

HAM RADIO COMMUNICATIONS INFORMATION & TRAINING

prepared for
FLORIDA BAPTIST DISASTER RELIEF

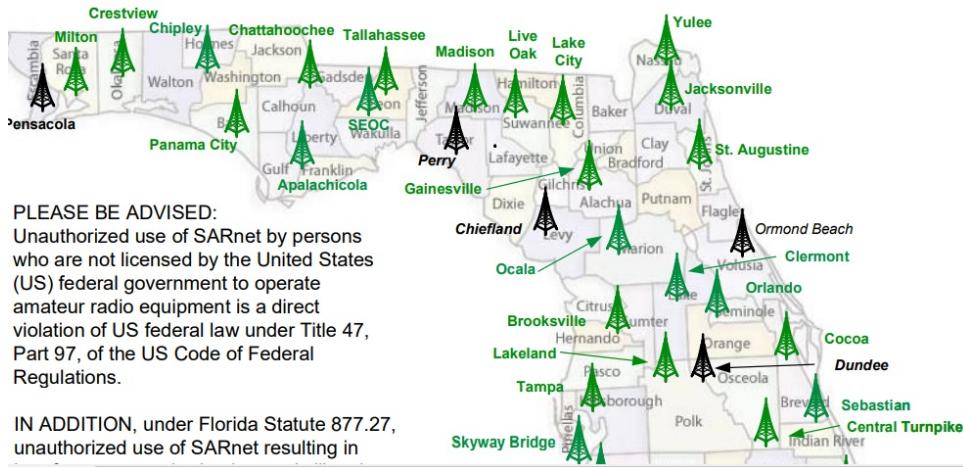
DRAFT
Gordon Gibby MD KX4Z
May 5, 2019

SARNet FREQUENCIES

NORTH

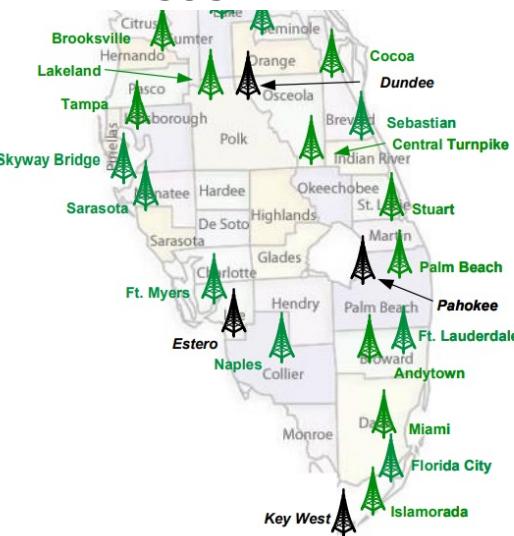
Statewide Amateur Radio Network "SARNet" Constructed Sites as of April 30, 2019

**YOU MUST BE A FEDERALLY LICENSED AMATEUR
RADIO OPERATOR WITH A CALLSIGN TO USE SARnet**



SARNet SITE	TX (MHz)	Tone
Andytown	442.825	110.9
Apalachiola	444.400	94.8
Brooksville	444.825	146.2
Central Turnpike	444.975	107.2
Chattahoochee	444.975	94.8
Chiefland	TBD	TBD
Chipley	444.750	100.0
Clermont	444.975	103.5
Cocoa	444.650	107.2
Crestview	444.900	100.0
Dundee	444.350	103.5
Esterio	TBD	TBD
Ft. Lauderdale	442.850	110.9
Florida City	442.050	114.8
Ft. Myers	444.225	136.5
Gainesville	444.925	123.0
Islamorada	442.850	114.8
Jacksonville	444.700	127.3
Key West	444.400	114.8
Lake City	444.900	110.9
Lakeland	442.275	82.5
Live Oak	443.700	110.9
Madison	444.300	94.8
Miami	444.600	167.9
Milton	444.725	100.0
Naples	444.050	103.5

SOUTH



Key West	444.400	114.8
Lake City	444.900	110.9
Lakeland	442.275	82.5
Live Oak	443.700	110.9
Madison	444.300	94.8
Miami	444.600	167.9
Milton	444.725	100.0
Naples	444.950	103.5
Ocala	444.025	123.0
Orlando	444.075	103.5
Ormond Beach	TBD	TBD
Pahokee	TBD	TBD
Palm Beach	443.975	110.9
Panama City	444.175	100.0
Pensacola	444.875	100.0
Perry	443.100	94.8
Sarasota	444.800	100.0
Sebastian	444.375	107.2
SEOC	443.500	94.8
Skyway Bridge	442.250	146.2
St. Augustine	442.800	127.3
Stuart	444.150	107.2
Tallahassee	442.100	94.8
Tampa	442.850	146.2
Yulee	442.900	127.3

LEGEND

Green Tower/Text = Constructed SARNet site
Black Tower/Text = Proposed site or site under construction
TX frequency is repeater talk-out. All UHF repeaters have a +5MHz offset for the talk-in repeater receiver

SKILL #1: PROGRAMMING YOUR RADIO FOR VHF / UHF REPEATERS

You will want to know the VHF/UHF amateur radio repeaters in the area to which you'll be deployed. However, all the suppliers of this information seem to COPYRIGHT their lists – so your leadership will need to collect this information for you and populate a list (such as an ICS-205) for your area.

Here are some suppliers of repeater directory information:

https://www.repeaterbook.com/repeaters/Display_SS.php?state_id=12&band=14&loc=%25&call=%25&use=%25

<https://www.artscipub.com/repeaters/search/index.asp?state=Florida&s=0>

TO SET YOUR VHF/UHF RADIO

1. You will need to know how to manually program your transceiver, or alternatively, have a programming cable specific for your radio, and use programming software (typically CHIRP, which is free and available here: <https://chirp.danplanet.com/projects/chirp/wiki/Download>)
2. The “frequency” posted for a repeater is the frequency you RECEIVE on, and the repeater TRANSMITS on.
3. The “offset” tells which direction and how much your TRANSMIT frequency must be offset. For 2-meter repeaters this may often by + or - 600 kHz (0.6 MHz); for 70-cm repeaters, it will generally be + or – 5 MHz. It should never push you out of the legal amateur band – so check for that, it would suggest you have made an error.
3. The final parameter for most repeaters will be the CTCSS tone (if any) used to determine which stations the repeater responds to (“TONE”) or which your receiver will listen to (“TONE SQUELCH”). This is a low frequency audio tone (not hear-able normally, something like 123 Hz) that is added to either or both of your transmitter, or the repeater transmitter signal. It enables repeaters that are somewhat “close” to each other to avoid being simultaneously triggered by accident. Some repeaters do not use them, but in more populated areas they are common. The TONE is important – if you don’t transmit a required tone, the repeater will ignore you. The TONE SQUELCH (transmitted by the repeater) is less important – if you don’t set that, your receiver will simply hear that repeater as well as any other on the same frequency.
4. The programming instructions for some handi-talkies are quite complex, and the tone frequencies for some older radios are selected not as a frequency, but by a numerical choice, adding another layer of possible confusion – so review this before your deployment!

Reference information:

ICOM tone lists: <http://www.repeater-builder.com/icom/icom-ctcss-chart.html>

Many tone lists: <http://www.repeater-builder.com/tech-info/ctcss/ctcss-chart.html>

INCIDENT RADIO COMMUNICATIONS PLAN ICS-205

INCIDENT RADIO COMMUNICATIONS PLAN (ICS-205)										
1. Incident Name: <i>EXAMPLE</i>			2. Date/Time Prepared: Date: May 2 2019 Time 0700			3. Operational Period Date From: May 3 Time From: 1800 LOC			Date To: May 4 Time To:	
4. Basic Radio Channel Use:										
Zone Grp.	C h #	Function	Channel Name / Trunked Radio System Talkgroup	Assig n-ment	RX Freq. N or W	RX TON E / NA C	TX FREQ N or W	TX TON E / NA C	MOD E (A, D, or M)	Remarks
		TACT	SARNET	HAM	441. 175	100	446. 175	100	A	PANAMA CITY SARNET CONNECT
		TACT	FL ARES EM. NET	HAM	3.950	N/A	3.950	N/A	A	Statewide emergency net
		LOG	WINLINK	HAM	TBD	N/A	TBD	N/A	D	Choose station in software
		LOCAL	Simplex1	HAM	146. 550	N/A	146.55 0	N/A	A	Local comms on site
		EOC	CB CHAN 9	Public	26.065	N/A	26.065	N/A	A	BAY EOC monitoring CB Channel 9
		EMERG	SHARES	SHAR ES	4.112	N/A	4.112	N/A	A	DHS SHARES NET
		EMERG	UTAC41	PS	453.46 25	156. 7	458.46 25	156. 7	A	Local search & rescue group / MARC tower
5. Special Instructions										
<p>***THIS IS AN EXAMPLE ONLY***</p> <p>FL BAPTIST DISASTER RELIEF will maintain a 24-hour watch on SARNET; when unable, will establish contact on FL ARES EM NET. Emergency WINLINK gateway is expected within next 24 hours; frequency to be announced. Only contact at this time with Bay County EOC is CB CHANNEL 9. SHARES and Public Service frequencies are provided for information and monitoring purposes only; <i>cannot be used by amateur operators except in extreme circumstances where no other comms exist.</i></p> <p>***THIS IS AN EXAMPLE ONLY***</p>										
6. Prepared By (Communications Unit Leader) Name G. Gibby Signature										
ICS 205			IAP PAGE			Date / Time 5/2/2019				

SKILL #2 – Getting an Antenna Up

It is hard enough for many people to merely get a VHF or HF antenna up at their house, let alone doing it in a disaster area! Yet that is obviously a skill you need to gain in order to serve!

If there is a Florida Baptist Disaster Relief TOWER present, with the appropriate antenna already hoisted, you're in luck! Special training and safety will likely be required to operate a trailer as there are obviously some safety precautions – I was privileged to be able to take MARC (Mutual Assistance Radio Communications) training on a 100-foot MARC unit tower, and if that is available in your area, jump at the chance, as the tower is very similar to the Florida Baptist DR tower.

If that is available, then you'll have to improvise.

Here are some suggestions:

No.	Suggestion
1	Get several lengths of coax with PL-259 connectors on each end. Prices vary, and so does quality. RG-8X will generally be sufficient for all our needs. You might want to have 25-foot, 50-foot and even 100-foot cables.
2	A “magnetic mount” VHF/UHF antenna is a fine antenna that can be placed on the highest ferromagnetic roof you can find, which might be an A/C unit on the top of a structure and cover miles and miles! Or you may need to attach a cheap steel cookie tin on the bottom of the mag mount to approximate the ground structure of a car roof. Mag mount antennas can be found on Amazon as cheap as \$15 For VHF/UHF your coverage radius in miles is approximately equal to 120% of the square root of the height of your antenna in feet. For example, a 16-foot high antenna (square root is 4) will have a coverage radius of almost 5 miles....or less. TREES and BUILDINGS are great ABSORBERS of radio energy.
3.	Our group in Alachua County has made literally DOZENS of end-fed Slim Jim antennas out of house-wire (#14 gauge solid) and 1x2 pressure treated lumber sticks. We have participants in our Tech license classes build them! They do require pre-adjustment for length and SWR, but the cost is under \$5 and they can be attached to almost any non-ferrous pole, or hoisted up by a rope. See: https://qsl.net/kx4z/TwoMeterHomeMadeSlimJim.pdf
4.	LEARN HOW TO USE A SLING SHOT – the kind with a wrist stabilizer work the best. Here are some possible products you might want to use if there are TREES in the vicinity you will be serving in https://www.amazon.com/gp/product/B0001W0E7G or similar the slingshot rubber deteriorates in the sun – protect it or plan on replacing

	<p>ORANGE braided high strength fishing line (300 feet)</p> <p>https://www.amazon.com/gp/product/B00MGA5VD8</p> <p>Fishing weight – either 1-1/2 or 2 ounce</p> <p>https://www.amazon.com/Bullet-Weights-Fishing-Sinker-2-Ounce/dp/B003NXAJUW</p> <p>Any good nylon rope (1/8 or 3/16 in 100-foot lengths) or the smaller paracords (check Home Depot or Loews or order online)</p>
5	<p>For an HF antenna, a homemade dipole works great on one band, and the odd harmonics; an off center fed antenna can work on multiple bands. Many people like the \$300 Buckmaster, but our group builds much-cheaper CLONES of that antenna: see https://www.qsl.net/nf4rc/2018/OCFCenterBalunInstructions.pdf</p>
6	<p>You may wish to invest in an automatic antenna tuner, in which case I can recommend both of the following products in the 100-watt output class:</p> <p>MFJ: https://www.dxengineering.com/search/part-type/antenna-tuners/product-line/mfj-993b-intellituner-automatic-antenna-tuners? autoview=SKU&sortby=Default&sortorder=Ascending</p> <p>LDG: https://www.dxengineering.com/search/part-type/antenna-tuners/brand/ldg-electronics/ product-line/ldg-electronics-at-200proii-automatic-antenna-tuners? autoview=SKU&sortby=Default&sortorder=Ascending</p>

SKILL #3: TRANSMITTING OR RECEIVING A FORMAL MESSAGE

Many messages are simply a piece of information (“We need 53 more cots by 6 pm”) while some are more formal and are handled in a letter- and word-perfect manner. The venerable ARRL Radiogram is one way to do this, which includes a checking mechanism that counts the words in the TEXT (not the TO: address, nor the SIG (nature).)

Detailed information on message guidelines can be found in the ARRL Methods, Practices & Guidelines text, for example here: <http://www.arrl.org/files/file/Public%20Service/MPG104A.pdf>

Amateur Radio "Radiogram"							
NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:				Message Received At:			
				Station: _____ Phone: _____			
				Name/Addr: _____			
email _____							
phone _____							
<BT>							
<BT>							
SIGNATURE: _____							
RCVD FROM		DATE		TIME		DATE	

Amateur Radio "Radiogram"							
NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:							
				Message Received At:			
				Station: _____ Phone: _____			
				Name/Addr: _____			
email _____							
phone _____							
<BT>							
<BT>							
SIGNATURE: _____							
RCVD FROM		DATE	TIME	SENT TO		DATE	TIME

Don't let formal traffic intimidate you! Just do your best! Remember when you are reading a message (transmitting) to go VERY VERY SLOW because the person at the other end is trying to WRITE and that is painful and slow for many of us. There are "procedural words" which help you when saying a message over a voice channel, and when asking for "fills" to correct missing portions. Here are the thirteen "most important" of these "pro words":

Handling Back and Forth:

- "Over" A reply is expected, "go ahead."
- "Out" No reply is expected. Do not respond (like "hanging up" the phone).
- "Roger" Received and Understood (NOT "Yes")
- "Affirmative" Yes
- "Negative" No
- "Clear" Same as "Out." No reply is expected.
- "Say Again" Repeat

Getting A Message Across

- I SPELL
- INITIAL (or INITIALS, as the case may be)
- FIGURES (zip codes, telephone numbers, zip codes, or combinations of numbers)
- MIXED GROUP (figures and letters)

- BREAK (what you say between sections)
- AMATEUR CALL SIGN

Note: groups in a message (what you think of as "words") have only a few possibilities: they are either a WORD, or INITIAL(S) or FIGURE(s) or MIXED GROUP.

Note: in the PREAMBLE everyone know what comes where, so you don't need to say things like "Station of origin" or "City of Origin" or "Check" etc.

SKILL #4 BASIC WINLINK EMAIL OVER THE INTERNET

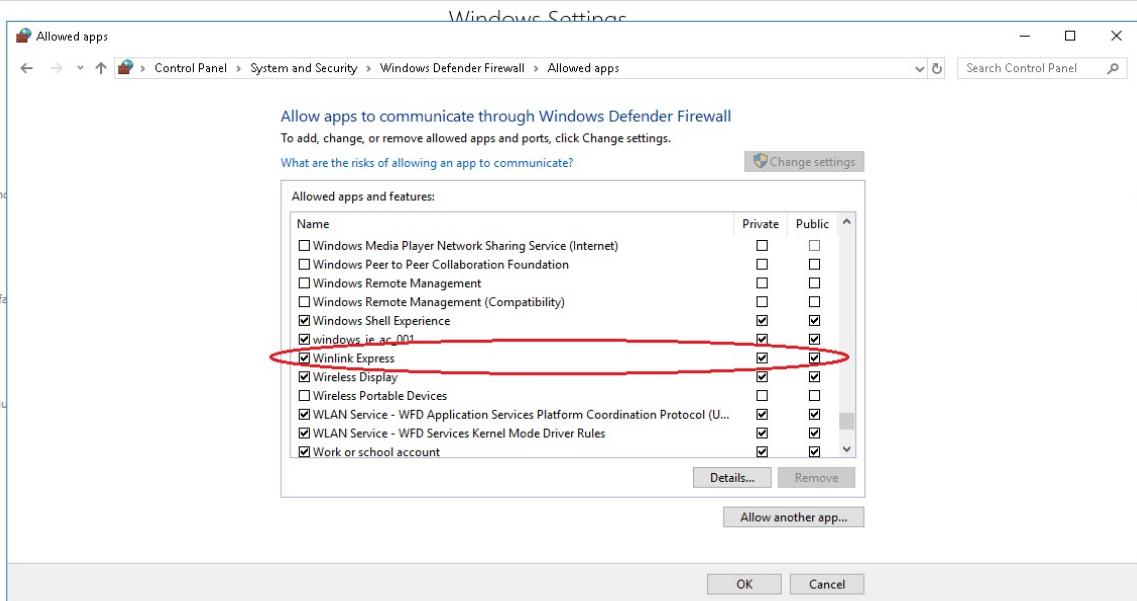
There are two basic skills for getting information across that you need proficiency with – voice communications suffice for MOST of what goes on, but sending complicated or long lists often transpires over the defacto emergency standard WINLINK system. WINLINK is basically an email system adapted to allow its use over many different audible protocols (think of them as different kinds of warbles) over single side band or VHF FM radio.

WINLINK is basically just like any other email program. It has a way to create emails, read emails, reply to emails, and forward them. Perhaps a tiny bit clunkier than the latest-greatest, but it WORKS.

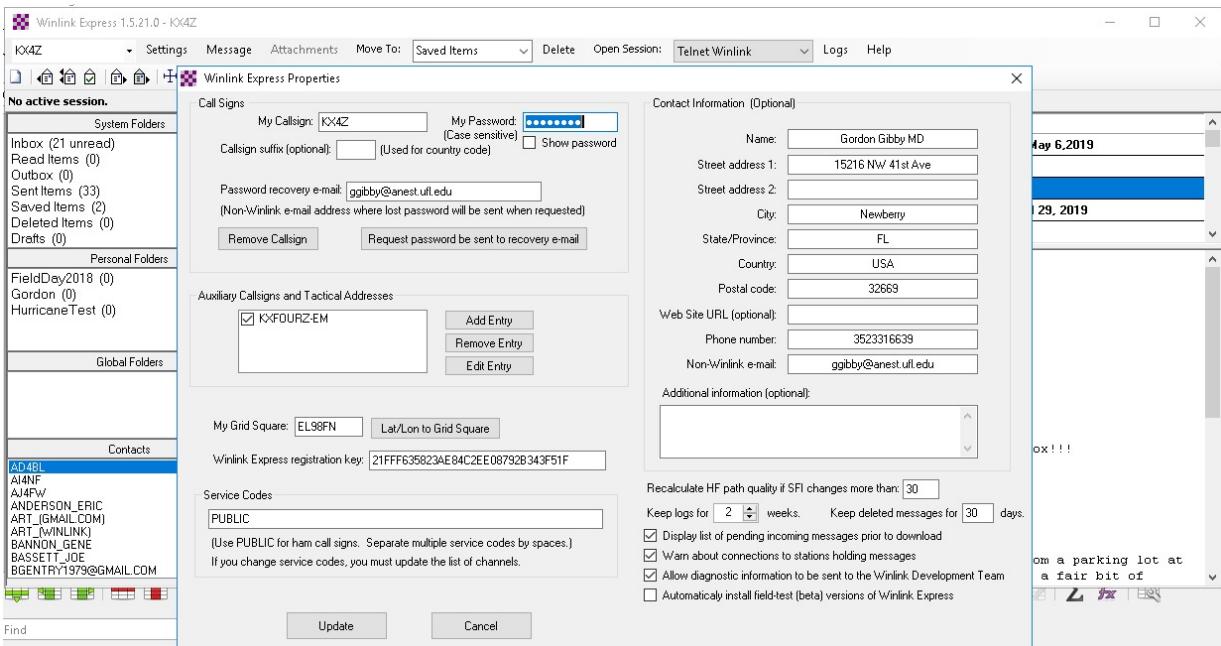
Where WINLINK differs is in transmission: With normal (internet) email systems, you have only ONE way to send an email – over the Internet. With radio email you have not only that choice (named “telnet” for the Internet protocol it uses) but also a SLEW of radio protocols with names like WINMOR, ARDOP, VARA, PACKET and PACTOR.

For Skill #3 we don't need to get up to radio speed – we just need to get (free) WINLINK installed on our deployment laptop computer (Windows 7, 8, 9 or 10 – nothing earlier!) and learn how to use it in INTERNET email (“telnet”). No radio, no signalink, no modem, nothing like that needed.

STEP	ACCOMPLISHMENT
1	Download the free winlink software here: https://downloads.winlink.org/User%20Programs/ Pick the one that starts with WINLINK_Express_Install – the version at the time of this writing was 1-5-21-0.zip
2	Extract that software and install it. If you aren't computer-savvy, you may need to get someone to help you.
3	Deal with any virus checkers that object to installing this software – it is NOT a Trojan or virus. Many common virus checkers do object and have to be TOLD to accept it. I use free WINDOWS DEFENDER (and have for years). You may need help from your computer savvy friend to get through this step. If you decide to change from your previous virus checker to WINDOWS DEFENDER, get a computer savvy person to help you install the new one and select it, so you don't end up with TWO firewalls active! Firewall: Software that helps to prevent Internet snoopers from probing into your computer, and prevents unauthorized malware on your computer from making an outbound surreptitious internet connection. Firewalls complement the protection of VIRUS CHECKERS which try to detect and deal with malicious software on your computer.
4	Tell your computer's FIREWALL to allow WINLINK EXPRESS to make use of Internet Ports – There is an option in most FIREWALLS to “let an app through” – In Windows DEFENDER it looks like this:



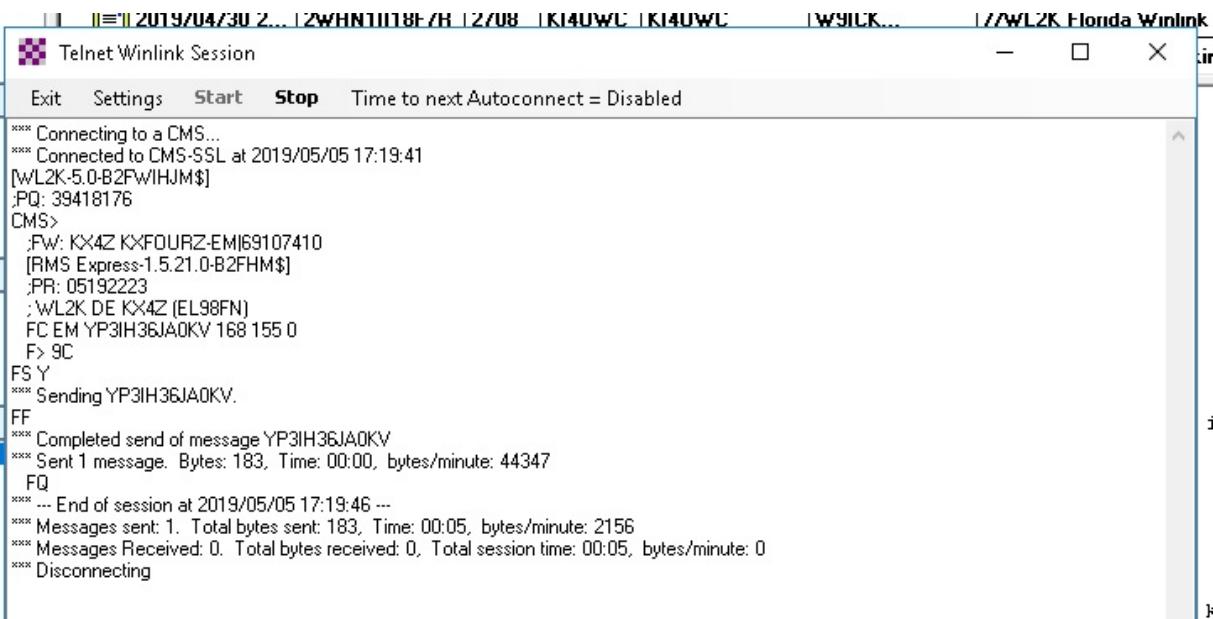
- 5 Create a WINLINK account for yourself. This can ONLY be done from the WINLINK application, by clicking on the menu option SETTINGS, followed by WINLINK EXPRESS SETUP



You need to fill out:

1. Your Callsign – this can only be used by licensed amateur operators.
2. A password of your choice (don't lose it!)
3. Some other email system where you can have your password sent if you forget it
4. Your “grid square” – you can find yours here:

	<p>http://www.levinecentral.com/ham/grid_square.php</p> <ol style="list-style-type: none"> 5. PUBLIC should be your “service code” 6. Fill in your contact information. 7. Leave the rest in its default settings 8. Click UPDATE. If all goes well, it will accept you. (There is an obligatory delay of about 180 seconds before you can SEND your first email)
6	To Create a message, click on the Menu item MESSAGE, and the sub-choice NEW MESSAGE, and put in an email address, and text as you would expect in any email system. Leave it set to send as “WINLINK MESSAGE” and when you are through – click “SAVE TO OUTBOX” (An intermediate step before sending)
7	To Send your message, in the “Open Session” drop down, choose Telnet Winlink, and then click the Open Session to open that kind of session-- then click START in the dialog box, and if all goes well you’ll be rewarded with a connection to a CMS (Central Message Server) and a notice that your message was sent – and you may get an introductory message from WINLINK about your new account or so.



```

[2019/04/30 2... 12WHN1018F/H 12/08 1K14UWL 1K14UWL] //WL2K Honda Winlink
Telnet Winlink Session
Exit Settings Start Stop Time to next Autoconnect = Disabled
*** Connecting to a CMS...
*** Connected to CMS-SSL at 2019/05/05 17:19:41
[WL2K-5.0-B2FWIHJM$]
;PQ: 39418176
CMS>
;FW: KX4Z KXFOURZ-EM|69107410
[RMS Express-1.5.21.0-B2FHM$]
;PR: 05192223
;WL2K DE KX4Z (EL98FN)
FC EM YP3IH36JAOKV 168 155 0
F> 9C
FS Y
*** Sending YP3IH36JAOKV.
FF
*** Completed send of message YP3IH36JAOKV
*** Sent 1 message. Bytes: 183, Time: 00:00, bytes/minute: 44347
FQ
*** ... End of session at 2019/05/05 17:19:46 ...
*** Messages sent: 1. Total bytes sent: 183, Time: 00:05, bytes/minute: 2156
*** Messages Received: 0. Total bytes received: 0, Total session time: 00:05, bytes/minute: 0
*** Disconnecting

```

SKILL #5: WINLINK OVER RADIO

For HF, the only additional equipment you need is some sort of sound-card interface that handles sending and receiving the warbles into your radio's microphone and out of your radio's speaker system (Signalink USB being a very common one, though there are ways to build one yourself) – several HF protocols are built right into your free copy of WINLINK EXPRESSED

For VHF most of the time you have to download a free protocol known as “packet” or “AX.25” and the one we use with soundcards is here:

http://uz7.ho.ua/modem_beta/soundmodem100.zip

However, learning how to USE these HF and VHF systems for radio email is more complicated than I can do in this text. There are numerous you tube presentations that may help, but what we have found to be the best is simply to have an Elmer come along to your radio and guide you through it.

Even after you get started, there will be more to learn and it will take a bit of practice before you are experienced. In Florida, we have a very successful Monday “check-in” net where you are encouraged to send in a certain line of text, in an email to KI4UWC@winlink.org, anytime during the 24 hours of each Monday. Currently, there are over FIFTY successful participants on most Mondays!! And many of us have an informal “competition” where we see how many DIFFERENT ways we can send in the requested message of the week. For more information see the Clay County Ares web page:

<http://www.clayares.org/wp/> where Ray Cook posts the assignment every Sunday, for the following Monday.