

Digital EmComm with NBEMS



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Agenda

- This Month – Very brief overview of NBEMS
 - Why digital for EmComm
 - Reminder of available digital modes
 - Why we are looking at NBEMS mode in particular
 - Give some sources for personal study/consideration, maybe post sources on www.stlares.com website
- Next month – More detailed discussion of NBEMS
 - Outside speaker who is well-versed in technical aspects of NBEMS – please save all tough questions for him 😊
 - Demonstration of operation

Why Digital EmComm?

Why Digital EmComm?

- Think back to your last public service event, drill, or deployment.
- You probably passed a lot of traffic best suited for voice communications but...
- What if you had been asked to pass:
 - Roster of evacuees
 - Required prescription medications
 - Directions to a disaster scene

Why Digital EmComm? (cont'd)

- The needs of our served agencies are changing.
- They still need voice communications but there's an apparent and increasing need for data communications.
- Begs the basic question of why are we involved in ARES (or any other EmComm group) in the first place.
- The answer is to meet the needs of the served agency, whatever those needs are, and that may indeed be more than just voice communications for command functions.

To Meet Changing Needs of Served Agencies, Various Digital Modes Are Available

Historically more familiar include:

- Packet (we use sparingly at the moment)
- PSK31
- RTTY
- Pactor, Amtor, etc., etc.

Relatively new and less familiar:

- NBEMS (Western PA ARES group, others (ME and VA, probably others now using)

NBEMS Comparison to Traditional Phone and to Other Digital EmComm

NBEMS

• Pros

- Useful for VHF/UHF and HF
- Narrow bandwidth
- Fast transfer speed – reduced air time
- Less susceptible to noise
- Software for all platforms
- Error checking
- Easy to learn
- Built-in ICS and ARRL radiogram forms
- Shared frequencies for voice and digital on VHF

- Spreadsheets
- Pictures/images (but not as good as SSTV)
- Unattended message capture (files auto saved with time and date stamp)
- Printable forms in std. formats (ICS and ARRL)

• Cons

- Computer needed (could be a field consideration)

Flmsg - Screenshot

The screenshot displays the FLMSG: 1.1.1AG application window. The title bar shows the application name and standard window controls. The menu bar includes File, Template, Config, and Help. The filename is set to default.m2s. Below the menu bar, there are tabs for ICS, Radiogram, Generic, Blank, and DnD. The 'Message' and 'Records' tabs are visible. The main form area contains several input fields and controls:

- SVC**: A checkbox.
- *NR**: A text input field.
- *PREC**: A dropdown menu currently showing 'ROUTINE'.
- HX**: A text input field.
- *STN ORIG**: A text input field.
- CK**: A text input field.
- PLACE OF ORIG**: A text input field.
- TIME FILED**: A text input field with a browse button (...).
- *MON DY**: A text input field with a browse button (...).
- *TO**: A large text area for recipient information.
- TEL:**: A text input field for telephone number.
- OP NOTE:**: A text input field for operator notes.
- TXT:**: A large text area for additional text.
- SIG:**: A text input field for signature.
- OP NOTE:**: A text input field for operator notes at the bottom.

Buttons for 'hx', 'ck', and 'ARL MSG' are also present. The 'ARL MSG' button is located at the bottom right of the main form area.

What Is NBEMS?

- **N**arrow **B**and **E**mergency **M**essaging **S**ystem
- Consists of four basic programs:
 1. Fldigi – Fast Light Digital (i.e. modem software)
 2. Flarq – Fast Light Automatic Repeat Request (i.e. file transfer software)
 3. Flwrap – Fast Light “Wrap” - allows embedding a checksum in a file (i.e. error detection software)
 4. Flmsg – Fast Light Message - easily send ICS forms and Radiogram (i.e. messaging software)
- Can download all four programs from <http://www.w1hkj.com/>
- Runs on Windows, Linux, Mac, and others.
- Released under GNU Public License, so completely FREE.
- Other new associated programs include Flrig, Fllog, and Flwkey

NBEMS Philosophy

- Keep it cheap.
- Keep it simple.
- Use open-source software; i.e. users have access to code and may modify the software.
- Doesn't depend on digital infrastructure.
- Make it fun to use between drills and disasters.
- Any computer, any radio.

How FLDIGI Works

- Fldigi uses your computer's sound card to generate and decode digital signals.
- All work is done by your computer, don't need an external Terminal Node Controller (TNC).
- Audio from your computer speakers go into your radio's mic input for transmission.
- Audio from your radio goes into your computer's mic or line-in for decoding.
- Don't need an extremely powerful new computer, older machines work just fine.

NBEMS Interfacing with Computer

Two basic ways to interface with computer.

- Hardwire interface: Rigblaster or Signalink
- Acoustic interface: Hold radio mic up to computer speaker and hold radio speaker up to computer mic!
 - In an emergency, then, don't really need hardwired interface.
 - Means that hams can participate who do not have a soundcard interface.
 - Disable all DSP "enhancement" programs on mic.
 - MT63 for VHF/UHF FM work is sufficiently robust to deal with background noise, even in a noisy EOC or field site.

Typical RIGblaster Nomic Setup

Typical **RIGblaster nomic** station hookup diagram.

Note: This is only a sample station hookup diagram! What might be used for portable operation with a RIGblaster nomic.
A desktop computer would have similar connections with different labels*.

PTT CONTROL: Supplied DB9M to DB9F serial cable connected between the RIGblaster's serial jack and computer's com/serial port. (software **MUST** be configured properly)

RECEIVE AUDIO: Supplied 3.5mm, 1/8" stereo phone plug patch cord from radio's speaker or fixed level output to computer's mic* input.



TRANSMIT AUDIO: Supplied 3.5 mm, 1/8" stereo phone plug patch cord from computer's headphone* output to RIGblaster's audio in.

MICROPHONE TRANSMIT AUDIO & PTT: Mic. cable supplied with RIGblaster connects to radio's mic. input.



* For desktop computers use the computer's line input in place of the mic. input and use the line output in place of the headphone output.

COMPUTER AUDIO MONITOR: Connect computer headphones or amplified computer speakers.

Signalink USB



Two Basic Modes for NBEMS

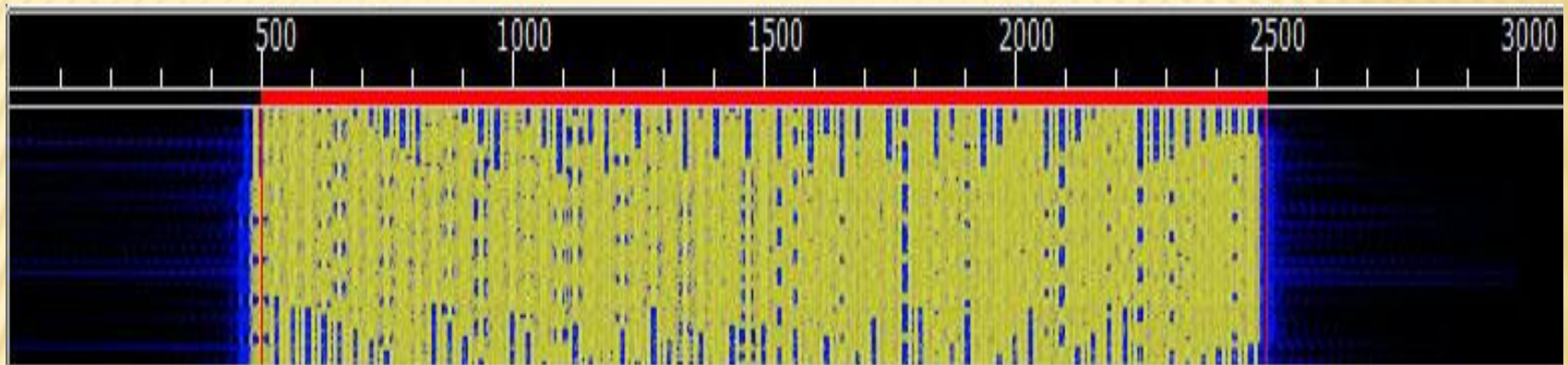
- MT63 (500 Hz, 1000 Hz, or 2000 Hz bandwidth) for VHF/UHF
- Olivia for HF

VHF/UHF Mode

- MT63-2000 great choice for FM EmComm
- Fast – less than 2 min to send 2kb text file
- Data redundancy in time and in frequency
- Used by MARS.
- Very resistant to noise – can lose up to 25% of signal and still copy.
- Works well with holding mike up to speaker
- QST by WA1LOU – January 2000, p. 88
- See instructional video at <http://www.youtube.com/watch?v=SWZ2vKWSiIE>

MT63-2000 Waterfall

Screenshot of MT63 Signal in Waterfall



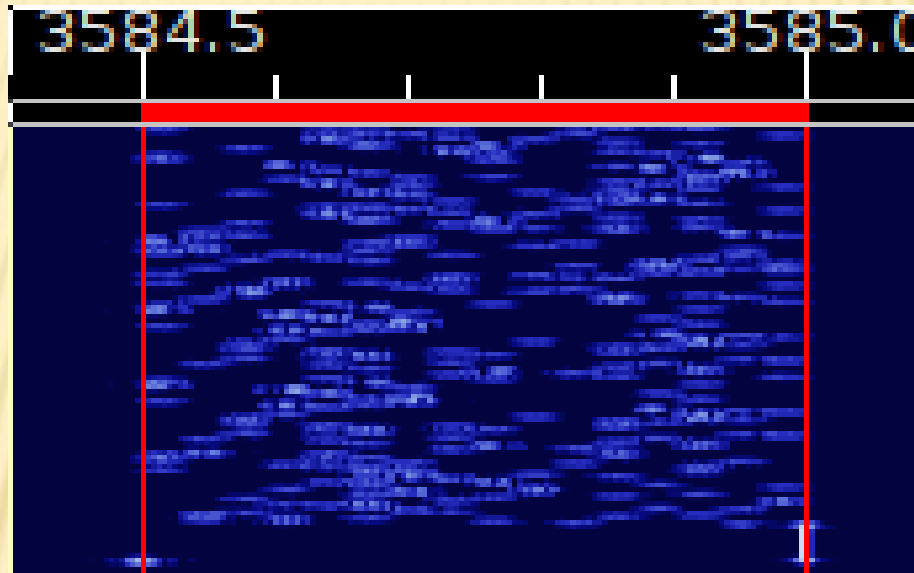
- 64 tones sent at same time
- Signal width is 2000 Hz
- Offset frequency is always fixed at 1500 Hz
- Fixed low frequency eliminates tuning errors
- Sounds like a giant buzzsaw

HF Mode

- Preferred HF mode is Olivia.
- Olivia is great for poor HF conditions.
- Will get through when other modes won't.
- Can make contacts below noise floor!
- Does not require precise tuning.
- Use 8/500 setting when possible – 8 tones in a 500 Hz bandwidth.
- When conditions are poor, go to 16/500 – 16 tones in a 500 Hz bandwidth.
- 16/500 is slower, but will get through.
- Article in Dec 2008 QST by WB8ROL on Olivia.

Olivia Waterfall

Screenshot of Olivia 16/500 signal in waterfall



Unmistakable sound...like a flute!

HF Tips

A few things to remember for HF operation:

- Always use upper sideband (USB), even on 40M and 80M
- Don't overdrive your audio
- Disable speech compressor, noise blanker, and all other audio processing
- Adjust mike gain so that ALC just moves a little
- Digital modes are 100% duty cycle like CW or RTTY so...
- 50 watts is plenty! Don't need high power for digital modes anyway
- RF kills touch pads...use an external mouse!

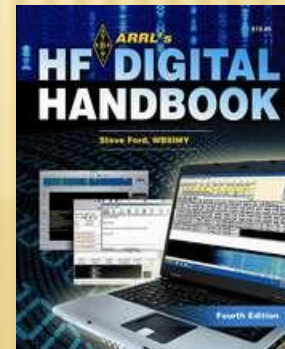
Next Steps

Our strength is the ability to turn fun amateur activities into powerful EmComm tools – NBEMS appears to be interesting to work with – So, next steps for us:

- Download NBEMS files and see what they look like, get a feel for them
- Review resource material between now and next month's meeting so as to ask pertinent questions and to expedite the learning

Resources

- paNBEMS <http://panbems.org>, organized by Dave Kleber KB3FXI and Ed Brenneiser WA3WSJ
- General Yahoo group, too – currently 954 members
<http://groups.yahoo.com/group/paNBEMS/>
- ARRL's *HF Digital Handbook*, pp. 10-5 thru 10-10



Resources (cont'd)

Internet

- W1HJK (author of fldgi) <http://www.w1hkj.com/>
- MT63 page <http://www.qsl.net/zl1bpu/MT63/MT63.htm>
- MT63 Wikipedia page <http://en.wikipedia.org/wiki/MT63>
- WPA Section Digital Emcomm Standards <http://www.wpaares.org/ecom.html>
- NBEMS slide sets for basic and advanced training
<http://www.arrl.org/nbems>

Magazine articles

- October 2010 CQ - NBEMS
- August 2009 QST - NBEMS
- June 2010 QST - NBEMS
- January 2000 QST - MT63
- December 2008 QST - Olivia