

Introductory Florida Baptist Disaster Relief Communications Volunteer Training

Version 0.1 9/25/2020 G. Gibby

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Disasters disrupt virtually all facets of normal, organized society. Utilities such as potable water and electrical power may be compromised or severely damaged. Food and fuel delivery may be interrupted. **But one of the most devastating effects of a disaster is to damage communications, because the efficiency of modern societies depends on communications.**¹

Societies are now accustomed to instantaneous and reliable communications.

- Sub-units of almost all organizations (government, NGO, businesses, hospitals, and even families) are directed and monitored by Internet data communications or cellphones.
- Equipment and supplies are ordered by computer, Internet and telephone.
- Appointments and schedules are created, organized, and promulgated by web pages, Facebook and online entry systems
- Questions can be answered almost immediately via cell phone or text instant messaging.
- Electrical power, liquid and gaseous fuel deliver, sewage, and water systems are maintained and tracked by automated systems that depend on fiber optic, radio, or copper-based electronic connections.

When a disaster damages or obliterates communications systems, not only are food, water, shelter and protection no longer a "given," but the entire community, as well as responders, suddenly lack the ability to operate with their normal efficiency, because of a lack of normal organizational communications. The Florida Baptist Disaster Relief arrived at Mexico Beach after Hurricane Michael to find *everything* obliterated – and they had NO communications -- had to send cars out by a very difficult and slow trek to carry messages. As a result, they became much more interested in emergency backup communications, and hence this arm of their ministry was born. **It becomes difficult to even know where the problems are, and what is their magnitude**, much less to coordinate an effective, efficient response, when communications are no longer available. Furthermore, it is now common to use internet-dependent tools to manage workflow, tracking requests, teams, progress and status. All of this is made much more difficult or impossible if there is a communications failure.

A very practical and concrete local example might be: *A mudding team is heading out in a disaster area to work on three houses. Communications in the area have been destroyed and the team has no means of communications. They are unable to find one address. With no communications, they are unable to check the address or their directions. When they reach the next address, it has already been attended to – but there were no communications of that. On the way to the third address, they suffer significant vehicle difficulties and become stranded -- and with no way to communicate their plight to "home base" now some 10 miles (3 hours of walking) away. Night is approaching and they have gotten nothing done, and are now stranded in a disaster area. Thankfully a sheriff's deputy drives past*

¹ Strongly suggest you read this excerpt: <https://www.qsl.net/nf4rc/KatrinaComms.pdf> to understand just how devastating it can be to lose communications.

with an amateur radio volunteer in the vehicle who has working communications -- they had been alerted over amateur radio that the mudding team was overdue and had been searching for them.

The purpose of this introduction is to provide **technical education** to initial communications volunteers for Florida Baptist Disaster Relief amateur radio communications group, in order to help them better join in on basic communications needs, such as assisting with security teams' radio communications, or mudding or chainsaw teams.

ICS Organization: Florida Baptist Disaster Relief is organized based on the Incident Command System. This drawing is loosely based on information from Missouri Baptist Disaster Relief, but applies reasonably well in many states. Comm Units vary at times where they fit within an organization, which may be organized along ministry lines such as Emergency Response Team, Administration, Feeding, etc.

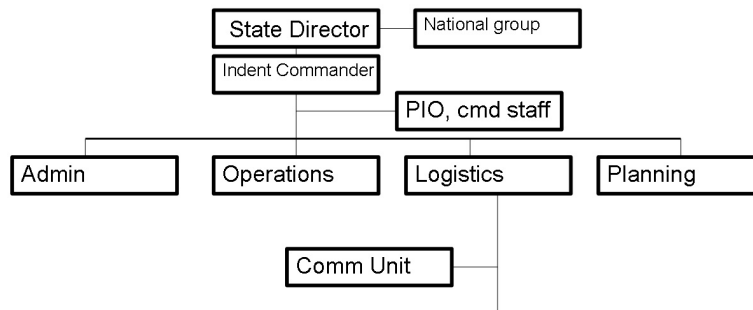


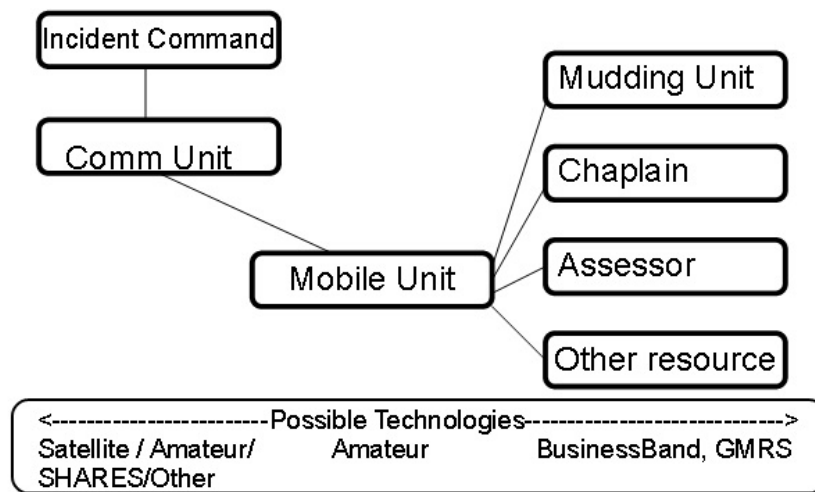
Illustration of ICS System in disaster relief. G. Gibby

Entry level volunteers for Florida Baptist Communications ministry team should

- have a Technician or higher Amateur Radio License
- be familiar with the use of a hand held vhf/uhf transceiver, including repeaters, tones, etc.
- have a basic familiarity with WIFI networks, such as those used in most homes to provide Internet connectivity.

OVERVIEW OF COMMUNICATIONS GOALS

This graphic gives a good overview of the types of communications you may be assisting in a Disaster Relief Ministry:



Possible Radio Technologies. Illustration by G. Gibby

In any disaster area of operations with damaged communications, multiple types of communications links must be re-created, including:

- Between Disaster Relief Incident Command (IC) and State or Local Emergency Operations Center(s) and county / state / federal officials at their locations, potentially through volunteers from the Disaster Relief stationed there. (This is typically handled by communications volunteers with more training than contained in this document.)
- Between DR IC and suppliers of all types, including materials for food preparation and all other needed supplies
- Between DR IC and forward deployed units.
- Between DR IC / forward deployed units, and strike teams or individual resources such as mudding teams, chaplains etc. in the field.

Some of the communications are long range, some are short range. **Entry-level communications volunteers are a huge help in solving the short-range communications problems.** Examples include:

- Amateur radio VHF/UHF simplex or repeater communications to reach deployed units or individual resources where appropriate.
- Business band VHF/UHF simplex or repeater communications to reach deployed units or individual resources
- GMRS or other suitable radio communications to respond to the needs of citizens
- Human relaying of messages from one system to another
- Assistance with desktop and laptop computers (logging into WIFI network, setting up printers)
- Temporary ("itinerant") repeater systems to assist in communications.

FLORIDA SARNET

Florida has a unique system of connected UHF repeaters that runs the backbone of the state, connected together as a giant "Party Line" system. The repeaters are connected by radio equipment that receives and transmits to local ham UHF repeaters in many communities, but is connected together up and down the Interstates via microwave connections formerly used by the Florida Motorist Assistance System (which was decommissioned after cell phones became so widespread).

The SARNET offers party-line ANALOG FM VOICE (NOT digital) communications and will likely be monitored by the State EOC as well as EOC's in many counties. The SARNET has many strengths and many weaknesses, but it is an important tool in your bag of capabilities:

- Allows easy voice connection to a host of authorities in a time of real need
- Can be reached with just a UHF transceiver; no computer or special knowledge needed
- Because of the delays, you'll need to be even more patient – after hitting the PushToTalk button, your first second or two will not be heard --- so give it a moment for all the relays to click in....
- This system is a "serial" system, and any failure of the microwave connecting backbone splits it into broken pieces of spaghetti. That can easily happen in a severe disaster.
- This system is susceptible to malicious jamming. While there are some techniques that can be utilized against jammers, they aren't perfect. So it is a vulnerable resource.
- DON'T HOG THE FREQUENCY -- this is used by many, many people, so be BRIEF and SUCCINCT. It typically operates as an informal net, and is intended to handle brief or emergency needs for communications in emergencies..

SITE	Repeater Receive	RX Tone	Repeater Transmit	TX Tone
Apalachicola	449.4000	94.8	444.4000	94.8
Brooksville	449.8250	146.2	444.8250	146.2
Central Turnpike	449.9750	107.2	444.9750	107.2
Chattahoochee	449.9750	94.8	444.9750	94.8
Chipley	449.7500	100	444.7500	100
Clermont	449.9750	103.5	444.9750	103.5
Cocoa	449.6500	107.2	444.6500	107.2
Crestview	449.9000	100	444.9000	100
Dundee	449.3500	103.5	444.3500	103.5
Florida City	447.0500	114.8	442.0500	114.8
Ft. Lauderdale	447.8500	110.9	442.8500	110.9
Ft. Myers	449.2250	136.5	444.2250	136.5
Gainesville	449.9250	123	444.9250	123
Islamorada	447.8500	114.8	442.8500	114.8
Jacksonville	449.7000	127.3	444.7000	127.3
Key West	449.4000	114.8	444.4000	114.8
Lake City	449.9000	110.9	444.9000	110.9
Lakeland	447.2750	82.5	442.2750	82.5
Live Oak	448.7000	110.9	443.7000	110.9
Madison	449.3000	94.8	444.3000	94.8
Miami	449.6000	167.9	444.6000	167.9
Milton	449.7250	100	444.7250	100
Naples	449.9500	103.5	444.9500	103.5
Ocala	449.0250	123	444.0250	123
Orlando	449.0750	103.5	444.0750	103.5
Palm Beach	448.9750	110.9	443.9750	110.9
Panama City	449.1750	100	444.1750	100
Pensacola	449.8750	100	444.8750	100
Perry	448.1000	94.8	443.1000	94.8
Sarasota	449.8000	100	444.8000	100
Sebastian	449.3750	107.2	444.3750	107.2
SEOC	448.5000	94.8	443.5000	94.8
Skyway Bridge	447.2500	146.2	442.2500	146.2
St. Augustine	447.8000	127.3	442.8000	127.3
Stuart	449.1500	107.2	444.1500	107.2
Tallahassee	447.1000	94.8	442.1000	94.8
Tampa	447.8500	146.2	442.8500	146.2
Yulee	447.9000	127.3	442.9000	127.3

Updated on 8/2/19

Further information about the SARNET:

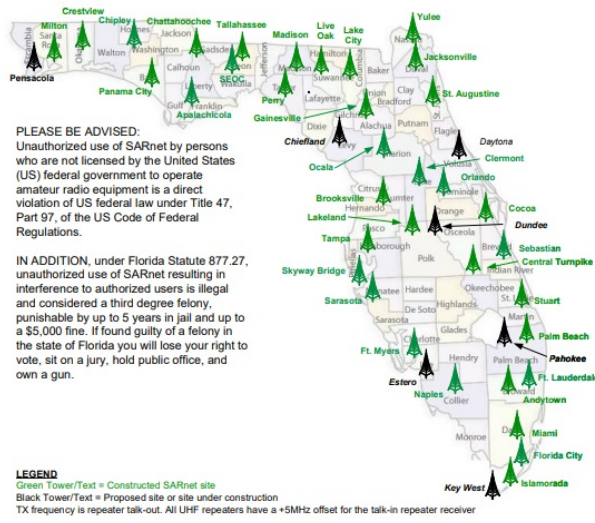
Homepage: <https://www.sarnetfl.com/>

How It Works: <https://www.sarnetfl.com/how-it-works.html>

SARNET CURRENT MAPS: <https://www.sarnetfl.com/system-maps.html>

Page to check current status: <https://www.sarnetfl.com/system-status.html>

Statewide Amateur Radio Network "SARNET"
Constructed Sites as of September 24, 2019
YOU MUST BE A FEDERALLY LICENSED AMATEUR
RADIO OPERATOR WITH A CALLSIGN TO USE SARNET



PLEASE BE ADVISED:
 Unauthorized use of SARNET by persons who are not licensed by the United States (US) federal government to operate amateur radio equipment is a direct violation of US federal law under Title 47, Part 97, of the US Code of Federal Regulations.

IN ADDITION, under Florida Statute 877.27, unauthorized use of SARNET resulting in interference to authorized users is illegal and considered a third degree felony, punishable by up to 5 years in jail and up to a \$5,000 fine. If found guilty of a felony in the state of Florida you will lose your right to vote, sit on a jury, hold public office, and own a gun.

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

SARNET SITE	TX (MHz)	Tone (Hz)
Andytown	442.825	110.9
Apalachicola	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	444.850	107.2
Crestview	444.900	100.0
Daytona	TBD	TBD
Dundee	444.350	103.5
Estero	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	444.950	103.5
Ocala	444.025	123.0
Orlando	444.075	103.5
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

Note that this map is only current as of October 7 2019

SUGGESTIONS TO AVOID REGULATORY DIFFICULTIES WITH AMATEUR RADIO AND NON-AMATEUR BUSINESSES IN DISASTER COMMUNICATIONS

Explanation: There are persons who will take issue with any communications related to purchase of items over amateur radio, particularly if these accidentally occur outside of a real disaster.

SUGGESTION Most of the communications in disaster service have to do with VOLUNTEERS serving the community. Avoid any discussions of MONEY as all services of Florida Baptist Disaster Relief are FREE anyway. When possible, use our business band repeater system for FBDR related traffic, but when there aren't other working solutions, utilize amateur radio and mention that it is for life or property protection if that isn't already obvious. Never hesitate to use any radio system available in the event of an acute emergency or medical issue.

LOCAL COMMUNICATIONS

Used for Emergency Response Team and also potentially to reach deployed tarp, chainsaw or mudding teams.

REPEATERS: Most repeaters are “duplex” repeaters that receive on one frequency and simultaneously re-transmit the received audio on a different frequency. If a repeater offset is described as “+5” that means the USER transmits at a frequency 5 MHz higher than the frequency on which the Repeater transmits and the USER RECEIVES. If only one frequency is published for the repeater, it will be the one on which the user receives and the repeater transmits. (In an ICS-205, the user receive and transmit frequencies are made much more explicit.) CTCSS (“private line”) sub-audible tones may be required for a user to access the repeater. These are chosen from a discrete set of standardized frequencies. These parameters are very commonly utilized and understood by all amateur radio operators. **You will need to know how to program your radio to adapt to a local repeater’s frequencies and required tone.** Review your manual and/or bring any required programming equipment!

Business Band Repeater. Florida Baptist Disaster Relief is blessed with a business band repeater in the 460 MHz band which allows the use simple UHF hand held transceivers as well as mobile units. The radius of the coverage circle of this repeater is primarily related to the HEIGHT OF ITS ANTENNA. In miles, the coverage is just a bit greater than the square root of the height of the antenna (in relatively flat territory) due to the curvature of the earth. Example: a 25 foot high UHF repeater antenna (square root 5) gives about 6 miles of coverage radius. If More coverage is required, the distant station can raise their antenna (adding to the total radial distance) or a higher antenna tower can be used for the repeater antenna. This repeater is a primary tool for local Florida Baptist Disaster Relief communications.

Direct Simplex Radio

For very local communications (less than a mile, in relatively unobstructed territory) direct business band or amateur radio communications may suffice.

Amateur Radio Repeaters

If a local amateur radio repeater in the area of ministry still work, it may be an excellent resource to provide essential communications to deployed teams as long as there is no pecuniary interest in any of the communications. Be courteous of other amateurs, ARES® and authorities who may be utilizing that resource; if there is a directed net operating on it, follow net control directions.

Many amateurs are familiar with a "repeater directory" that lists available VHF/UHF repeaters. It would be a very wise idea to print out the applicable pages from such a directory for the area of service BEFORE HEADING THERE. Some of those repeaters may still be in operation; others will not. Some users may congregate (using simplex) on the "output frequency" (user receive frequency) of the repeater and have useful information.

Bringing Your Own Repeater: You may be able to provide a temporary "replacement repeater" for the area, as your disaster ministry gains assets. Remember, the key for a repeater isn't really power – it is HEIGHT.

Here is an example of a topical conversation with a deployed unit over an amateur radio frequency (material retyped with small changes from Missouri Baptist Disaster Relief). When using readily received communications resources, we want to protect the confidentiality of the disaster assistance recipients (addresses, names, etc, for safety) as well as our volunteers, while complying with identification requirements. If communicating over a business band system, amateur call signs should not be used.

TYPICAL CONVERSATION

Com Trailer on 2 meter Amateur Radio: "W0GRP Mobile 2, this is KD0KVS Baptist Com."

Mobile 2: "KD0KVS Baptist Com, this is W0GRP Mobile 2, go ahead."

Com Trailer: "Operations needs to know the current location of Recovery 35."

Mobile 2: "Operations need to know the current location of Recovery 35, Stand by Baptist Com and we will check. W0GRP Mobile 2 clear."

Com Trailer: "That is correct, KD0KVS Baptist Com standing by."

Mobile 2 on Business Band: "Recovery 35, this is Mobile 2."

Recovery 35: "Recovery 35, go ahead."

Mobile 2: "Operations need a current Work Order Number where your unit is located."

Recovery 35: "Operations needs a current Work Order Number where our unit is located. We are current at Work Order Number 135."

Mobile 2: "I understand. Recovery 35 is currently at Work Order Number 135." Thank you, Recovery 35. Mobile 2 clear."

Recovery 35: "Recovery 35 clear."

Mobile 2 on 2-meter Amateur Radio: "KD0KVS Baptist Com, this is W0GRP Mobile 2."

Com Trailer: "W0GRP Mobile 2, this is KD0KVS Baptist Com, go ahead."

Mobile 2: "Baptist Com, Recovery 35 is current at Work Order Number 135.:"

Com Trailer: "Recovery 35 is current at Work Order Number 135. Thank you, Mobile 2. KD0KVS Baptist Com clear."

Mobile 2: "W0GRP Mobile 2 clear."

Notice what extreme effort was made to ensure accurate transmissions, with multiple redundancies employed. Also notice that no personally identifiable information (addresses, etc) were transmitted. Those are good techniques to use to protect our clients and volunteers.

WHAT TO BRING

1. A willing and servant-minded heart. – and your Bible!
2. A twin-sized mat or preferably air mattress or cot, with appropriate bedding. (Larger than twin size is strongly discouraged due to space.) Floors may be hard!
3. All your medications for twice the time of anticipated deployment.
4. Suitable clothing for several days. Laundry facilities are limited to very long-term participants
5. Suitable protection against rain.
6. You may wish to bring along some safely stored fuel for your vehicle in case there are fuel distribution issues in your disaster area.
7. Some emergency water (normally the ministry will have plenty of water)
8. Any necessary snacks (normally the ministry will handle all meals)
9. Multiple hand-held transceivers, marked with your name and with charging systems.
10. Additional batteries is possible.
11. If possible one or more mobile amateur radio VHF/UHF transceivers in your vehicle, with a roof mounted temporary or permanent antenna.
12. Florida Baptist Disaster Relief Credentials (current badge, appropriate clothing)
13. If possible, place a FBDR sticker on your car to make it easier to identify in a convoy
14. CPAP or other required medical equipment.
15. Suitable sleeping garments – trips to the restroom/shower will require full clothing (shirt, pants, etc)
16. If possible, a small tool kit to handle normal wiring failures or connector problems that communications volunteers can assist with Include a voltmeter/multi-meter. Complex repairs are not likely to be handled in the field.
17. If possible, a suitable laptop computer if you are trained or proficient with networking or digital communications.

No.	Question	Choices	Your choice
1	You are told the repeater is “146.820, minus 600kHz, tone 100.0” What frequency do you set your transceiver to transmit on?	A. 146.820 B. 146.220 C. 100.000 D. 146.920	
2	Ministry service recipient names and addresses should be freely transmitted over the radio.	A. TRUE B. FALSE	
3	Discussions of prices of available bulk food items for organizational purchase should be freely discussed over amateur radio repeaters.	A. TRUE B. FALSE	
4	Discussions of prices of available bulk food items for organizational purchase can be freely discussed over the business band radio.	A. TRUE B. FALSE	
5	The frequencies used by the	A TRUE	

	Emergency Response Team should be widely broadcast	B. FALSE	
6..	Your repeater antenna is set at 40 feet at the top of the antenna. Assuming relatively rural landscape, and users' radios at waist level, what range can you expect?	A. 1 mile B. 4 miles C. 6-7 miles D. 10 miles	
7.	When in disaster ministry service, you do not need to use your amateur radio callsign over amateur radio repeaters.	A. TRUE B. FALSE	
8.	You should always use your amateur radio call sign over the business band repeater.	A. TRUE B. FALSE	

