



Digital Modes for Emergency Communications

South Pasadena Amateur Radio Club

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SPARC's Goals

- ▶ Operators have necessary equipment, knowledge and experience to send digital traffic when needed in emergency situations
- ▶ Focus on Winlink
- ▶ Work one-on-one with operators who want to set up digital stations
- ▶ Provide regular exercises so all operators can develop and practice their skills



What Do We Mean by Digital Modes?

- ▶ Transmission of digital information between computers via amateur radio
 - ▶ Not considering Digital Voice modes such as DMR, System Fusion or D-Star
- ▶ A modem is used to convert digital information to an audio signal that can be transmitted via radio
 - ▶ The modem can be implemented in hardware or software
- ▶ Listen to various digital modes
 - ▶ http://www.hfradio.org.uk/html/digital_modes.html



Digital Mode Advantages

- ▶ High speed
- ▶ Low bandwidth
- ▶ Weak signal
- ▶ Low power
- ▶ Error correction
- ▶ Accurate relays
- ▶ Automatic store and forward



Examples of Digital Modes

- ▶ Packet
- ▶ VARA
- ▶ Winmor
- ▶ Pactor



Minimum Equipment for Digital Modes

- ▶ Radio
 - ▶ Handheld, mobile or base station
- ▶ Computer
 - ▶ Desktop or laptop
 - ▶ Software
- ▶ Signalink USB Soundcard
 - ▶ Single connection to computer
 - ▶ Does not utilize computer's sound card
 - ▶ Handles PTT switching



Computer Programs for Emergency Communications

- ▶ Winlink
 - ▶ Email via radio
- ▶ Narrow Band Emergency Messaging System (NBEMS) - fldigi
 - ▶ MT63
 - ▶ 8PSK
 - ▶ RTTY
 - ▶ CW
 - ▶ Many others



Winlink

- ▶ Computer application for sending email via radio
 - ▶ A valid amateur radio license is required to obtain a Winlink email account
- ▶ Built-in forms
 - ▶ ICS, ARRL
 - ▶ Custom
- ▶ Attachments
 - ▶ Text files (e.g., Excel CSV files)
 - ▶ Binary files (e.g., images)



Winlink Session Types

- ▶ To send or receive an email message, Winlink provides many “Session” types
 - ▶ Telnet
 - ▶ Via internet, no radio required
 - ▶ Packet
 - ▶ VARA
 - ▶ Pactor
 - ▶ Winmor



Gateway & Peer-to-Peer

- ▶ Messages can be exchanged either through a gateway or via a direct peer-to-peer connection
- ▶ A gateway is a station connected to one or more Common Mail Servers (CMS) in the “cloud”
 - ▶ The CMS servers allow messages to be exchanged via the internet to or from any email address
 - ▶ If the CMS servers cannot be reached, the gateway station can hold messages until they are picked up by the intended recipient
- ▶ Peer-to-peer exchange allows radio-to-radio communication with no internet connection



Software (as of 10/2/2019)

- ▶ Winlink - version 1.5.23.0
 - ▶ [https://downloads.winlink.org/User Programs/](https://downloads.winlink.org/User%20Programs/)
- ▶ Soundmodem - version 1.00b
 - ▶ <http://uz7.ho.ua/packetradio.htm>
- ▶ VARA FM - version 1.2.8
 - ▶ <https://rosmodem.wordpress.com/>
- ▶ VARA HF - version 3.0.3
 - ▶ <https://rosmodem.wordpress.com/>

