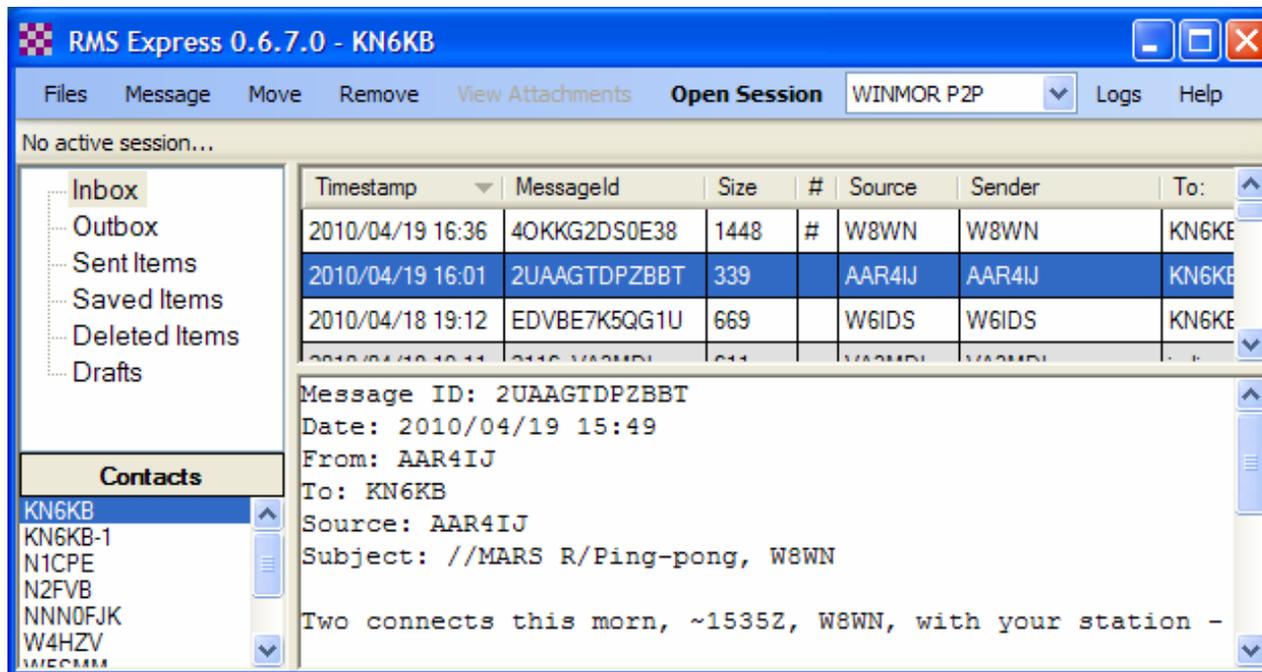Holds messages to internet recipients until internet connectivity
is restored.
Can forward over HF (Pactor 3) in emergencies.

RMS Express
New User WL2K Radio Client

- **Simplified Setup: Integral message editor**
- **Support for multiple call signs or Tactical Addresses**
- **Packet, Pactor, WINMOR and Telnet Portals**
- **Permits peer-to-peer connections via WINMOR**

RMS Express
Originally designed
for Early WINMOR testing

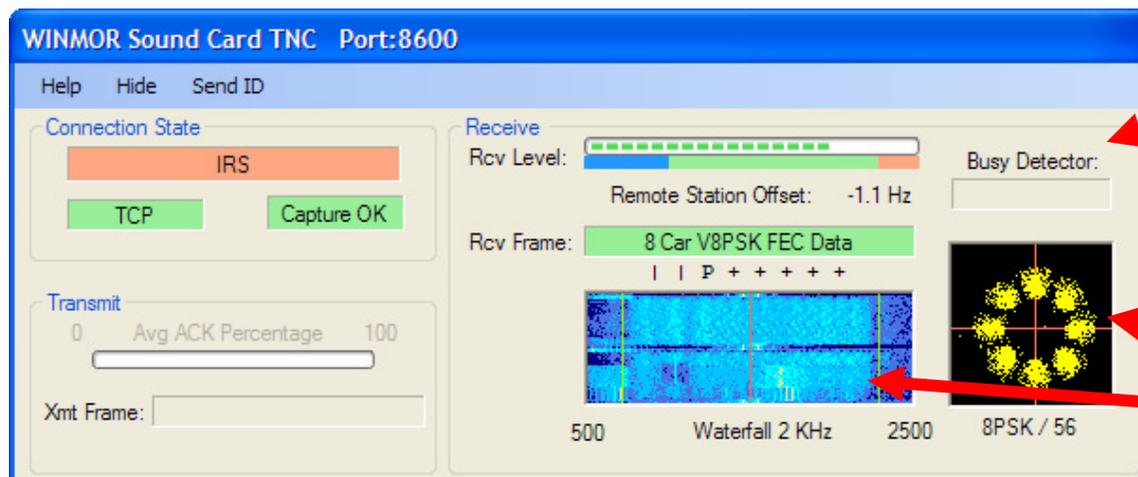**Available at:**
www.arsfi.org/winlink.aspx

WINMOR
New HF Sound card Protocol

WINMOR = **WIN**link **M**essage **O**ver **R**adio

- Introduced Sept 2008, at TAPR/ARRL DCC Chicago.
- Began Radio Beta Testing September 2009.
- Provides error free (ARQ + strong FEC) binary transmission over HF
    using WL2K's B2 compressed binary protocol (FBB extension)
    Both WL2K and peer-to-peer message forwarding.
- Over 2500 current users (Yahoo WINMOR forums)

Effective Channel Busy Detector for reduced QRM!

Constellation and Waterfall displays

The WINMOR "Virtual TNC" (can be integrated to other applications)

WINMOR Requirements…

- **Dedicated Sound card with isolated radio interface**
  (Windows Sound card NOT recommended)

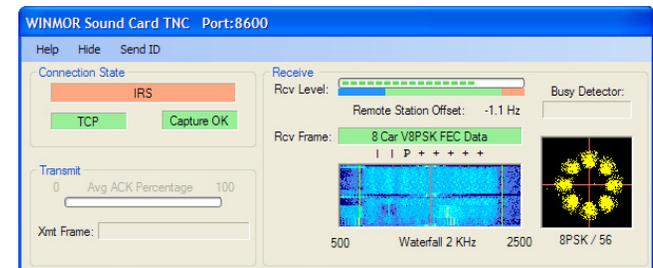- **Windows XP, Vista or Win 7 with MS.NET 3.5**

- **Program which uses the WINMOR Virtual TNC:**
  - *RMS Express*
  - BPQ32 (John Wiseman) Can be integrated with AirMail
  - SNOS
  - Other applications in process

- **WINMOR uses automatic mode selection (4FSK, 4PSK, 8PSK, 16PSK)**
  based on channel conditions.

- **HF Performance approaches Pactor 2 (500 Hz WINMOR) and**
  About 60% of Pactor 3 (1600 Hz WINMOR)
  See a Demo at the TAPR Booth!

WINMOR Technical…

- Rapid auto tune and track (+/- 200 Hz)
- Timing compatible with SDR
- True ARQ (error free binary transmission after automatic correction)
- Advanced FEC coding:
    - Selective ARQ (repeat only failed carriers)
    - Viterbi Trellis Code Modulation (4PSK, 8PSK, 16PSK modes)
    - 2 level Reed-Solomon Block Encoding outer layer FEC
    - Memory ARQ ("analog" frame averaging)
    - NVIS optimized mode (4FSK)
    -
    Automatic heuristic mode shifting based on path quality:
    - 4FSK, 4PSK, 8PSK, 16PSK
    - 5:1 speed range (500 Hz mode)
    - 20:1 speed range (1600 Hz mode)
- Good maximum throughput:
    - 9850 Bytes/min (3285 Words/min* 1600 Hz mode)
    - 2460 Bytes/min (820 Words/min* 500 Hz Mode)

* after 2:1 text compression

WL2K: Future Directions…

- *RMS Express* released… Some enhancements/features planned

- Port WINMOR TNC to *Paclink* (full feature radio client)

- Expand number of RMS WINMOR servers   **Need Sysop Volunteers!**

- Future VHF/UHF sound card protocols?

Thank you!

Questions?

WINMOR
New HF ARQ Sound card mode…

Optimized for Messages with attachments
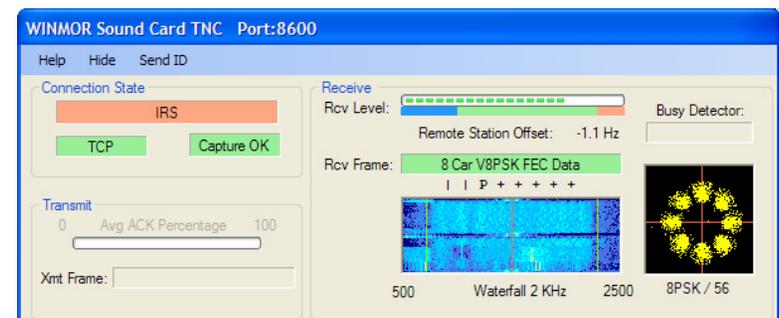
Can connect to Winlink RMS Servers or Peer-to-Peer

Lower cost alternative to Pactor

> **- better speed and robustness than Pactor 1**

> **- alternative to P2 or P3**

> **- 500Hz and 1600 Hz bandwidth modes**

WINMOR Virtual TNC Available

Software and info available at:
www.arsfi.org/winlink.aspx

WINMOR
New HF ARQ Sound card mode…

Optimized for Messages with attachments

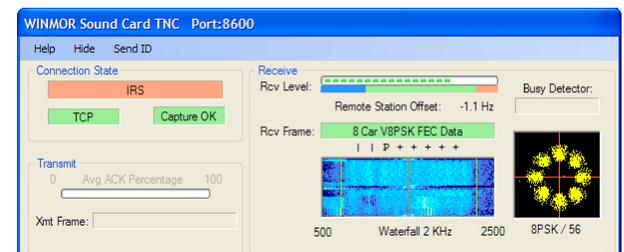**Can connect to Winlink RMS Servers or Peer-to-Peer**

Lower cost alternative to Pactor

     - better speed and robustness than Pactor 1

     - alternative to P2 or P3

     - 500Hz and 1600 Hz bandwidth modes

21 MARS RMS WINMOR Servers Now Operational!

Software and info available at:
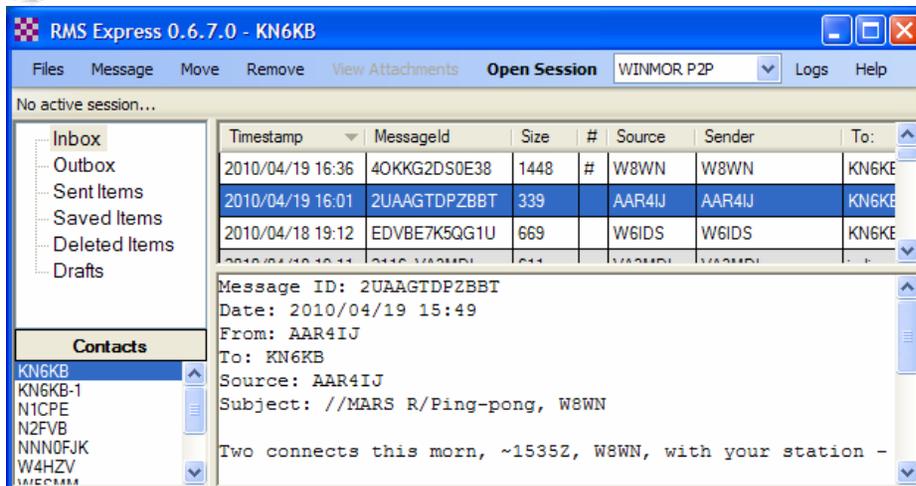http://tech.groups.yahoo.com/group/MARS_Winlink

WINMOR DEMO

New RMS Express Radio Client for Windows

Packet, Pactor, WINMOR and Telnet support

Radio Control, Propagation prediction

Peer-to-Peer Audio Link Demo

Software and info available at:
www.arsfi.org/winlink.aspx