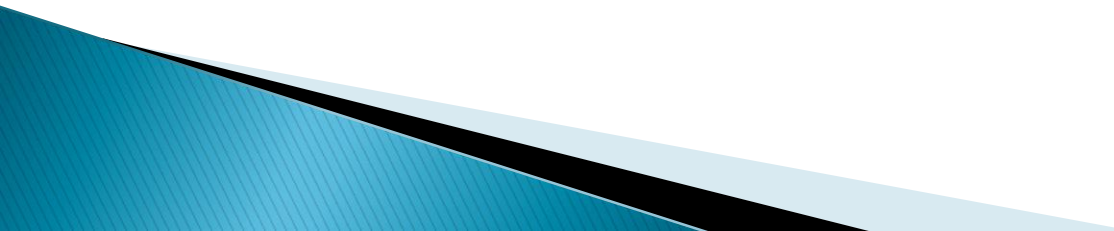


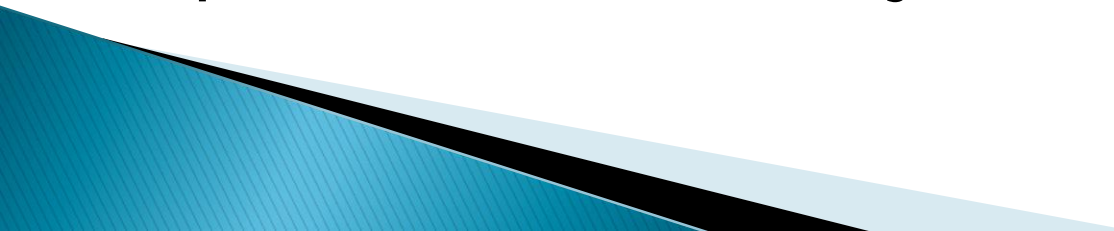
Simplex Operations & Equipment – Part 1

5 Minute Net Training Session

Simplex Operations & Equipment

- ▶ For the next several weeks, we will be discussing simplex operations and equipment.
 - ▶ The purpose of these discussions is to get everyone involved with amateur radio emergency communications to seriously consider the ramifications of performing our function with limited or no operational VHF/UHF repeaters.
 - ▶ The audience for these discussions includes all amateur radio emcomm volunteers including those involved with ARES, RACES, CERT, Skywarn, and the growing number of local non-profit and/or religious relief organizations.
- 

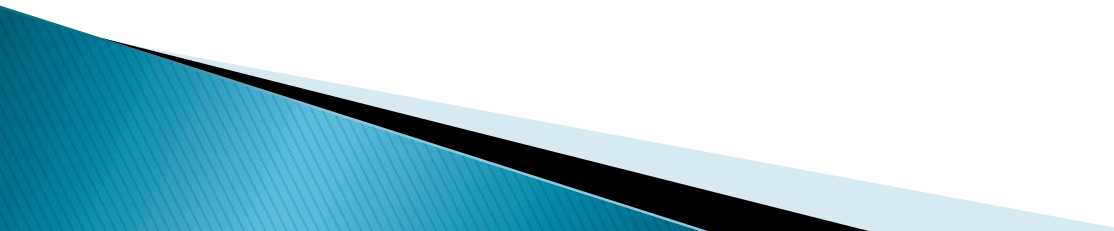
Why Consider Simplex?

- ▶ Major hurricanes are category 3, 4, or 5.
 - ▶ It has been over 44 years since Palm Beach County has experienced a major hurricane.
 - ▶ The last major hurricane in Palm Beach County was Isbell in 1964 (Category 3).
 - ▶ Until the 1960's, Palm Beach County experienced a major hurricane on average once every 15 years.
 - ▶ Many area repeaters, especially private and club repeaters are not engineered for the punishment of a major hurricane.
- 

Lets Consider Thinking Simplex

- ▶ The following few slides are excerpts from various ARES/RACES sources on the Internet that stress the importance of thinking simplex.
- ▶ Again, the purpose of these slides is to stimulate discussions and thinking about Simplex among amateur radio emcomm volunteers.

Simplex Thinking

- ▶ **If amateurs take repeater systems for granted and depend on them, groups such as RACES are less able to respond during an emergency.**
 - ▶ **If one or more repeaters go off the air from wind, rain, or power failures, remaining ones can become overloaded. It is difficult to coordinate regional activities if everyone uses the same few repeaters!**
- 

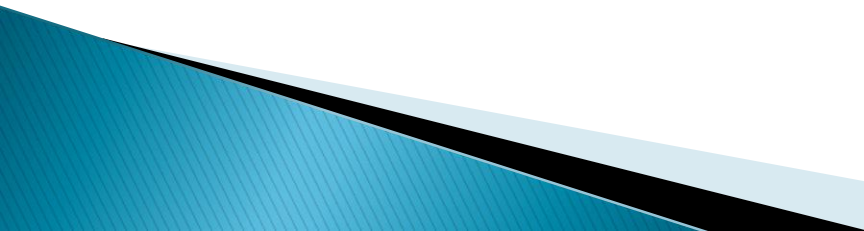
Simplex Thinking

- ▶ **Realistic disaster training anticipates that some or all local repeaters may be unavailable.**
- ▶ After a severe storm, repeaters may be on battery power, which should be conserved, so we shouldn't expect them to "always be there" to compensate for weak individual stations. Local and regional plans must stipulate when simplex is appropriate, including guidance to manage communications if one or more repeaters go "down."

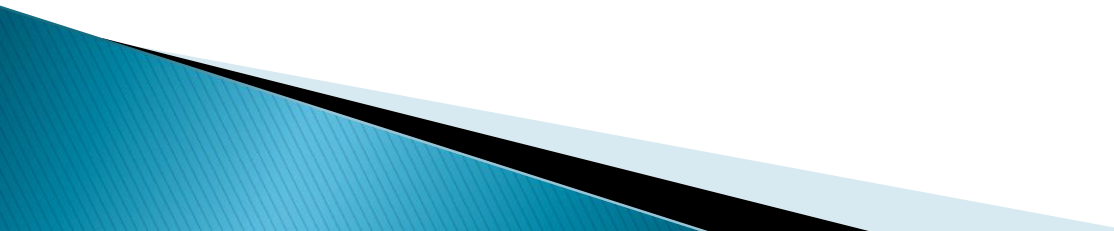
Simplex Thinking

- ▶ Repeaters are appropriate for "talk-in" and to reach into areas with poor simplex coverage, but don't use them for your primary working frequency for an event covering a small area.
- ▶ If an event covers a radius of only a few miles, consider using simplex instead of tying up a machine. Keep repeaters available for inter-jurisdictional, priority traffic, as a backup, for alerting, etc. when wide-area coverage is really needed.

Simplex Thinking

- ▶ **Operators need to know assigned simplex frequencies to use for local nets, which follow approved band plans and channelization!**
 - ▶ A laminated wallet card with a contact list of emergency telephone numbers and a regional frequency list is recommended.
 - ▶ The ICS-205 is the primary document for “governmental” amateur radio emcomm frequencies including RACES, and CERT.
 - ▶ Non-governmental emcomm groups should also have assigned simplex frequencies.
- 

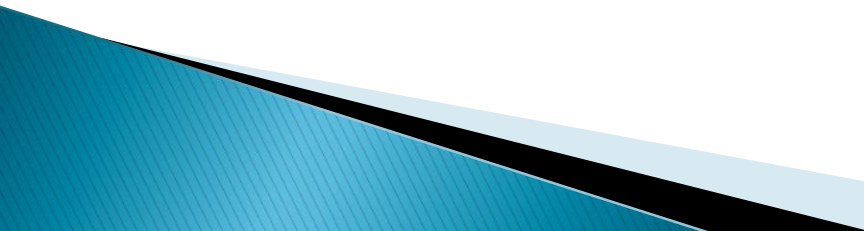
Simplex Thinking

- ▶ **"Elmering" Should Teach Basic Skills.**
 - ▶ New operator classes should stress operating skills, "good amateur practice," safety, preparation and proper use of equipment, beyond the minimum needed to "pass the test." Encourage new hams to participate in public service events and nets to learn essential skills, such as handling formal traffic, so they will gain experience and confidence enabling them to become skilled, effective emergency communicators.
- 

Simplex Thinking

- ▶ **Stress in nets, club events and exercises the appropriate use of simplex while teaching directed net procedures.**
- ▶ Show why, how and when to change from repeater to simplex operation. Instruct operators to listen routinely to a repeater's input frequency. If both stations have good copy, change to simplex and free up the machine. Pause 2–3 second breaks between transmissions, for stations with priority traffic, or needing relays.

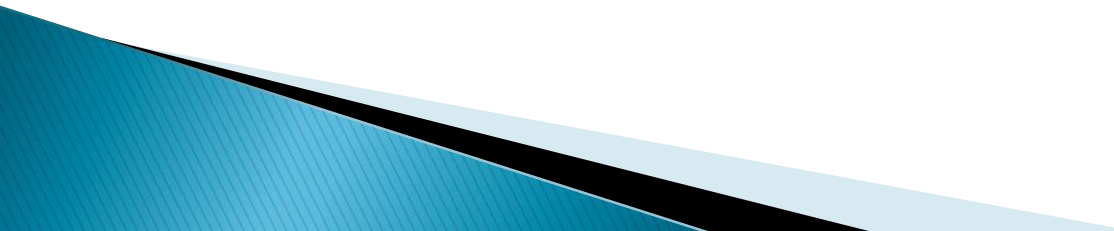
Summary

- ▶ These are just some of the recommendations on the internet from various amateur radio emcomm groups around the country.
 - ▶ Next week, we will continue with additional thoughts about simplex and start talking about equipment needs for simplex.
 - ▶ **“HOMEWORK”** – Start talking with your fellow hams about whether you think “Simplex Thinking” should be a part of what we do to support our served agencies.
- 

Simplex Operations & Equipment – Part 2

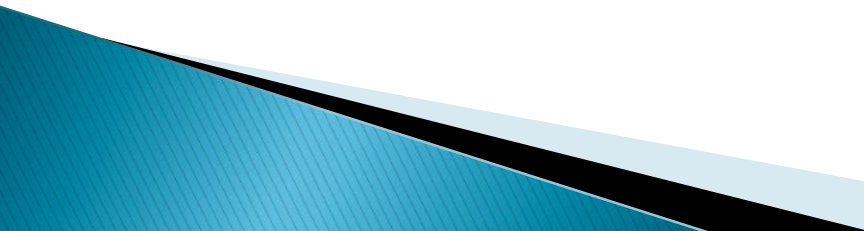
5 Minute Net Training Session

Simplex Operations & Equipment

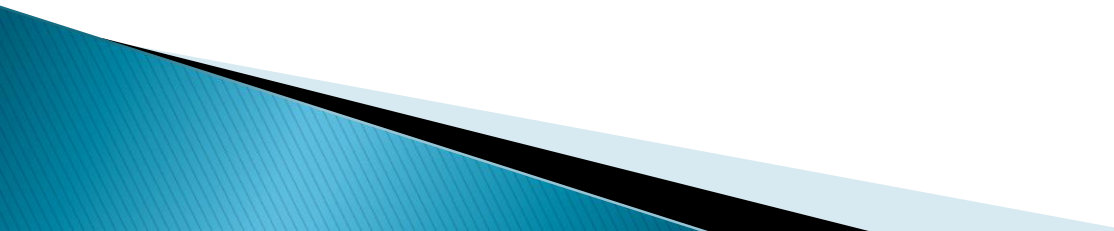
- ▶ Starting last week and continuing for a few more weeks, we are discussing simplex operations and equipment.
 - ▶ The purpose is to get everyone involved with emergency communications to consider the ramifications of performing our function with limited or no operational VHF/UHF repeaters.
 - ▶ This includes all amateur radio emcomm volunteers including those involved with ARES, RACES, CERT, Skywarn, and local non-profit and/or religious relief organizations.
- 

Why Consider Simplex?

As we said last week:

- ▶ Major hurricanes are category 3, 4, or 5.
 - ▶ It has been over 44 years since Palm Beach County has experienced a major hurricane.
 - ▶ The last major hurricane here was Isbell in 1964 .
 - ▶ Until the 1960's, Palm Beach County experienced a major hurricane on average once every 15 years.
 - ▶ Many area repeaters, especially private and club repeaters may not be engineered for the punishment of a major hurricane.
- 

Lets Consider Thinking Simplex

- ▶ The following few slides are excerpts from various ARES/RACES sources on the Internet that stress the importance of “**thinking simplex**”.
 - ▶ You may not agree with everything here but the purpose of these slides is to stimulate discussions and thinking about Simplex among amateur radio emcomm volunteers.
- 

Simplex Thinking

- ▶ **Teach new operators the routine use of relays to operate in a simplex environment.**
- ▶ **On simplex, it is important to open the squelch to listen for weak stations, instead of keeping it tight to reduce noise. New operators also need to be taught to use plain language, correct "pro words" and ITU phonetics on phone and how to program a new frequency, offset and CTCSS tone not already in memory.**

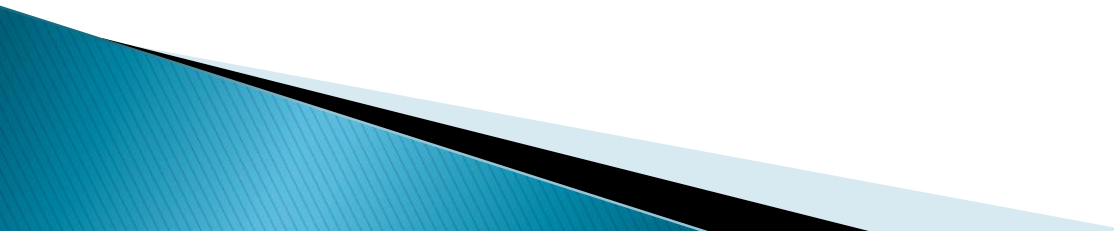
Simplex Thinking

- ▶ **Hand held transceivers are not adequate as primary rigs for emergency communications!**
- ▶ If a HT signal is so weak that it cannot be copied, it takes double the air time and battery consumption from others to provide relays, repeats or fills. Having "only an HT" limits you to nearby repeaters or simplex within a few miles.

Simplex Thinking

- ▶ **Stress the use of minimum power needed for reliable communication, but remember that with simplex, the emphasis must be on **RELIABLE!****
- ▶ New operators of driving age should buy 50w mobiles as first rigs, because they cost no more than a HT, but have better simplex performance. When you can afford a spare rig, **THEN** buy a sturdy dual-band HT! Guidance is necessary on appropriate power for working simplex versus local or distant repeaters.

Simplex Thinking

- ▶ **If a repeater goes off the air, operators need adequate power to continue on simplex, including listening for and relaying weak stations!**
 - ▶ **Use enough output power to get your traffic through the first time, but don't waste your batteries with inefficient use of excessive power, causing interference to distant stations you cannot hear!**
- 

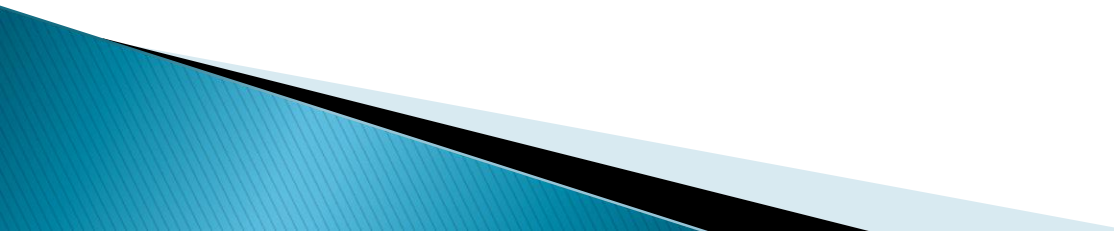
Simplex Thinking

- ▶ **Mobile/portable VHF operators for county-wide nets need 25 watts output and at least a 3db gain antenna elevated 15 ft. or more above ground elevation.**
- ▶ **Hand held users need external battery power to maintain 5w into a higher-gain directional antenna, such as a 3 or 4-element Yagi, or to augment their HT with a 25-30w brick amplifier into an elevated Omni-directional antenna, such as a J-pole. Fixed stations need equivalent antenna height and gain with adequate auxiliary power to last a minimum of 24 hours.**

Simplex Thinking

- ▶ **The importance of increasing antenna height cannot be stressed highly enough.**
- ▶ **A 4-element Yagi elevated 15 ft. with 25w from an HT+brick amp out performs 100 watts into a typical mobile whip mounted on the car trunk lid.**

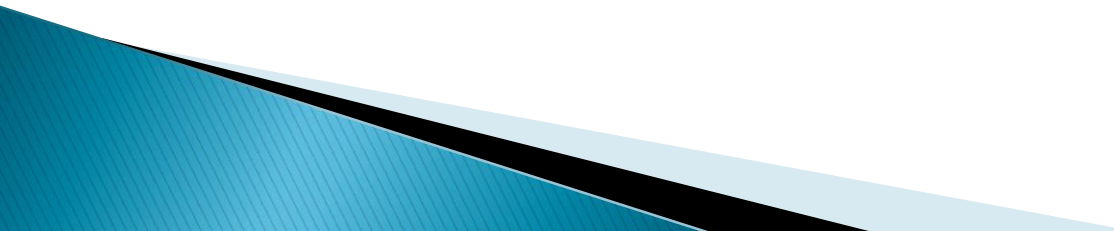
Summary

- ▶ These are just some of the recommendations on the internet from various amateur radio emcomm groups around the country.
 - ▶ Next week, we will continue with additional thoughts about simplex and equipment needs for simplex.
 - ▶ **“HOMEWORK”** – Talk with your fellow hams about whether you think **“Simplex Thinking”** should be a part of what we do to support our served agencies.
- 

Simplex Operations & Equipment – Part 3

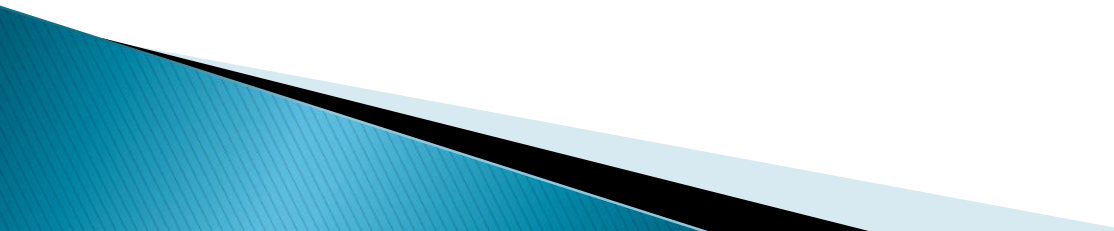
5 Minute Net Training Session

Simplex Operations & Equipment

- ▶ Starting two weeks ago and continuing for a couple more weeks, we are discussing simplex operations and equipment.
 - ▶ The purpose is to get everyone involved with emergency communications to consider the ramifications of performing our function with limited or no operational VHF/UHF repeaters.
 - ▶ This includes all amateur radio emcomm volunteers including those involved with ARES, RACES, CERT, Skywarn, and local non-profit and/or religious relief organizations.
- 

Why Consider Simplex?

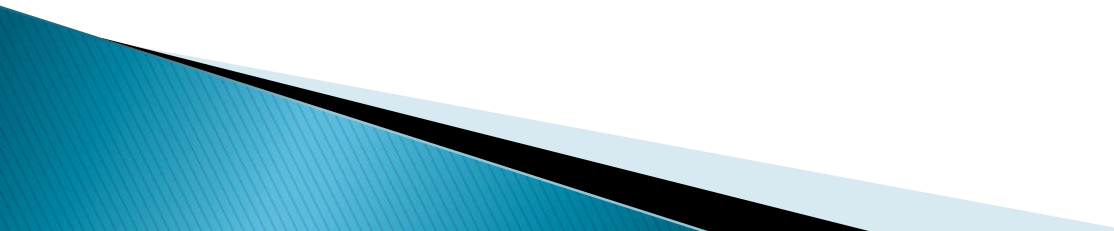
As we have said before:

- ▶ Major hurricanes are category 3, 4, or 5.
 - ▶ It has been over 44 years since Palm Beach County has experienced a major hurricane.
 - ▶ The last major hurricane here was Isbell in 1964 .
 - ▶ Until the 1960's, Palm Beach County experienced a major hurricane on average once every 15 years.
 - ▶ Many area repeaters, especially private and club repeaters may not be engineered for the punishment of a major hurricane.
- 

Lets Consider Thinking Simplex

- ▶ The following few slides are excerpts from various ARES/RACES sources on the Internet that stress the importance of “**thinking simplex**”.
- ▶ You may not agree with everything here but the purpose of these slides is to stimulate discussions and thinking about Simplex among amateur radio emcomm volunteers.

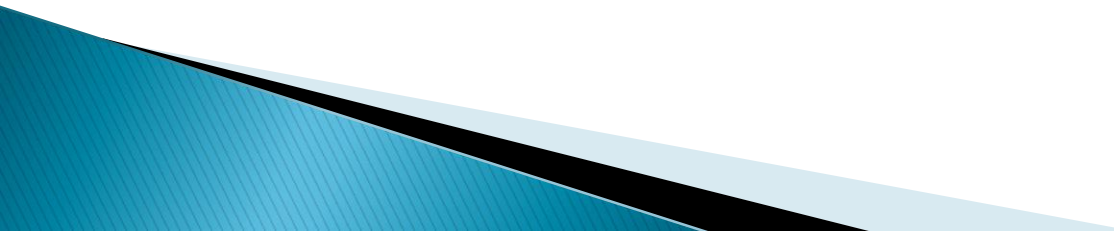
Simplex Thinking

- ▶ **Using a portable mast mounted base antenna or Yagi enables you to use less power to save your batteries.**
 - ▶ **Some operators use a ground radial adapter, which enables a mobile antenna to be attached with hose clamps and elevated on a portable mast. Others use a small dual-band base antenna with at least 3db gain.**
- 

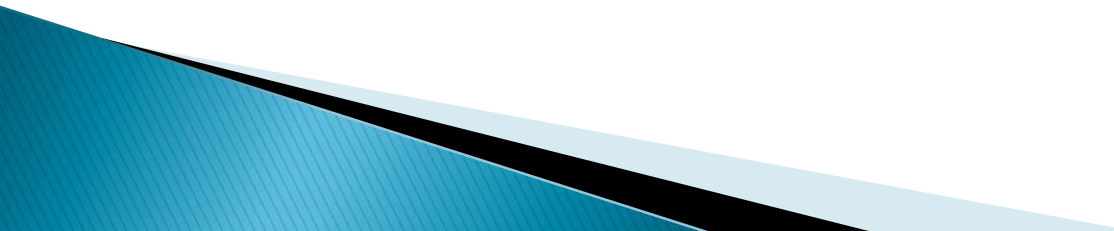
Simplex Thinking

- ▶ **Don't depend on having a regular Net Control.**
- ▶ RACES operators should know how to call up and run a net. In an emergency, your "regular" net control may be busy elsewhere or otherwise unavailable. This goes double if we must use simplex.

Simplex Thinking

- ▶ A "weak signal" rig is recommended for the primary NCS in a simplex environment because its improved sensitivity brings in fringe stations that a typical FM mobile can't even hear. All-mode transceivers, which don't receive outside the 2-meter band, are also less susceptible to intermodulation distortion when used in high RF environments such as hospitals.
- 

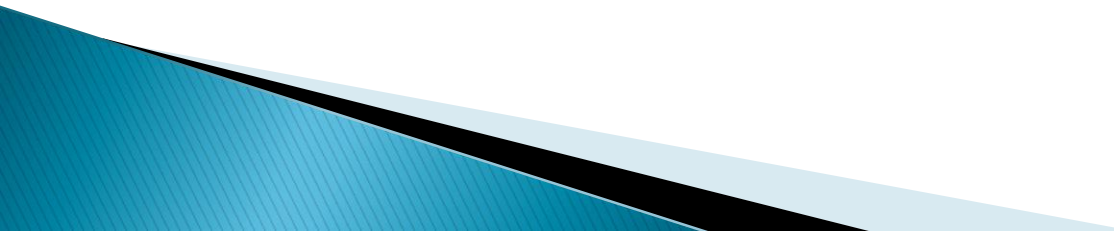
Simplex Thinking

- ▶ **Simplex requires low loss feed-line to preserve signal strength.**
 - ▶ Use RG8-X for HF runs less than 100 ft., jumpers and short VHF runs to 40 feet and for mobile installs.
 - ▶ Use RG-8 or RG-213 for 6 meters and below for runs up to 200 ft.
 - ▶ Use 9913F or LMR-400 for VHF runs over 40 feet and all uses above 200 MHz.
- 

Simplex Thinking

- ▶ **Become familiar with the simplex frequency assignments for your area.–**
- ▶ The ICS–205 document lists simplex frequency assignments for each area in the event that the repeaters are down. Become familiar with these frequencies and/or program them into your radio. Remember, simplex frequencies don't use offsets or tones like repeater frequencies.

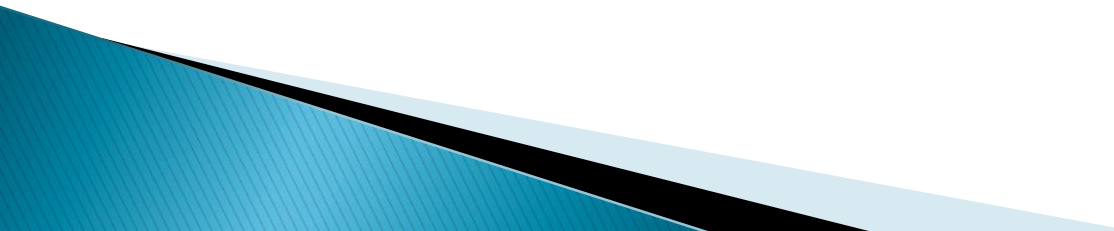
Summary

- ▶ These are just some of the recommendations on the internet from various amateur radio emcomm groups around the country.
 - ▶ Next week, we will continue with additional thoughts about simplex and equipment needs for simplex.
 - ▶ **“HOMEWORK”** – Talk with your fellow hams about whether you think **“Simplex Thinking”** should be a part of what we do to support our served agencies.
- 

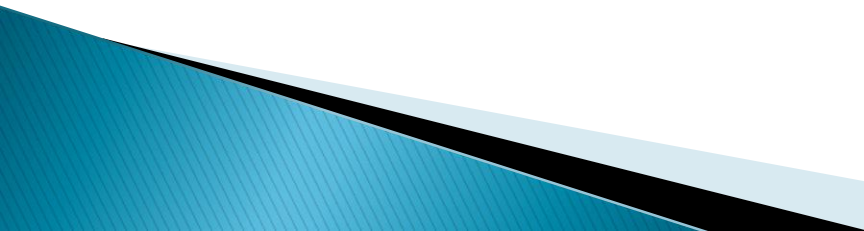
Simplex Operations & Equipment – Part 4

5 Minute Net Training Session

Simplex Review

- ▶ For the last several weeks we have been reviewing simple operations, equipment, and techniques.
 - ▶ This week we will review simplex issues one more time.
 - ▶ In day to day VHF/UHF amateur radio, we have become accustomed to using repeaters.
 - ▶ Not only do repeaters extend our range, but they let us operate day to day with less powerful radios (i.e. HT's) and less efficient antennas (i.e. rubber ducks).
- 

Simplex Review

- ▶ Because of our day to day use of repeaters, we may be lulled into complacency as to what it really takes to communicate on VHF/UHF over any distance WITHOUT the use of repeaters.
 - ▶ In a sever enough disaster such as a major hurricane (stronger than we have experienced locally in over 40 years), repeaters may not survive.
 - ▶ This is not the time to “wake up” about issues with simplex VHF/UHF communications.
- 

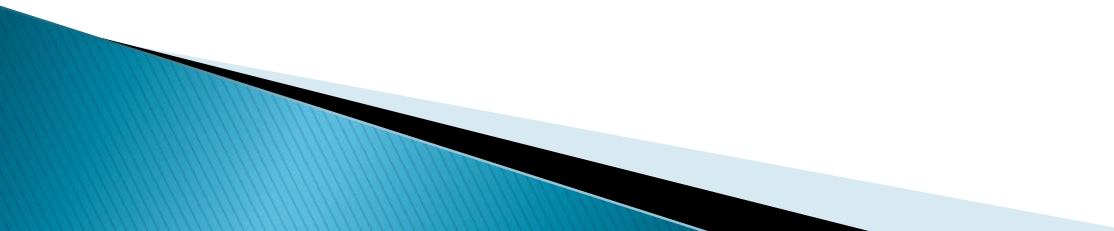
Simplex Review

- ▶ Although you may be able to check-in a the weekly ARES/RACES net with an HT and rubber duck using a repeater, this kind if equipment is not adequate for emergencies.
- ▶ If we need to “go simplex”, we need power, better antennas, and height.
- ▶ A mobile type radio that outputs 25 to 50 watts or more will reach much farther than a 5 watt handheld transceiver.
- ▶ Another option is an amplifier to boost an HT’s lower power output to 25 watts or more, but the combination of an HT and an amplifier will probably cost more than a mobile type radio.

Simplex Review

- ▶ Any external antenna is better than a rubber duck – even an inexpensive rolled j-pole made with 300 ohm twinlead will outperform a rubber duck significantly.
- ▶ Remember, “Height is Might”. The higher the antenna is located, the greater the distance that simplex will work.
- ▶ Simplex operations also may require additional operating procedures.
- ▶ We rarely need “relays” when using repeaters but with simplex, some stations may not be able to communicate to the NCS without an intervening relay station to hear and retransmit the message.

Simplex Review

- ▶ The best way to become familiar with simplex operations and limitations is to use and practice with it.
 - ▶ This season, we will be periodically be doing pre-announced simplex exercises and at least one major simplex drill.
 - ▶ If you are listening to the net right now with an HT and a rubber duck, start thinking about what you will want to have for simplex.
 - ▶ Remember, to truly be effective for our served agencies, groups, or teams, we must be prepared to work without repeaters.
- 

An Experiment

- ▶ Finally, you can start to get a “feel” for simplex by using your radio’s “Monitor” function.
- ▶ Most Amateur Radios have a way to open the squelch and listen to the repeater input frequency to see if you can hear the other station directly. In many cases, it is as simple as pressing a button.
- ▶ While people are checking-in, use your radio’s monitor function to see if you can hear them without the repeater.
- ▶ If they are relatively close to you and using more than an HT, you may be able to hear them
- ▶ If they are farther away or using just an HT and rubber duck, you probably won’t be able to hear them

An Experiment Continued

- ▶ After monitoring check-ins on the repeater input frequency for a while, you will begin to get a feel for what simplex would be like without the repeater!
- ▶ Next try this → Use your radio's monitor function to monitor the repeater input frequency when the Network Control Station is talking. **IF YOU CAN'T HEAR THE NETWORK CONTROL STATION, YOU WOULD NOT BE ABLE TO CHECK-IN TO THE NET IF THE REPEATER WAS NOT THERE!**

An Experiment Continued

- ▶ Try different antennas and different heights to see if you can improve the number of check-ins you hear and how well you hear the NCS while using your radio's monitor function. This will give you a feel for what antennas work best even without transmitting simplex.
- ▶ If you can hear the other station better, they will probably be able to hear you better.
- ▶ If you are not experienced with VHF/UHF FM simplex, monitoring the repeater input may be an "eye opener" on what communications would be like without the repeaters! – TRY IT OUT.