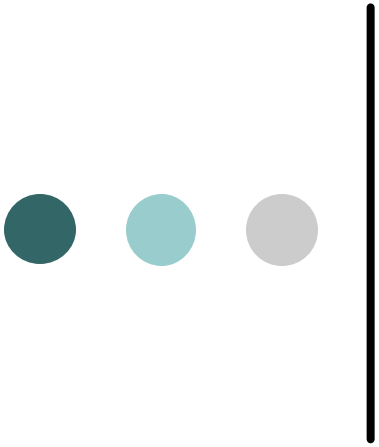


NBEMS

Narrow Band Emergency Messaging System

------ Utilizing Sound Card Technology ------

What is NBEMS?

- Narrow Band Emergency Messaging System

- (NBEMS) is an Open Source software suite that allows amateur radio operators to reliably send and receive data using nearly any computer (Windows, Mac, and Linux) and any analog radio without requiring a dedicated digital infrastructure or specialized modem hardware.

- NBEMS works on both VHF/UHF FM and on HF.

NBEMS – Where is It Used?

- ARES/RACES Emcomm
- MARS
- SKYWARN
- FUN!

NBEMS – Programs?

- FLDIGI
- FLMSG
- FLWRAP
- Etc.

FLDIGI

- **Fast Light Digital Modem Application**
- **is a cross-platform modem program that supports most of the digital modes used on the amateur radio bands.**

NBEMS Modes

- CW
- Contestia +
- DominoEX +
- Hell +
- MFSK +
- **MT63 +**
- **Olivia +**
- PSK +
- QPSK +
- PSKR +
- RTTY +
- Thor +
- Throb +

Where Do I Get NBEMS Software?

Software By W1HKJ & Associates

- http://www.w1hkj.com/
- http://www.w1hkj.com/download.html

It's FREE!

What is paNBEMS?

- paNBEMS Working Group is for those interested in the NBEMS (Narrow Band Emergency Messaging System), which includes the latest versions of FLDIGI and FLMSG.
- The purpose of the group is to help elmer those interested in NBEMS for both Emergency Communications and plain old fun on the air.

paNBEMS Emcomm Modes

- MT63-1000 (HF)
- MT63-2000 (VHF/UHF)
- Olivia 8/500 (HF)
- Olivia 16/500 (HF)

paNBEMS Links

- http://groups.yahoo.com/group/paNBEMS/
- http://panbems.org/
- http://berkscountynbems.homestead.com/Berks_County_NBEMS.html

Digital EmComm with NBEMS

- Dave Kleber KB3FXI
- O'Hara Twp EMA
- kb3fxi@arrl.net
- Harry Bloomberg W3YJ
- Assistant SEC WPA ARRL Section

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

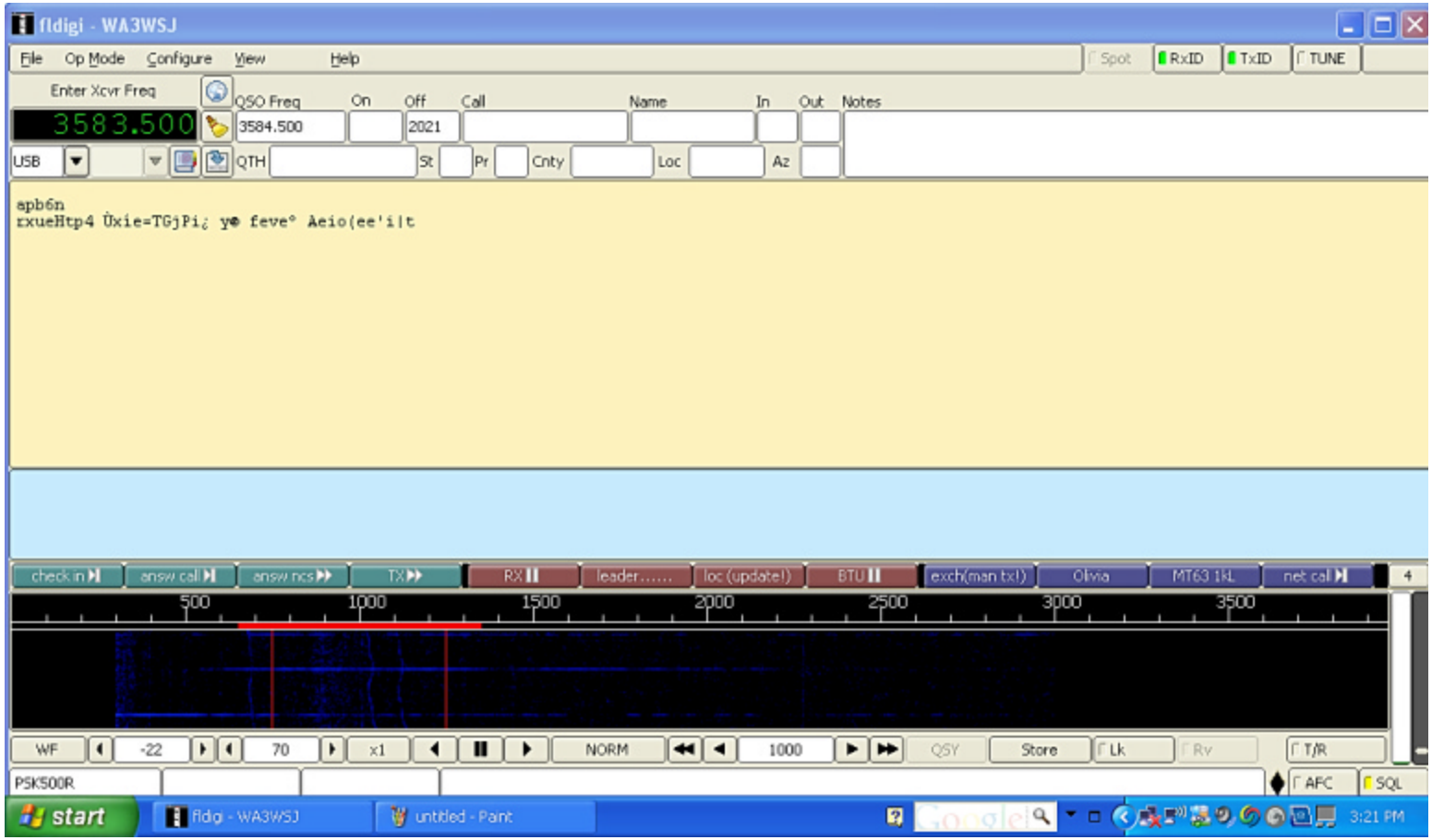
Why Digital EmComm?

- The needs of our Served Agencies have changed.
- They still need voice communications but...
- There's an increasing need for data communications.
- We need to be able to provide more than just voice communications from a ham with an HT.

NBEMS philosophy

- Keep it cheap.
- Keep it simple.
- Use Open Source software.
- Don't depend upon infrastructure.
- Make it fun to use between drills and disasters.
- Any computer, any radio

Fldigi



How it 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 mike input for transmission.
- Audio from your radio goes into your computer's mike or line-in for decoding.
- Don't need an extremely powerful new computer, older machines work just fine.

Interfacing with computer

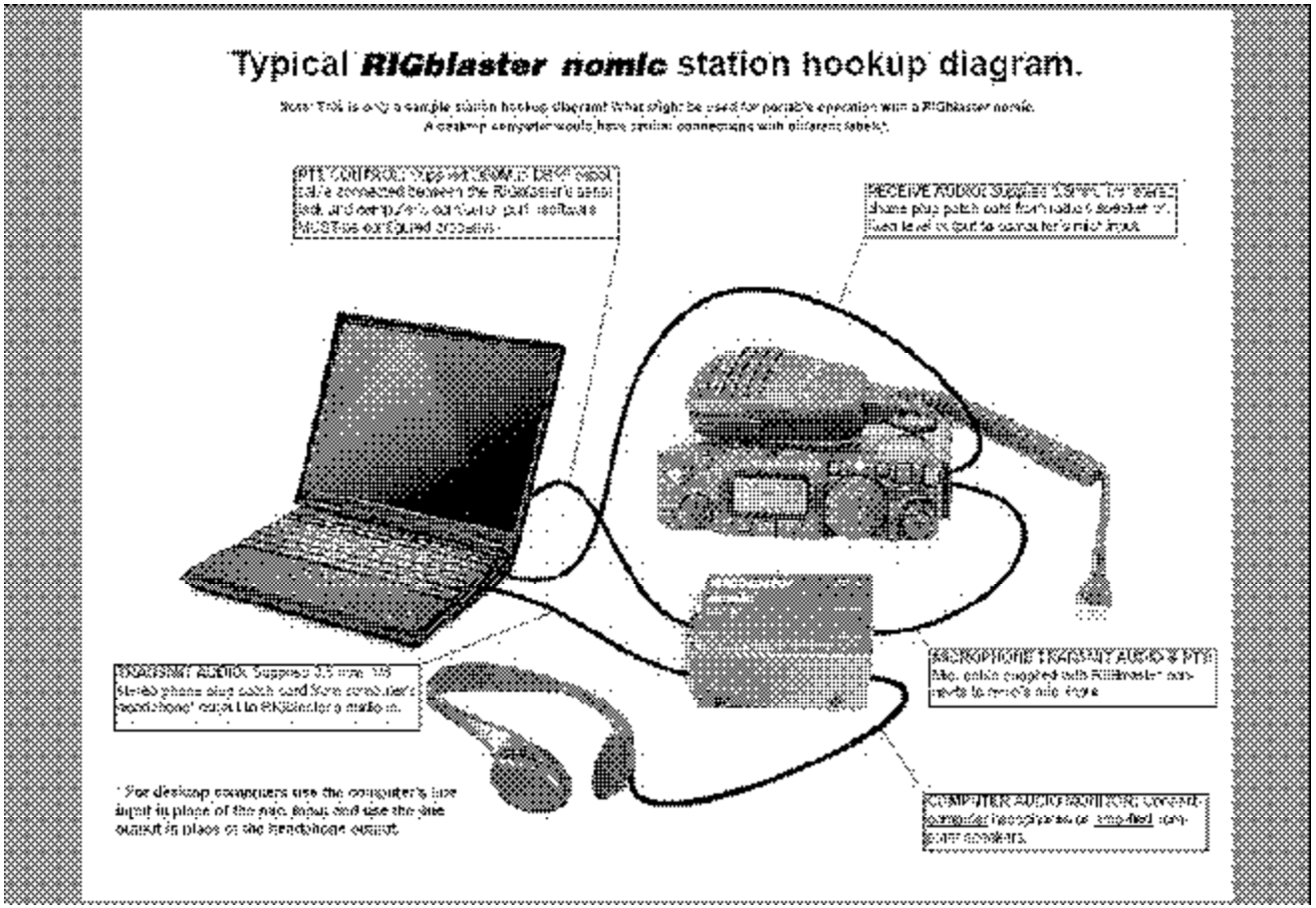
- Many ways to interface with computer.

  Rigblaster, SignaLink, etc.
- But, if necessary, hold radio mike up to computer speaker and...
- Hold radio speaker up to computer mike!
- In an emergency, don't really need hardwired interface.
- Disable all DSP “enhancement” programs on mic

Acoustic Interface

- Easiest way to interface radio to computer is to...
- Hold radio mike up to computer speakers.
- Hold radio speaker up to computer mike.
- You do PTT manually.
- Works especially well with VHF/UHF FM.
- Real game saver during emergencies.
- Allows you to easily send data using any radio.
- Hams can participate who do not have a soundcard interface.
- MT63 is sufficiently robust to deal with background noise, even in a noisy EOC or field site.

Typical Rigblaster nomic setup

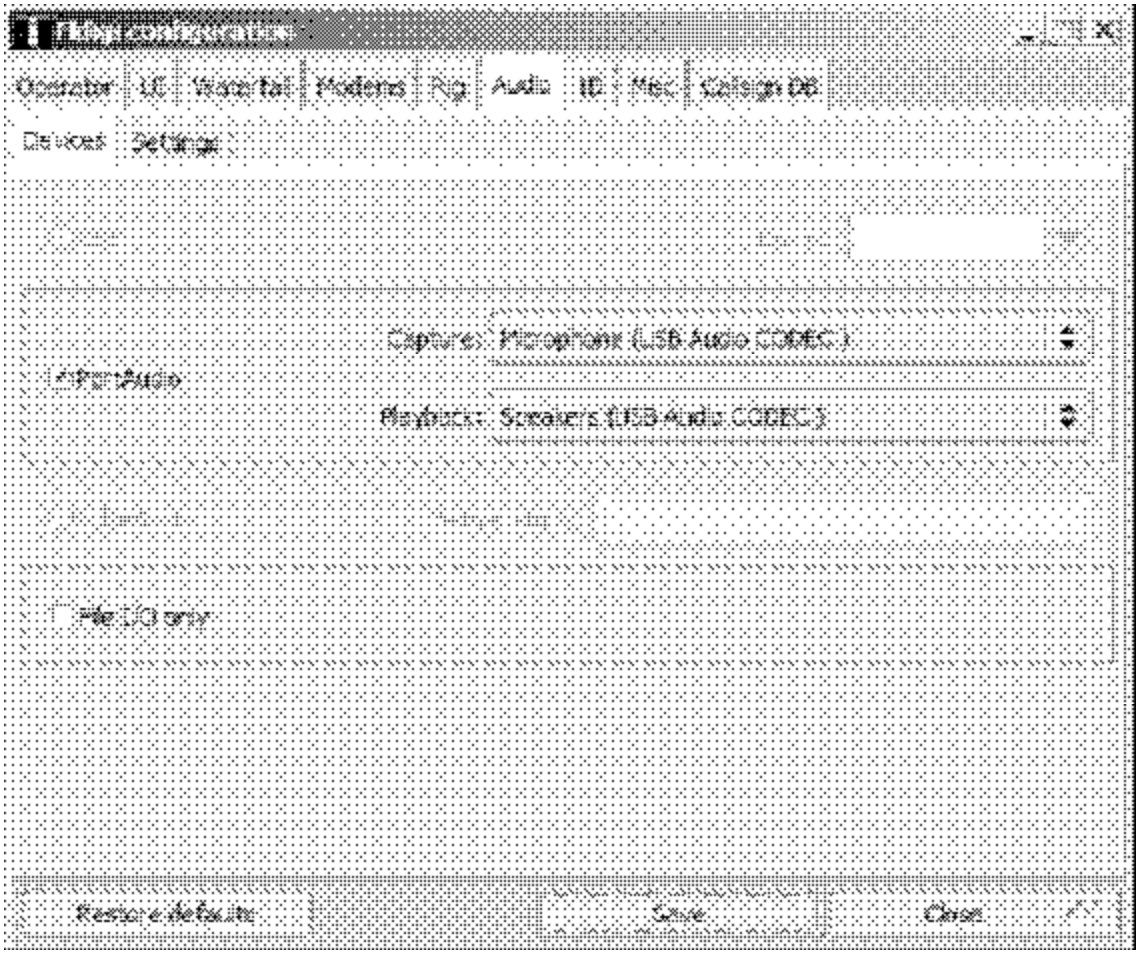


Signalink USB

SignaLink Configuration

- SignaLink is very easy to configure.
- Just connect to computer via USB.
- Configure Fldigi to use SignaLink USB sound card.
- Generate just enough audio from computer to trigger SignaLink vox.
- Use volume controls on SignaLink and don't touch computer audio settings

SignaLink Configuration

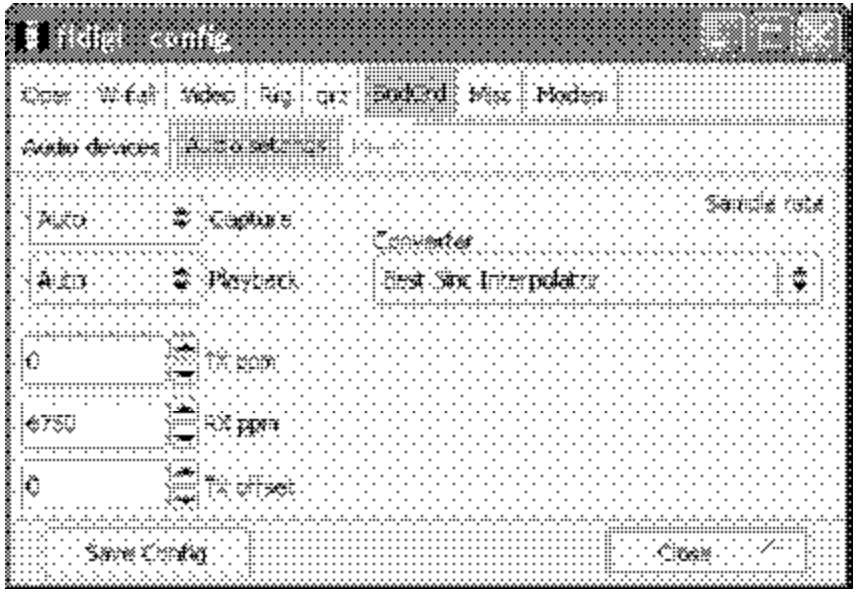


Configuring Fldigi

- First time through, wizard is run.
- Enter your personal info.
- Also configure soundcard, radio interface, and modems

Soundcard Calibration

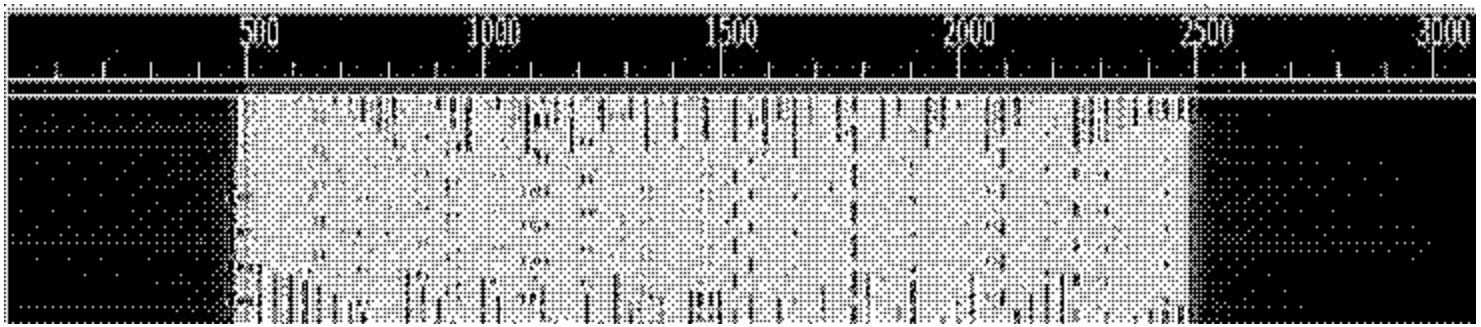
- If possible, calibrate your soundcard.
- Especially necessary for narrowband HF modes.
- Can use fldigi WWV mode or CheckSR.exe.



MT63 – King of EmComm modes

- 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
- Used in Allegheny County SET and Red Cross drills
- See instructional video at
- http://www.youtube.com/watch?v=SWZ2vKWSilE

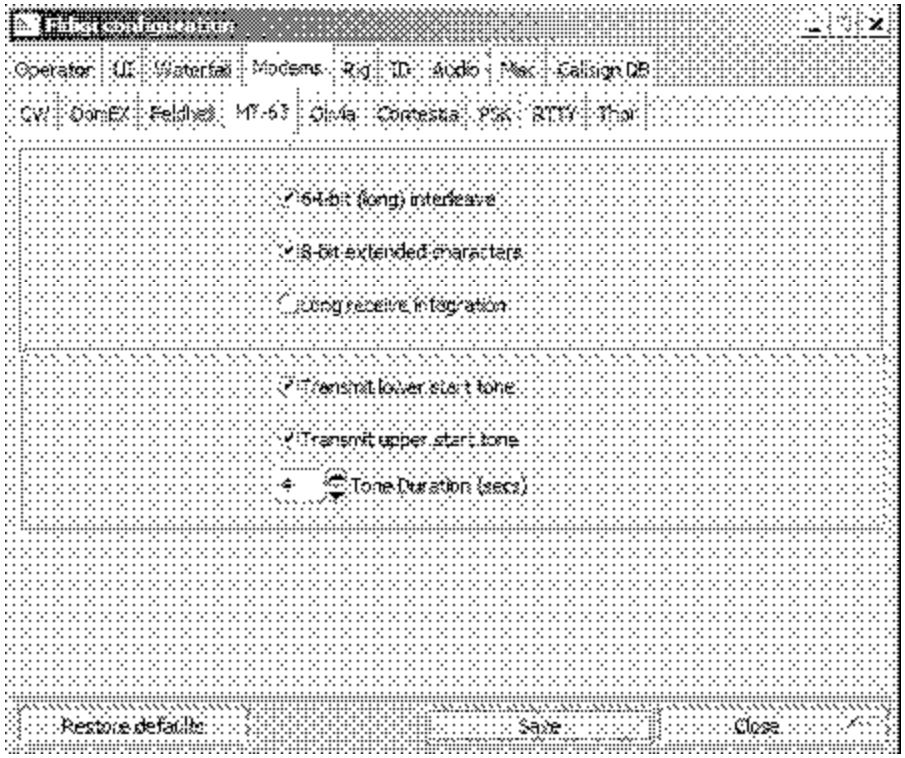
MT63-2000 Waterfall



- 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

Important MT63 configuration

- Be sure to set 64 bit interleave and 8-bit char.
- Provides extra data redundancy.
- Both stations must have same interleave setting

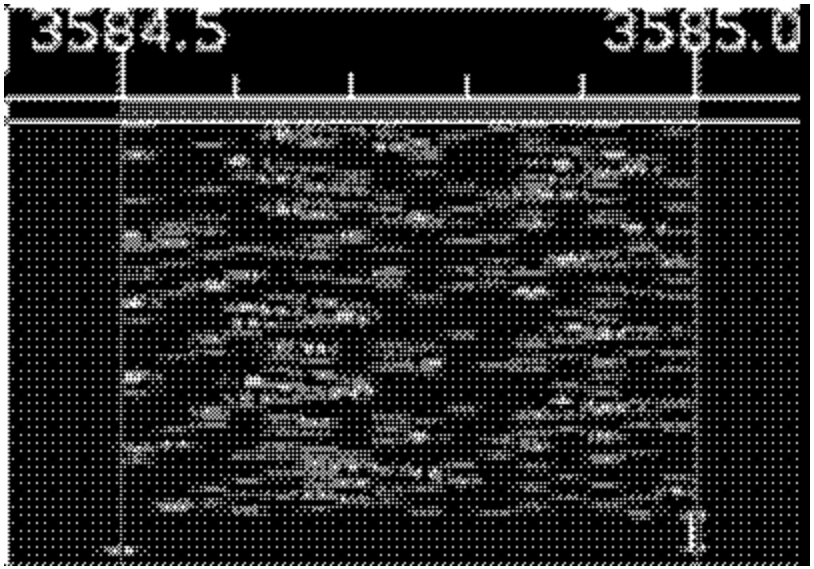


HF modes

- Preferred HF mode is Olivia.
- Olivia is great for poor HF conditions.
- Will get through when no other mode will.
- Can make contacts below noise floor!
- Does not require precise tuning.
- We use 8/500 when possible – 8 tones in a 500 Hz bandwidth.
- When conditions are poor, we go to 16/500 – 16 tones in a 500 Hz bandwidth.
- 16/500 is slower, but will get through.
- Fine article in Dec 2008 QST by WB8ROL

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!
- RF kills touchpads...use an external mouse!
- Don't need high power for digital modes anyway

Data Mode Specs

Mode	Symbol Rate	Typing Speed	Modulation	Audio Range	Interleave Latency	Bandwidth
MT63-500	5.0 baud	50 wpm	64 x 2-PSK	500 - 1000 HZ	6.4 OR 12.8 SEC	500 Hz
MT63-1000	10.0 baud	100 wpm	64 x 2-PSK	500 - 1500 HZ	3.2 OR 6.4 SEC	1000 Hz
MT63-2000	20 baud	200 wpm	64 x 2-PSK	500 - 2500 HZ	1.6 OR 3.2 SEC	2000 Hz
Olivia 8-500	62.5 baud	30 wpm	8-FSK			500 Hz
Olivia 16-500	31.25 baud	20 wpm	16-FSK			500 Hz
BPSK31	31.25 baud	50wpm				62.5 Hz
BPSK63	62.5 baud	100 wpm				125 Hz
BPSK125	125 baud	200 wpm				250 Hz
BPSK250	250 baud	400 wpm				500 Hz
BPSK500	500 baud	800 wpm				1000 Hz
QPSK31	31.25 baud	50 wpm			<1 SEC	62.5 Hz
QPSK500	500 baud	800 wpm				1000 Hz
PSK63FEC	62.5 baud	55 wpm				125 Hz
PSK125R	125 baud	110 wpm				250 Hz
PSK250R	250 baud	220 wpm				500 Hz
PSK500R	500 baud	440 wpm				1000 Hz

Data verification with Flwrap

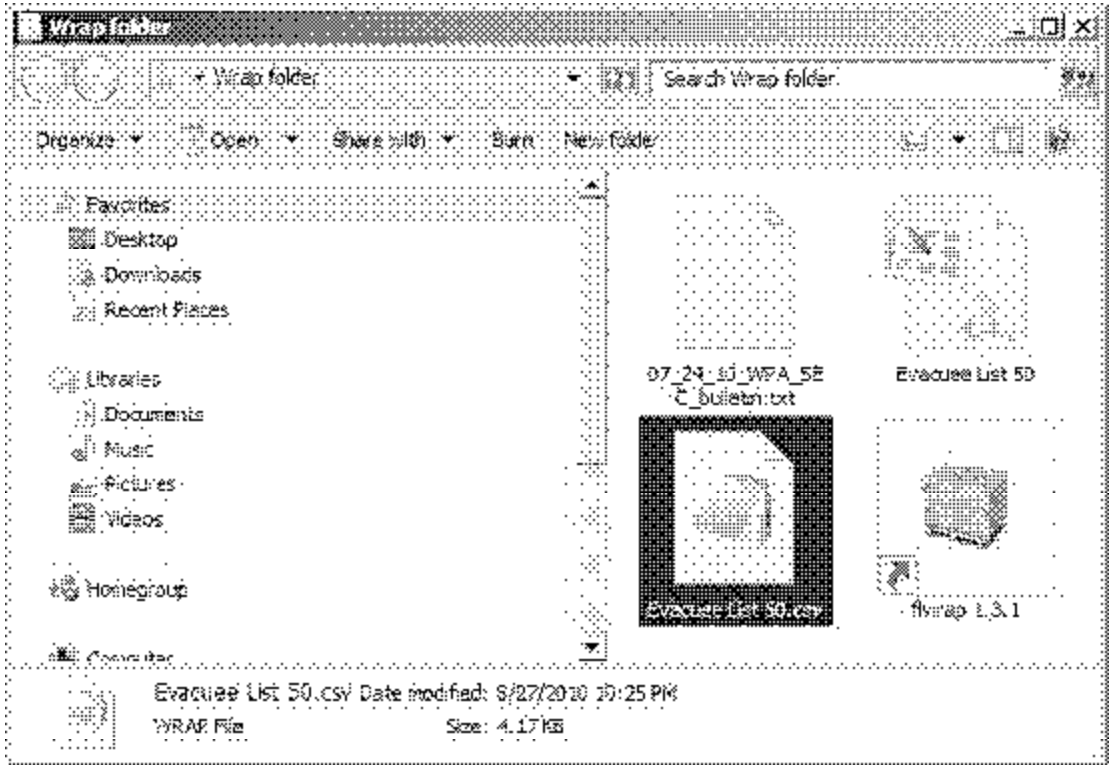
- Flwrap allows you to be 100% sure your message was received accurately.
- Checksum is inserted into a file.
- Receiving station computes the checksum on the incoming file and...
- If the two checksums are identical, the file was received without error.
- Allows multiple stations to receive and confirm data 100%.
- Great for bulletins like situation updates, weather reports, road closures, lists of contact info

Flwrap – example

- This is an example of a “wrapped” file:
- [WRAP:beg][WRAP:crlf][WRAP:fn example.txt]This is an example of a wrapped file.
- Here's what happens when we wrap something.[WRAP:chksum B71E][WRAP:end]
- Note the WRAP beg and end delimiters
- Also note the checksum, it's B71E.
- Easy to import wrapped file...just drag into Fldigi transmit window.

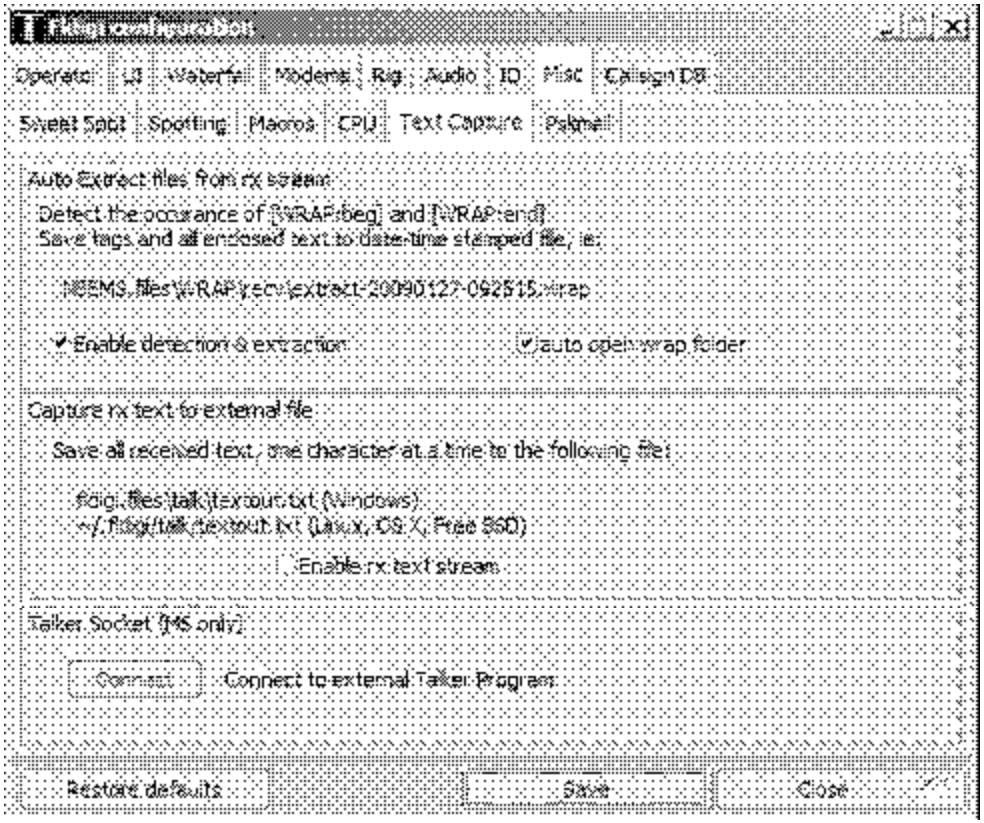
Wrapping data

- To “Wrap” data, just drag and drop a file onto the Flwrap program's icon



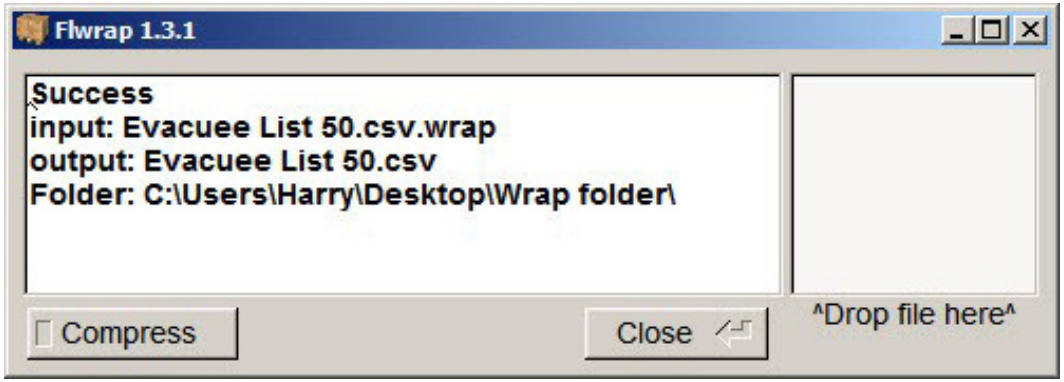
Configure fldigi to extract data

- Set the Fldigi configuration setting and Wrapped data will be automatically extracted!

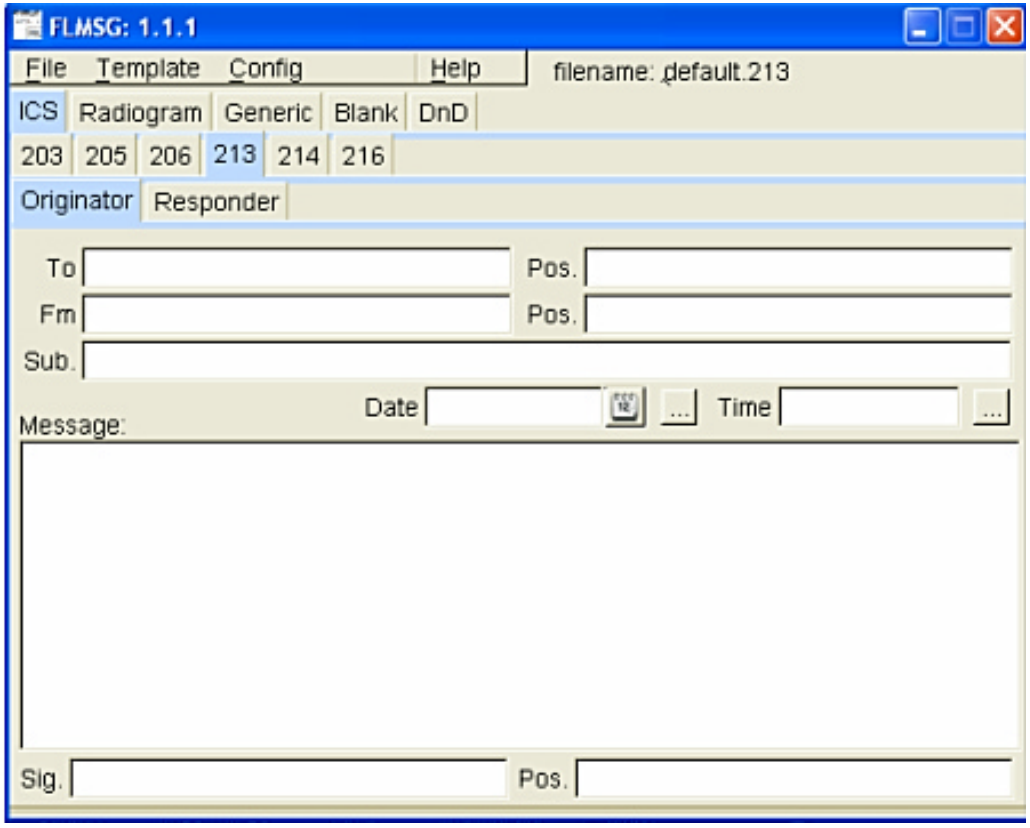


Verify extracted Wrapped files

- Go to File-->Folders->NBEMS Files menu and enter Wrap/recv folder.
- Drag resulting files over Flrap icon to verify and extract data



FLMSG ver. 1.1.1

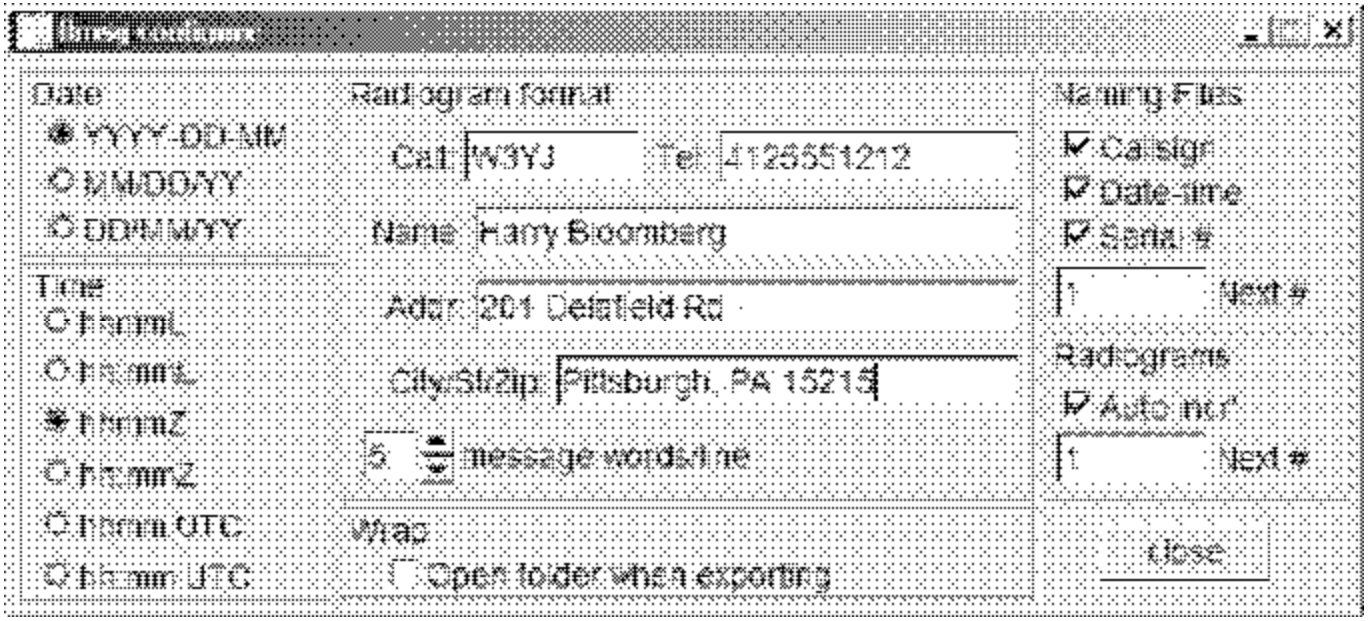


Flmsg – send forms

- Flmsg used to send formatted messages:
- ICS forms like ICS-203, 205, 206, 213, 214, 216
- ARRL Radiograms
- Blank text
- Blank text form can easily speed workflow for plain text messages.
- No need for use of text editor like Notepad.
- Automates use of Flwrap.
- Starts transmission automatically.
- Eases importing and checksum verification of incoming message

Flmsg – configuration

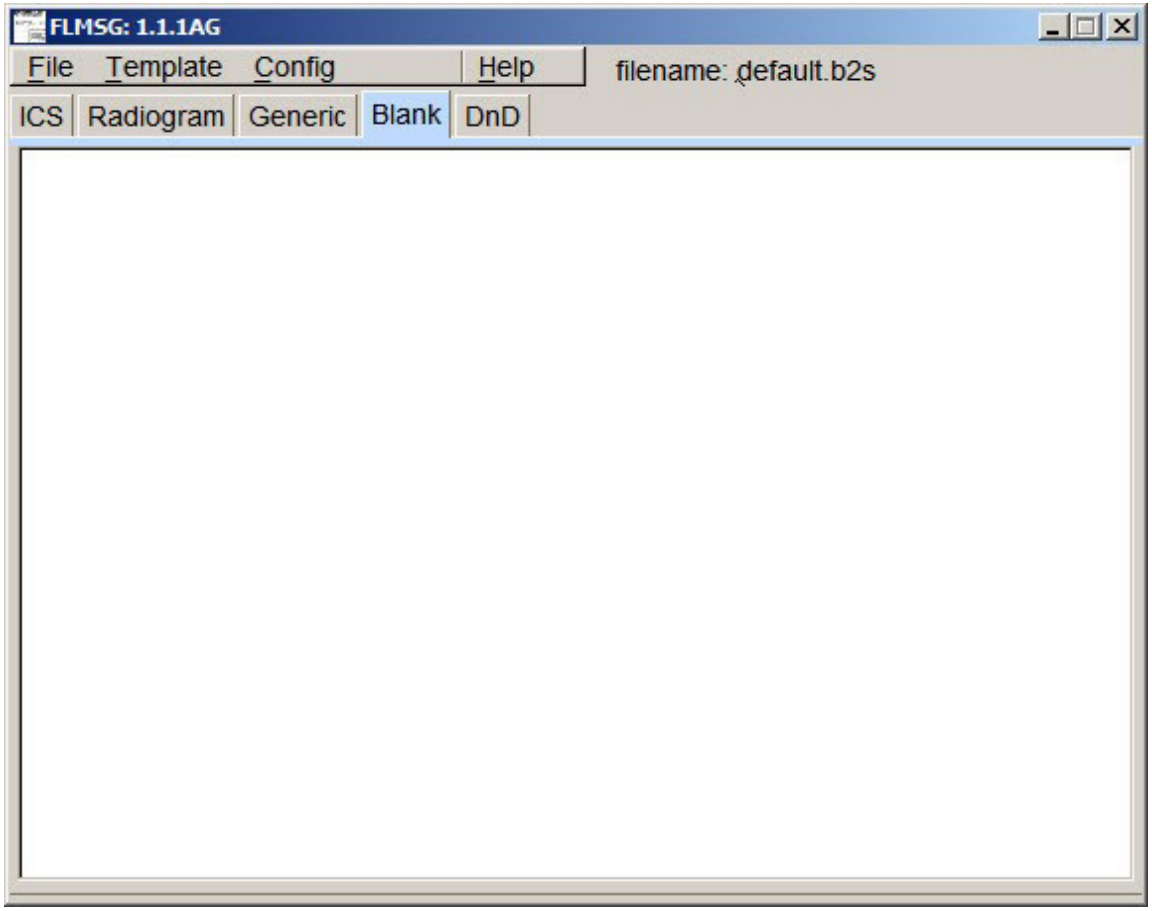
- Click on Config menu.
- Enter your preferences and info.



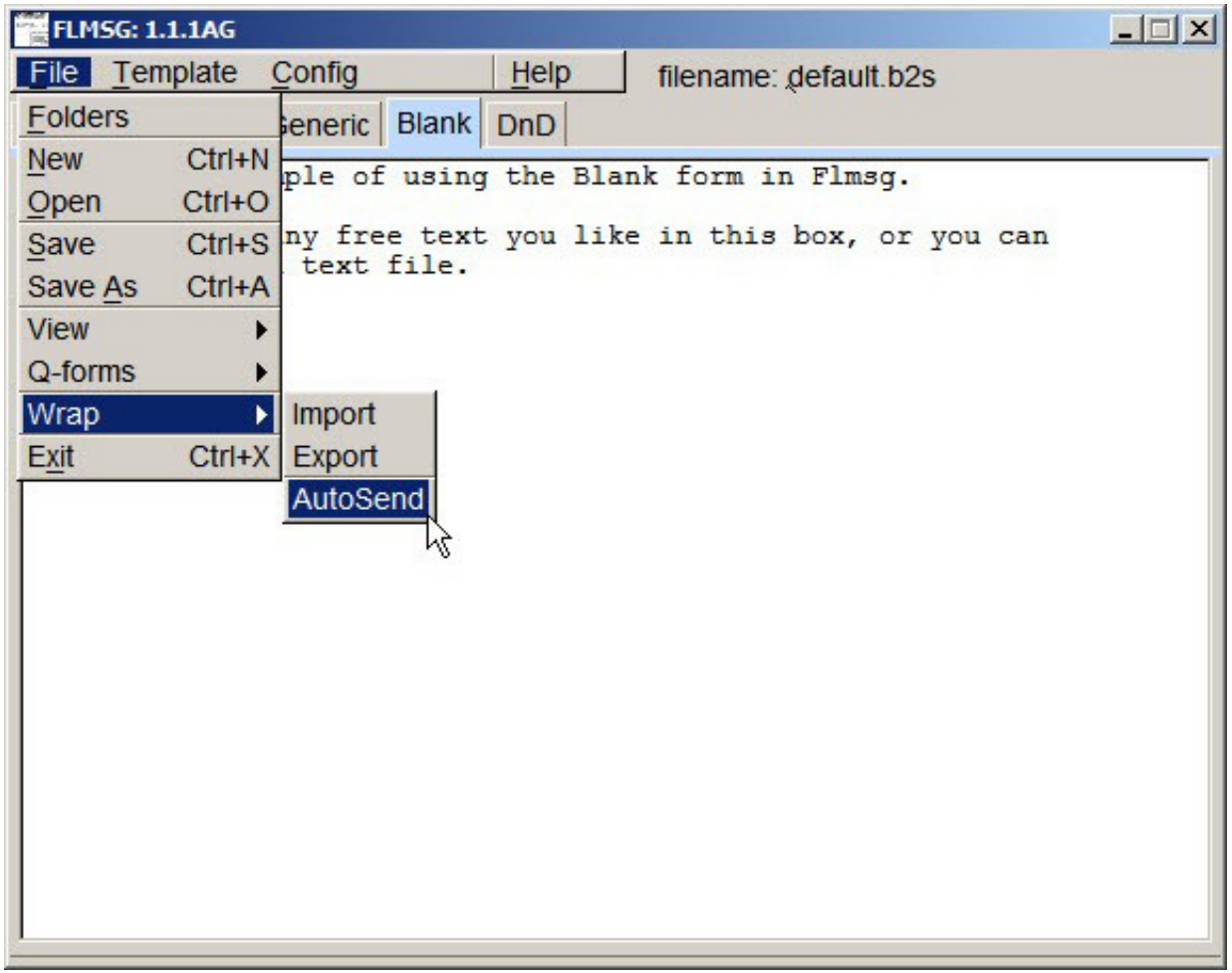
Flmsg – Autosend workflow

- Click on Blank tab.
- Enter text directly into large empty box.
- Can also drag-and-drop text file into box.
- File->Wrap->Autosend
- Will be prompted to save file with automatically assigned unique filename.
- Flmsg will cause Fldigi to automatically send message.
- That's it! Much simpler workflow!
- Easier to teach to beginners

Flmsg – use Blank tab for text



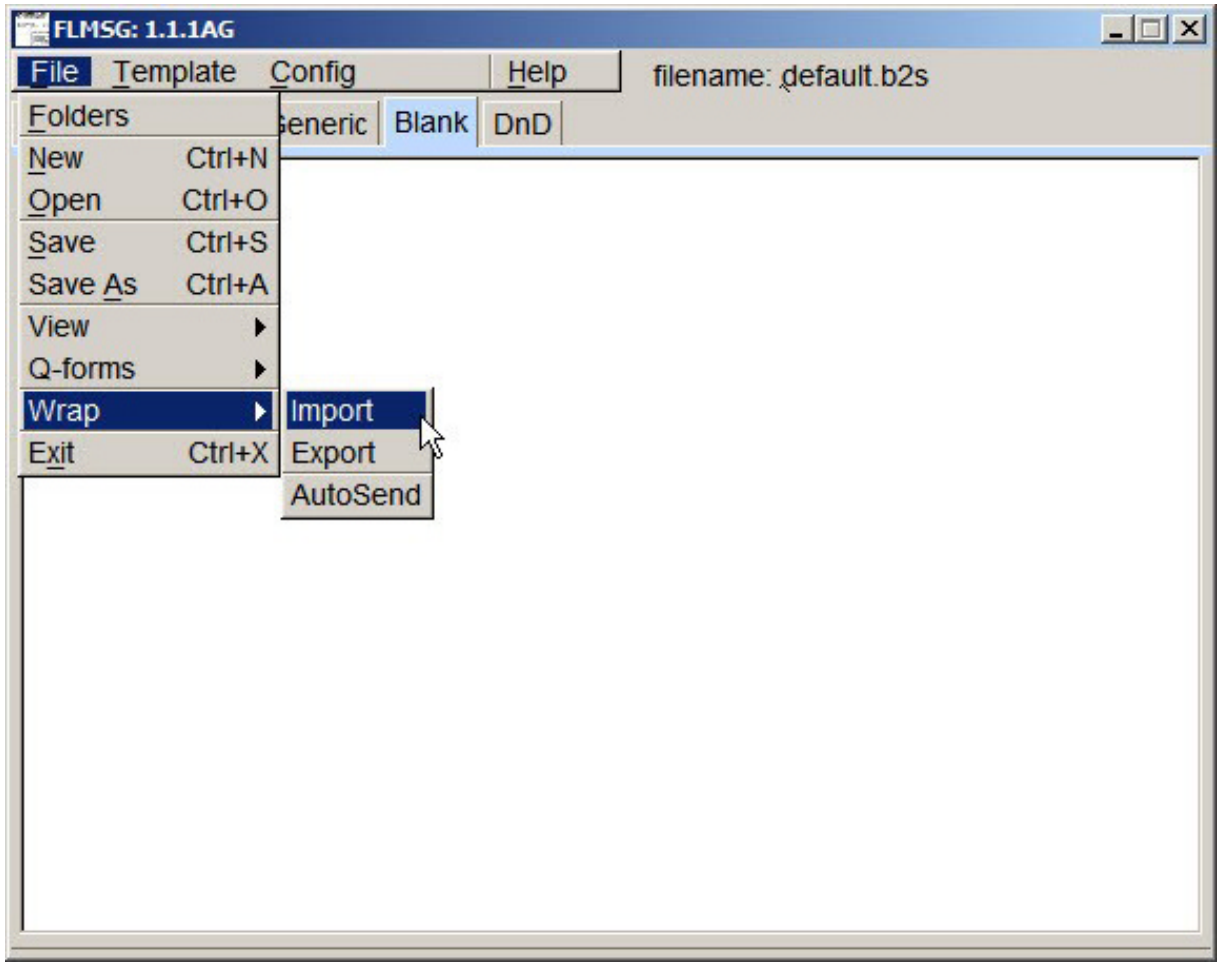
Flmsg – Autosend



Flmsg – importing file

- Flmsg simplifies importing file.
- File->Wrap->Import
- Select desired extract file from Wrap folder.
- Usually want extract file on bottom – newest file.
- File will be loaded into Flmsg.
- Can do this only if file was sent using Flmsg.
- If not sent with Flmsg, must use manual workflow.
- If checksum error, Flmsg will ask if you want to try to import anyway

Flmsg – importing file



Next steps

- Our strength is the ability to turn fun amateur activities into powerful emcomm tools.
- So, download NBEMS, and make lots of contacts!
- If you're ready for your daily hamming, you're more prepared for emergency than you think.
- Be active, and on the day you're needed, you'll feel right at home.

NBEMS Nets

Net Name	Day	Time	Frequency	Waterfall (c)	Mode-1	Mode-2	PL
paNBEMS 80m Net	Tuesday	6:00pm local	3.5835 mhz	1.0kz	Olivia 8/500 1kz	MT63-1K	
paNBEMS 80m Net	Sunday	10:00am local	3.5835mhz	1.0kz	Olivia 8/500 1kz	MT63-1K	
Virginia Digital Net	Nightly	7:15pm local	3.5785 mhz	1.3kz	Olivia 4/500		
Berks County, PA	Monday	7:00pm local	147.180mhz	1.5khz	FM Phone	MT63-2k	110.9
Chester County, Pa	Thursday	8:00pm local	446.175mhz	1.5khz	FM Phone	MT63-2K	100.0
CVARC, WPA	3rd Sunday	9:30pm local	147.120 mhz	1.0kz	MT63-2k	Olivia 8/500	
Erie County, PA	Wednesday	6:30pm local	146.700 mhz				186.2
Pen Bay ARC , ME	Sunday	7:00pm local	145.490mhz	1.5khz	FM Phone	MT63-2k	91.5
Pen Bay (Back-Up)	Sunday	7:00pm local	147.060mhz	1.5khz	FM Phone	MT63-2k	91.5
wpaNBEMS, WPA	Sunday	8:00pm local	443.450mhz	1.5khz	FM Phone	MT63-2K	100.0

Resources

paNBEMS group

- http://paNBEMS.org
- http://groups.yahoo.com/group/paNBEMS/
- http://berkscountynbems.homestead.com/Berks_County_NBEMS.html
- http://www.w1hkj.com/
- http://www.w1hkj.com/download.html

Thanks from WA3WSJ!

- wa3wsj@arrl.net