BROWARD COUNTY FLORIDA

EMERGENCY COMMUNICATIONS TRAINING

Sorry for the lateness of this Newsletter. Due to health reasons, it was sent out late.
This month's topic will be "Intro to EmComm" and "Shadow Communicator" by Barry Porter / KB1PA
Please plan on attending this meeting. Starts at 7:30 PM. Map and Directions on the last page.

March 2015

Broward County ARES RACES

ARRL officials met with the members and leadership of the Hollywood Community Emergency Response Team #CERT to discuss ham radio operations at the Hollywood EOC. Photo from left to right: Jeff Beals, WA4AW, ARRL Section Manager, South Florida Section; Carol Sjursen, KJ4AWB, Broward County ARES Emergency Coordinator; Jaime Hernandez, Emergency Management Coordinator, City of Hollywood; Charles Benn, WB2SNN, ARRL District Emergency Coordinator for the Gold Coast Region of the South Florida Section; Jan Lederman, K9JCL, Hollywood CERT; Marty Falk, KI4IQZ, ARRL Assistant Section Manager, South Florida Section.

A big thank you to Mickey Baker, N4MB and Barry Porter, KB1PA for educating our group on DStar, AllStar, SARnet and the upcoming regionalized training for our #ARES and #RACES members.

Mickey N4MB

Barry KB1PA

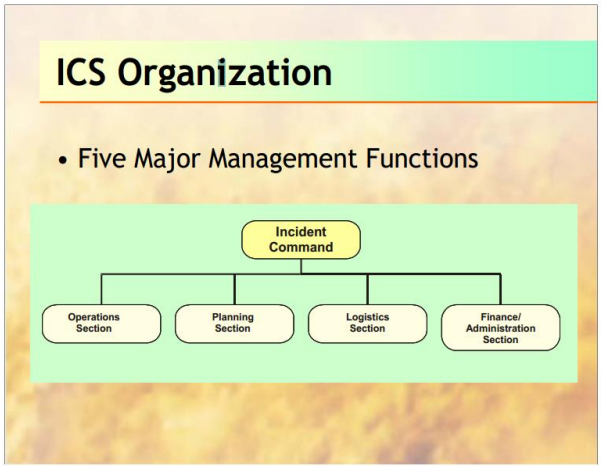
When Disaster Calls
Amateur Radio Answers

WHAT IS THE INCIDENT COMMAND SYSTEM (ICS)

Taken from the ARRL and FEMA

The Incident Command System (ICS) is a management tool designed to bring multiple responding agencies, including those from different jurisdictions, together under a single overall command structure. Before the use of the ICS became commonplace, various agencies responding to a disaster often fought for control, duplicated efforts, missed critical needs, and generally reduced the potential effectiveness of the response. Under ICS, each agency recognizes one "lead" coordinating agency and that person will handle one or more tasks that are part of a single over-all plan, and interact with other agencies in defined ways.

The Incident Command System is based upon simple and proven business management principles. In a business or government agency, managers and leaders perform the basic daily tasks of planning, directing, organizing, coordinating, communicating, delegating and evaluating. The same is true for the Incident Command System, but the responsibilities are often shared among several agencies. These tasks, or functional areas as they are known in the ICS, are performed under the overall direction of a single Incident Commander (IC) in a coordinated manner, even with multiple agencies and across jurisdictional lines. The ICS also features common terminology, scalability of structure and clear lines of authority.



"ARES®" and "Amateur Radio Emergency Service" are registered service marks of the American Radio Relay League, Incorporated and are used by permission. The Incident Command System (ICS) is a management tool that has been adopted by professional emergency responders throughout the country. ICS provides a coordinated system of command, communications, organization, and accountability in managing emergency events. Due to the wide spread use of ICS, Amateur Radio operators should be familiar with the system, as well as how they will interface with agencies employing ICS.

Integral to the ICS is the concept of Unified Command. There is only one boss, the Incident Commander, who is responsible for the overall operation. For any incident, there are a number of functions that must be performed ranging from planning and logistics to handling the press.

The functional requirements of planning, logistics, operations, and finance are always present despite the size of the incident. They may be handled by a single individual for a small incident, or a "Command Staff" in a large incident. Another characteristic of ICS is "span of control." In simple terms, any manager should only directly manage a small number of people. ICS uses the number of five for organizational purposes. The number five isn't hard and fast, but provides a useful organizational guide line.

How does the Amateur Radio volunteer fit into the Incident Command System? We are expected to be communicators, and within the ICS, this would normally place us in the Logistics Section as part of the Communications Unit. The communications unit provides all communications services for the operation. There are five major management functions that are the foundation upon which the ICS organization develops. These functions apply whether you are handling a routine emergency, organizing for a major non-emergency event, or managing a response to a major disaster.

The five major management functions are shown in the table above. Below is a brief description of each ICS function:

- **Incident Command: Sets the incident objectives, strategies, and priorities and has overall responsibility at the incident or event.**
- **Operations: Conducts tactical operations to carry out the plan. Develops the tactical objectives and organization, and directs all tactical resources.**
- **Planning: Prep ARES® and documents the Incident Action Plan to accomplish the objectives, collects and evaluates information, maintains resource status, and maintains documentation for incident records.**
- **Logistics: Provides support, resources, and all other services needed to meet the operational objectives.**
- **Finance/Administration: Monitors costs related to the incident. Provides accounting, procurement, time recording, and cost analyses.**

Using RG-59 or RG-6 CATV cable with an amateur radio antenna

Used with written permission from Michael, KB9VBR

As ham radio operators, we're always looking for a way to save a buck. I'll frequently dig through a free bin of part, hoping to scavenge something for the next project. This scavenger mentality extends to coax feed-line. High quality coax cable can be expensive. That's why we love a deal when can find it. The cable television companies go through miles of coax cable on a daily basis. Often a ham can pick up free pieces and reel ends for pennies on the dollar. Or just take a trip through your local home improvement store and you'll see 100 foot spools of 75 Ohm RG-6 for a fraction of the cost of similar 50 Ohm RG-8U.

But are 75 Ohm cables really a good bet? Will it work for ham radio? Or am I setting myself up for aggravation? This article explores the good and bad of 75 Ohm coax cable.

Impedance mismatch of 75 Ohm Cable

RG-59 and RG-6 are 75 Ohm coaxial cables designed for cable television applications, they tend to have wide frequency response and low line loss. They also have an impedance of 75 ohms, which is a standard for coax cable used in the broadcast industry. You can use these cables with a 50 Ohm amateur radio antenna system, but because of the impedance mismatch, your SWR will be a little higher. For example, if everything else is balanced out, using the 75 ohm cable with a 50 Ohm antenna will increase your SWR to 1.5:1 at the transmitter.

For HF, this mismatch isn't a big deal

Now this really isn't a big deal as 1.5:1 is still within the 2:1 SWR limit that most modern ham radio transceivers will tolerate. In HF applications, the impedance mismatch can be further reduced by the use of an antenna tuner. The tuner gives the transmitter the 50 Ohm match that it expects. So for their HF antenna systems, many hams will use RG-59 or RG-6 because it's cheaper than 50 Ohm RG-58 or RG-8, and any mismatch can be resolved by the tuner. It works, but it's not an ideal situation.

But you also don't have to live with the mismatch on VHF

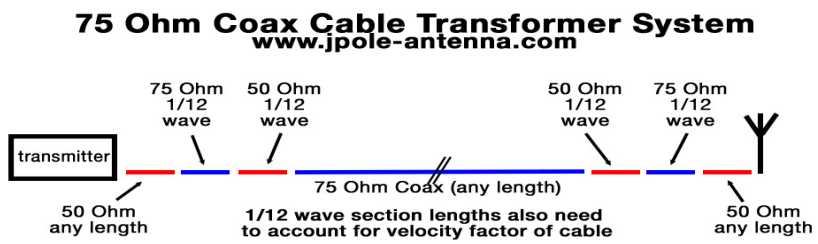
VHF/UHF is another story. RG-6 is rated for applications below 150 MHz, so it can be used with transmitters and antennas on the 2 meter band. but above the frequency, the losses are going to be so high, that you might as well invest in quality 50 Ohm cable. While resolving the impedance mismatch isn't critical (you can still run with an SWR of 1.5:1) most VHF rigs don't offer antenna tuners to create a 50 ohm match for the transmitter. You'll just have to take a small performance hit in exchange for saving money.

There are two ways to deal with this mismatch. They don't require a tuner, but you will only be able to effectively use the cable run for a single frequency or band. By the way, these methods also work on HF too.

The first method is to measure and cut your coax so the entire cable run can be measured in 1/2 wavelength multiples. For the two meter band, a half wave is approximately 38 inches. Keeping your cable length within these 1/2 wave multiples will present a near 50 Ohm match at the transmitter end of the line. But how does this work?

Say you where to take a length of 50 Ohm coax and put a 100 Ohm resister at the end. If you where to measure the impedance at the other end, what would it be? Not necessarily 50 Ohms. The reason is that coax offers a mix of resistive and reactive elements that change with the length of the coax. For example, using 1/4 wave length multiples of 75 Ohm coax will give you your 100 Ohm resister a 50 Ohm impedance at the transmitter end. Now if you were to substitute that resister with a 50 ohm antenna, using 1/2 wave multiples of 75 Ohm coax would give you a 50 Ohm impedance. Not too shabby. This practice works well with VHF as the 1/2 waves are relatively short, so you don't need to contend with a bunch of extra coax cable. But as you lower the frequency, those wavelengths increase, to the point were you've got up to 120 feet of extra cable on the 75 meter band.

Another method is to use a transformer. Like I mentioned earlier that transmission line offers a mix of resistive and reactive components based on length, you can change the impedance of a 75 Ohm coax cable line by using short 1/12 wavelength sections of 75 and 50 Ohm coax at the feed point and transmitter. This method again only works for a particular frequency, but you will have enough bandwidth to still cover the 2 meter VHF band.



A 1/12 wavelength section of coax at 146 Mhz will be 6.3 inches long. But don't cut the section to that length, you will need to shorten the cable based on the velocity factor of the cable. This value could be anywhere from .60 to .90. The VF is sometimes printed on the cable, otherwise you'll have to look it up on the specification sheet for the type of coax you're using. Put the sections inline like the diagram and do a final check with an antenna meter or analyzer.

If I was using 75 Ohm cable, for simplicity's sake, I'd use the transformer for HF applications were it's easier to cut longer pieces of coax into 1/12 wave sections and rely on running my feed line in 1/2 wave multiples for VHF.

RG-6 connectors

The biggest challenge in using 75 Ohm coax cable with your amateur radio setup is not the impedance, but attaching the connectors to the cable. RG-6 and RG-11 both have an aluminum shield material that can be quite difficult to solder. Attaching a PL-259 connector to the cable, in the normal fashion by soldering the braid to the barrel of the connector will often result in a weak connection that will corrode or break in time. That is, if you can get it soldered. What often happens is the dielectric of the cable starts to melt before the solder begins to flow.

F to PL-259 (UHF) connectors. Available at Radio Shack or Tower Electronics.

A better solution is to use crimp F connectors designed for for RG-6 or RG-11 and an F to Pl-259 adapter. The F connectors are sturdy and reliable, the crimping process is designed for this style of cable. The additional cost of the adapters is marginal considering the per foot costs of RG-6 to 50 Ohm RG-8U. Here's a great set of step-by-instructions on how to properly crimp RG-6 cable.

Conclusion

I have no problem with using 75 Ohm cable for HF applications and in certain applications for transmitters up to 150 MHz. Cable coax seems to be just as well suited on the lower frequencies of the HF bands as does 50 Ohm coax. But at the VHF range and beyond, I find the losses of the cable to be too great. With VHF/UHF communications, were transmitter power can be easily eaten up be lossy coax, you're better off in putting your money into high quality coax cable. A wise ham once told me: "purchase an affordable antenna and invest your money into high quality coax." It's easier to replace an antenna than it is to re-do cable runs.

VHF/UHF ANTENNAS FOR AMATEUR RADIO, PUBLIC SAFETY, BUSINESS BAND, SCANNING, AND BROADCAST

About the author:

My name is Michael, KB9VBR, and I carry a full line of VHF and UHF antennas for sale. I specialize in a certain type of antenna called a J-Pole. The J-Pole antenna is a 1/2 wave antenna with a 1/4 wave matching stub. Sounds complicated, but it really isn't.

The great thing about J-Pole antennas is their simple design and excellent performance. My antennas have a low noise floor and a beautiful omnidirectional radiation pattern. They work great for amateur radio, public safety, scanner listening, business band, and GMRS purposes.

Looking for a simple, affordable, high performance antenna? Our J-Pole antennas work great and are inexpensive. Write jpole-antenna.com or call Michael at (715)845-4218

Congratulations to the Broward County Southeast Florida Traffic Net and ARES for a Job Well Done

Sent in by Mike / KM2V

Congratulations to local Broward County hams who were able to give assistance to a fellow ham in need stranded on a Deerfield Beach, Florida road! On Monday night, February 16, 2015, during the nightly session of the Southeast Florida Traffic Net (SEFTN) a station in distress broke in to the net. The person happened to be a ham (KK4OAP) Eddie Bender who was stranded in the middle of the road in Deerfield Beach with a dead cell phone. There was concern that he was in a hazardous position and he was asking for the assistance of those on the net. W4JRK (Jon) was the net control operator and he, along with other members of the net staff, K2SHA (John) and K4MME (Denise), they were able to get a tow truck dispatched and have the Broward Sheriff's Office send a car to mitigate the hazard. When the net was over, net personnel stayed on the air in the event further assistance was needed before the emergency vehicles arrived. This is truly an example of the excellence in teamwork and the abilities of true ham operators to create a real "feel good" event. Thanks to all who were able to think on their feet and provide some much-needed assistance to a ham in need.

Articles Needed

If you have anything pertaining to ARES® / RACES / SKYWARN that you would like to contribute to, and share with others, I would be happy to include your offering in any future edition. I am looking for articles that include hints and kinks, training articles, public service events, pictures, operating tips, ham humor or ham jokes etc.

All articles are to be camera ready. All articles must be in by the first Tuesday of every month. Copyright rules and permission apply to all submissions. Please send your submission to:

Robin / N4HHP Editor n4hhp@comcast.net

SKYWARN TRAINING

Thunderstorms and Severe Weather Spotting

Taken From the NOAA National Severe Storms Laboratory and the National Weather Service

Nature provides clues that can help one realize that threatening weather is approaching and that action needs to be taken. Understanding these clues can be the difference in getting to safety in time when weather suddenly turns for the worst.

Basic Facts about Thunderstorms

Thunderstorms occur in all 50 states. They can occur, at any time, day or night, throughout the entire year. Thunderstorms are most common in the late afternoon and evening during the warm months. Approximately 1800 thunderstorms are in progress at any given moment around the world and lightning strikes the earth 100 times every second. Thunderstorms are basically beneficial providing necessary rainfall. In the United States, only about five percent of thunderstorms become severe and only about one percent of thunderstorms produce tornadoes.

What makes a typical thunderstorm?

Thunderstorms range between 5 and 25 miles in diameter making it a very localized storm. There are three essential ingredients necessary to grow a thunderstorm:

1) Moisture – Moisture is necessary to form the cloud and rain.

2) Instability - Warm air is less dense (lighter) than cold air. The sun warms the ground and the ground warms the air above it. Evaporation of moisture from the ground or bodies of water increase the humidity. The warming of the air and the increase in humidity cause the air mass to destabilize. If there is cooler, drier air above, the tendency would be for the air to want to overturn with the cooler air sinking and the warmer air rising. This is instability.

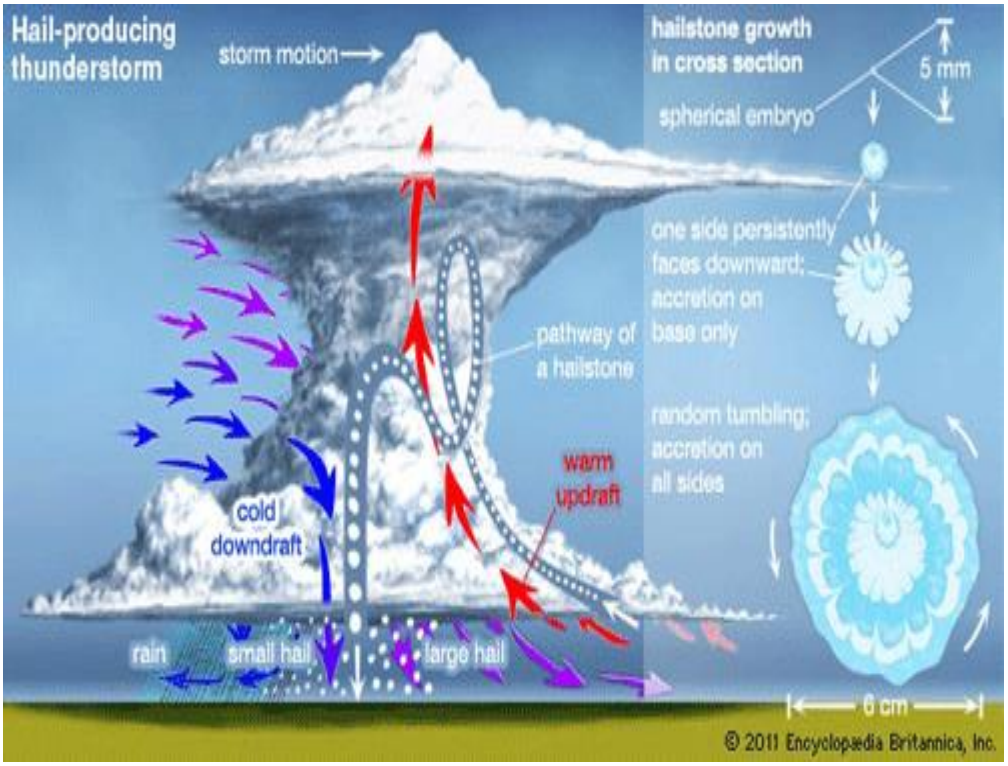
3) Lift - This is the trigger that starts air rising and focuses storms. Examples of Lift -- 1) air moving up a mountain; or 2) air colliding with a front. A front is a boundary between two different air masses. Where the air masses collide, the less dense air (warmer or more humid) will rise over the other. 3) Cool air blowing from an ocean or lake can form a sea-breeze front as it collides with the warmer air inland. 4) The cool outflow from a thunderstorm forms a "gust front" which may in turn cause the development of a new thunderstorms. These are all sources of lift. If instability and moisture is the fuel, than lift is the spark that ignites the storm.

The thunderstorm life cycle:

1) Towering cumulus stage - Imagine a parcel of air like a balloon. If the air in the balloon is warmer than the environment around it, it will rise. As the balloon (air parcel) rises, the air cools, eventually cooling to its

condensation point. A cloud becomes visible. As the air condenses, heat is released which helps the air parcel remain warmer than its surrounding environment, and so, it continues to rise, building up speed. This rising air forms the updraft, a thermal. A towering cumulus cloud has grown with crisp, hard edges forming a puffy or cauliflower look to the cloud. The height of the cloud is usually equal to or greater than the width of the cloud's base.

2) <u>Mature thunderstorm stage</u> - The warm air continues to rise until eventually it has cooled to that of its surrounding environment. This is often not until it hits the tropopause and the more stable air of the stratosphere. The storm may now have reached a height of 5 to 10 miles above the ground. The rising air has been moving at speeds near 40 mph. Now as it slows, the upper level winds begin to fan out the cloud forming the anvil. With strong winds aloft and longer lasting storms, anvils can spread 100 miles downwind.



A thunderstorm's updraft can carry 8000 tons of water aloft per minute! The water vapor condenses to cloud droplets which collide and grow in the rising updraft. Eventually, the weight of the droplet overcomes the rising air and it falls. The falling rain droplets begin to drag the air down around them and a downdraft forms. The rain also is falling into unsaturated air and so some evaporation occurs. Evaporation is a cooling process (your body cools when sweat evaporates from your skin). This rain-cooled air is now cooler than its surrounding environment and it sinks, helping to form and intensify the downdraft. A thunderstorm with concurrent updrafts and downdrafts is considered mature. As little as 20 minutes has elapsed since the cloud began to form.

3) <u>Dissipating stage</u> - As the downdraft hits the ground, the rain-cooled air begins to spread out in all directions. Eventually, this more stable air (since it is cool) chokes off the warm inflow that was driving the storm's updraft. With no new fuel to keep the storm alive, it dies. The downdraft dominates and the storm rains itself out. Sometimes, all that is left it the anvil.

This entire thunderstorm life cycle from the growing cumulus cloud to the dissipated storm can take only 30 minutes. This is why thunderstorms can strike so quickly and with little if any warning. The National Weather Service predicts the likelihood of thunderstorms to develop, but does not warn for lightning nor general thunderstorms.

What causes thunder?

A lightning stroke carries an electrical potential of 100 million volts. This tremendous release of energy is converted to heat. Air around the lightning channel explosively expands as it is heated to nearly 50,000°F! After the discharge, the air rapidly cools and contracts. This sudden expansion and contraction of air molecules produces the sound wave which we identify as "thunder." Because the speed of light is a million times faster than that of sound, we see a lightning stroke before we hear it. You can estimate the distance (in miles) to a lightning stroke by counting the number of seconds between seeing the lightning and hearing the thunder, then divide by five. Just remember that lightning can come from the anvil portion of the thunderstorm and strike the ground 10 to 15 miles from the rain

portion of the storm. So, just because you are estimating lightning at a distance of 2 or 4 miles away, doesn't mean that the next strike won't be right next to you!

Understanding the Dangers of Lightning:

If you are outside and there are thunderstorms within 10 miles, you are at isk of being struck. In rare cases, lightning has been known to travel as far as 15 miles from the storm. There are four different types of lightning: 1) within cloud, cloud-to-cloud, cloud-to-air, and cloud-to-ground. Lightning can occur from any portion of the thunderstorm cloud. Thunderstorms can extend up to 10 miles high in the atmosphere and they are often tilted by stronger winds aloft. High clouds above you may be part of a thunderstorms anvil. Often during the dissipating stage of a thunderstorm, lightning will strike from the upper reaches of the storm including the anvil.

A study on lightning conducted in Florida found that the average distance between one lightning strike hitting the ground and the next was two to three miles. That means that (using the technique described in the section on thunder above) you may have just seen a lightning stroke in the distance and it took a full 15 seconds before the thunder reached you. It seemed a long way away and yet, on average, the next strike could be right next to you.

The most common mistake made by people is to let an outdoor activity continue because it appears as though a thunderstorm is too far away to be a danger. Many people think that if it is not raining, then they are okay, yet it is not the rain that can kill them. People who have been struck by lightning have noted that they heard some distant thunder, but there was blue sky overhead and so they perceived no threat.

The NOAA National Severe Storms Laboratory provides this

Lightning Safety 30/30 Rule:

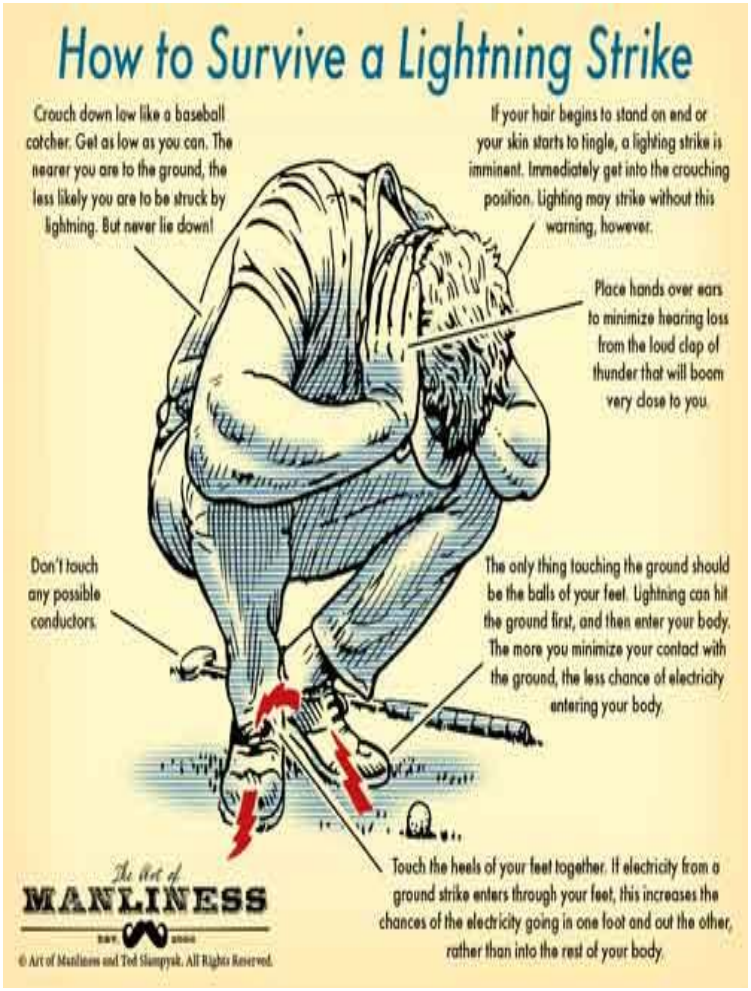
If the time between when you see the flash and hear the thunder is 30 seconds or less, the lightning is close enough to hit you. If you haven't already, seek shelter immediately. Wait inside until 30 minutes have passed since the last flash of lightning.

Shelter:

EVERYONE NEEDS TO MOVE INSIDE A BUILDING OR A CAR.

In buildings, do not remain standing in the door way and close windows and doors. Do not use telephones and computers. In a car, truck, or bus, windows and doors need to be closed. Convertibles, even with the tops up, are not protected.

If an activity is postponed to let the storm pass, try not to allow spectators to linger in unprotected areas. At a Lacrosse game in the District of Columbia, the game was called as a thunderstorm squall line rolled into the city. The teams went inside to the locker rooms to wait out storm. A group of spectators who had been watching the game, took cover under a tree. The tree was struck. A 16 year old boy was killed and 10 others were injured.



Lightning will be attracted to the tallest object. Tall trees are a prime example. Sports fields are a high risk area. The tallest object may be the players, or goal posts. Lightning may strike both players and goal posts at once. Metal bleachers, tall lights for night-time play, and metal fences around ball fields are all at risk of being struck. Even the dugout are not safe.

Thunderstorm Clues:

Static on your AM radio

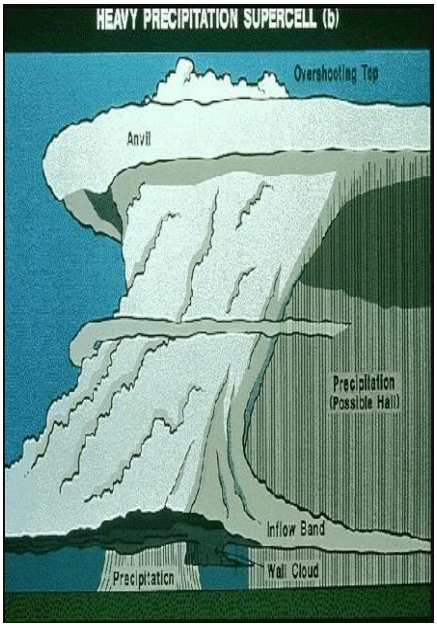
A sudden increase in wind or a sudden change in the wind direction. Leaves on trees may flip over so you see their underside. You might smell rain before it arrives or feel a sudden drop in temperature with the breeze.

Darkening and billowing clouds or darkening haze.

Distant flashes of lightning or the sound of thunder.

The Severe Thunderstorm:

The more unstable the air mass and the stronger the lifting mechanism, the stronger the thunderstorm updraft becomes and the more likely the storm will be severe. Increasing winds with height also help to the storms ability to maintain itself. The longer a storm lasts, the greater chance it has of becoming severe. The National Weather Service defines a severe thunderstorms as a storm producing three-quarter inch or larger hail and/or winds greater than 58 mph. When thunderstorm updrafts reach speeds of 70 mph, they can support the growth of hailstones.

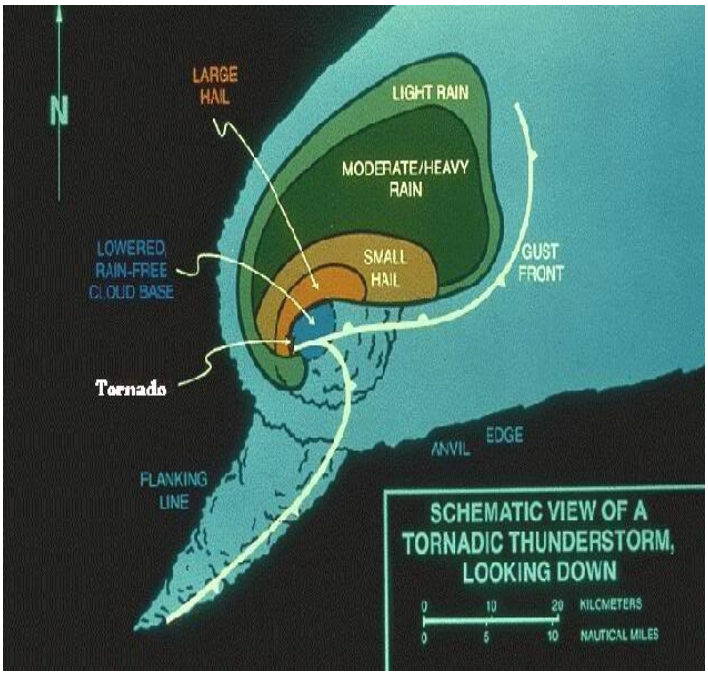


A hailstone is a lump of ice that falls from a thunderstorm. It can range from pea size to the size of grapefruit. Such large hail can impact the ground at nearly 100 mph demolishing crops, breaking windows, and damaging roofs, cars and airplanes. Hail begins as rain droplets which are carried by strong updrafts to high altitudes (well above the freezing level) where they are frozen into ice pellets. The ice pellets collide with more water droplets which freeze to the surface of the developing hail stone increasing its size. The stone continues to grow until the updraft can no longer suspend its weight and the hail falls to the ground.

Long-lasting thunderstorms, sometimes referred to as supercells, are more likely to be severe. For a thunderstorm to last, it must be able to sustain both its updraft and its downdraft. One way that this occurs is with increasing winds with height. If the horizontal wind, blowing into the storm, is stronger in the mid and upper reaches of the storm, the rising updraft becomes tilted.

Now the rain is carried downwind of the updraft instead of collapsing upon it.

Another important factor is if the horizontal wind, blowing into the storm, veers with height (changes direction in a clockwise motion), and the storm's updraft may begin to rotate. The combination of veering and increasing winds with height can produce a tilted and rotating updraft. This rotating thunderstorm, called a mesocyclone, is able to maintain its updraft and warm inflow region independent of the storms rain-cooled outflow. The rotating updraft of this type of thunderstorm is where the tornado can form and descend to the ground.



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The Downburst:

So far, we have discussed how strong updrafts can produce hail and rotating updrafts can produce tornadoes, but what about downbursts or damaging straight-line winds from thunderstorms? A downburst is a powerful, concentrated downward burst of air that occurs in the downdraft region of the thunderstorm. Looking at the map view of a severe thunderstorm above, it tends to occur in the moderate to heavy rain region of the storm. One theory for how downbursts originate is that a layer of drier air, between perhaps 10 and 20 thousand feet high, is entrained into the thunderstorm. As rain falls through this drier air, it evaporates, rapidly cooling the air. This cold ball of air, now denser than its surrounding environment, descends toward the ground. The momentum of the winds in this mid-level dry layer (the wind blowing into the storm) is now tilted downward and is accelerated by gravity. The burst of rain-cooled air smacks the ground and spreads outward. Wind speeds produced by downbursts can reach over 100 mph and produce damage similar to a tornado. However, downbursts damage paths are usually broader than tornado paths.

The term straight-line wind when referring to a thunderstorm wind is the rain-cooled air of the downdraft as it spreads out and away from the thunderstorm. The wind is moving in a straight-line as opposed to rotating like a tornado. Therefore, straight-line damaging winds from a thunderstorm is generally caused by a downburst. In aviation, the term wind shear is used. Wind shear is the change of wind speed and direction. A downburst is extremely dangerous to aircraft on takeoff and landings because of the strong wind shear. Wind speed and direction is in constant flux and the pilot cannot compensate fast enough. A microburst refers to a small downburst (less than 2 miles across). A downburst larger than that would be called a Macroburst.

Some Basic
Severe Thunderstorm and Tornado Spotting Techniques

Our local National Weather Service Office in Miami-Dade County provides severe weather spotter training under a program called SKYWARN. It is provided free of charge with the request that when you do encounter severe weather, you report it to the National Weather Service. The spotter training class includes 100 or so slides that help you learn how to pick out visual clues from clouds to help determine the severity of a storm.

Color: A very dark (black) thunderstorm or one taking an eerie look (brownish, green, or yellow cloud colors) may be an indication of a severe thunderstorm. The colors and darkness of the cloud are caused by the storm's massive size and the blockage of sunlight. This storm may bring hail, very heavy rain, and damaging winds. Take protective action immediately.

Sound: The sound of a freight train is the roar of wind as it moves through trees and buildings. It may indicate an approaching tornado or severe downburst. The rapid rotation of winds in a tornado also sometimes make a high pitch whistling or whirling noise. In any of these cases, you should take protective action immediately.

Swirling Debris: Tornadoes are sometimes obscured by rain, low clouds, trees, or buildings that block your view of the funnel. A visible funnel need not even be touching the ground (it may only extend half or two-thirds of the way from the cloud toward the ground). But even with weak tornadoes, swirling debris or debris rising up in the air can often be seen. This is a sure sign of significant damaging winds and protective action must be immediate.

Shelf Cloud / Roll Cloud: The rain-cooled air flowing out of a thunderstorm forms the gust front. Warm air ahead of the gust front rises up into the storm forming a wedged-shape cloud called a "shelf cloud" on the leading edge of the storm. The sharper or more defined that this cloud is, the stronger the winds are below. As the cool wind continues to blow out ahead of the storm, the shelf cloud can become detached from the storm forming a "roll cloud". This horizontal cloud is not a tornado. It marks the gust front (the gust front is the leading edge of the rain-cooled outflow from the thunderstorm). If you see a well-defined roll cloud rolling toward you, prepare for strong and possibly damaging winds as it passes.

Mammatus Clouds (also known as Mamma): These clouds hang down from the anvil portion of the thunderstorm. They look like breasts (hence the Latin term) or like a cumulus cloud turned upside down. Mammatus clouds are often an indication that the storm is severe. Prepare for possible hail and damaging winds.

Rotating storms: Sometimes it is possible to see the entire thunderstorm rotating. Generally, to see this you are located south of the storm or behind it. The storm is usually then moving away from you. A rotating thunderstorm is likely severe and may produce a tornado. If the storm is, by chance, moving toward you, prepare for severe winds and hail. Otherwise, report your sighting to the National Weather Service.

Rotating Wall Cloud: This is a lowering of clouds from the rain-free cloud base (updraft region) of the storm. It is circular in shape and can be seen slowly rotating. Sometimes a tail forms from the wall cloud toward the rain area of the storm Air is moving in and rising up into this portion of the cloud. This is a sign of a tornadic thunderstorm. If a tornado is to form it will generally descend from the storm near or within the wall cloud. Take cover immediately if this is approaching you. Otherwise, contact the National Weather Service with your sighting.

Funnel / Tornado: A funnel is a small rotating funnel-shaped cloud. It does not touch the ground. If the funnel-shaped cloud is touching the ground, it is a tornado. Only about 50 percent of funnels turn into tornadoes. It is possible for the rotating column of damaging winds from a tornado to be on the ground with the visible funnel only extending half-way to the ground. Look for debris, leafs and dust rising into the air and listen for the sound of a freight train.

Waterspouts: When a tornado moves over water, it is called a waterspout. Waterspouts can also occur in more benign situations and these are not severe but still may have winds of 35 to 50 mph.

Squall lines: Sometimes thunderstorms form a solid line of storms called a "squall line". The squall line thunderstorm can also become severe and is unlike the supercell thunderstorm discussed earlier (see diagram showing side and map views of a typical severe thunderstorm under section B). The supercell storm has its updraft on the right-rear quadrant of the storm. With a squall line, the warm air feeding the storm is all out ahead of it, so the updraft on the front (approaching) portion of the storm dominates.

When a squall line approaches, you will see the shelf cloud which is the leading edge of the storm (see discussion on shelf clouds). Tornadoes rarely occur with squall lines and they tend to be less severe than those with supercell storms. Still, winds can reach 100 mph which is enough to damage roofs, break windows and drop trees. The tornado in this case will precede the rain. The tornado would be found in the updraft region of the storm behind the shelf cloud.

Do You Know What CoCoRaHS Is?

http://www.cocorahs.org/Media/Training/Training_General.htmlCoCoRaHS

CoCoRaHs is a grassroots volunteer network of backyard weather observers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow) in their local communities. By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications. The only requirements to join are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can affect and impact our lives.

For more information, contact Jan Lederman K9JCL *Community Collaborative Rain, Hail & Snow Network*

hamdogjcl@gmail.com or call 954 483-6838

Broward County CoCoRahs Coordinator

ARES/RACES Training

Emergency Communications

http://twit.tv/show/ham-nation/2

ARES® / RACES TRAINING ON ANTENNAS

ANTENNA DIMENSION CHART

Written Permission by VE3ELB

Original Concept and Design *by George I. Wagner K5KG*

AMATEUR RADIO ANTENNA LENGTH CHART

	FREQUENCY (Mhz)	1/4λ (Feet)	1/2λ (Feet)	1λ (Feet)	1/2λ Inv Vee 90° (Feet)
	1.800	**130' 0"**	**260' 0"**	**558' 4"**	**257' 5"**
	1.850	126' 6"	253' 0"	543' 3"	250' 5"
160 METERS	1.900	123' 2"	246' 4"	528' 11"	243' 10"
	2.000	**117' 0"**	**234' 0"**	**502' 6"**	**231' 8"**
	3.500	**66' 10"**	**133' 9"**	**287' 2"**	**132' 5"**
	3.750	62' 5"	124' 10"	268' 0"	123' 7"
80 METERS	3.900	60' 0"	120' 0"	257' 8"	118' 10"
	4.000	**58' 6"**	**117' 0"**	**251' 3"**	**115' 10"**
	7.000	**33' 5"**	**66' 10"**	**143' 7"**	**66' 2"**
40 METERS	7.150	32' 9"	65' 5"	140' 7"	64' 10"
	7.300	**32' 1"**	**64' 1"**	**137' 8"**	**63' 6"**
30 METERS	**10.100**	**23' 2"**	**46' 4"**	**99' 6"**	**45' 10"**
	10.150	**23' 1"**	**46' 1"**	**99' 0"**	**45' 8"**
	14.000	**16' 9"**	**33' 5"**	**71' 9"**	**33' 1"**
	14.150	16' 6"	33' 1"	71' 0"	32' 9"
20 METERS	14.300	16' 4"	32' 9"	70' 3"	32' 5"
	14.350	**16' 4"**	**32' 7"**	**70' 0"**	**32' 3"**
17 METERS	**18.068**	**12' 11"**	**25' 11"**	**55' 7"**	**25' 8"**
	18.168	**12' 11"**	**25' 9"**	**55' 4"**	**25' 6"**
	21.000	**11' 2"**	**22' 3"**	**47' 10"**	**22' 1"**
15 METERS	21.200	11' 0"	22' 1"	47' 5"	21' 10"
	21.450	**10' 11"**	**21' 10"**	**46' 10"**	**21' 7"**
12 METERS	**24.890**	**9' 5"**	**18' 10"**	**40' 5"**	**18' 7"**
	24.990	**9' 4"**	**18' 9"**	**40' 3"**	**18' 6"**
	28.000	**8' 4"**	**16' 9"**	**35' 11"**	**16' 7"**
10 METERS	28.500	8' 3"	16' 5"	35' 3"	16' 3'
	29.700	**7' 11"**	**15' 9"**	**33' 10"**	**15' 7"**
6 METERS	**50.000**	**4' 8"**	**9' 4"**	**20' 1'**	**9' 3"**
	54.000	**4' 4"**	**8' 8"**	**18' 7"**	**8' 7"**
2 METERS	**144.000**	**1' 8"**	**3' 3"**	**7' 0"**	**3' 3"**
	148.000	**1' 7"**	**3' 2"**	**6' 9"**	**3' 2"**

Antenna length calculations are based on the following formulas:
1/2 wave dipole (feet) = 468/frequency in Mhz
Full wave loop (feet) = 1005/frequency in Mhz
Inverted Vee with 90 degree included angle is 99% the length of 1/2 wave dipole

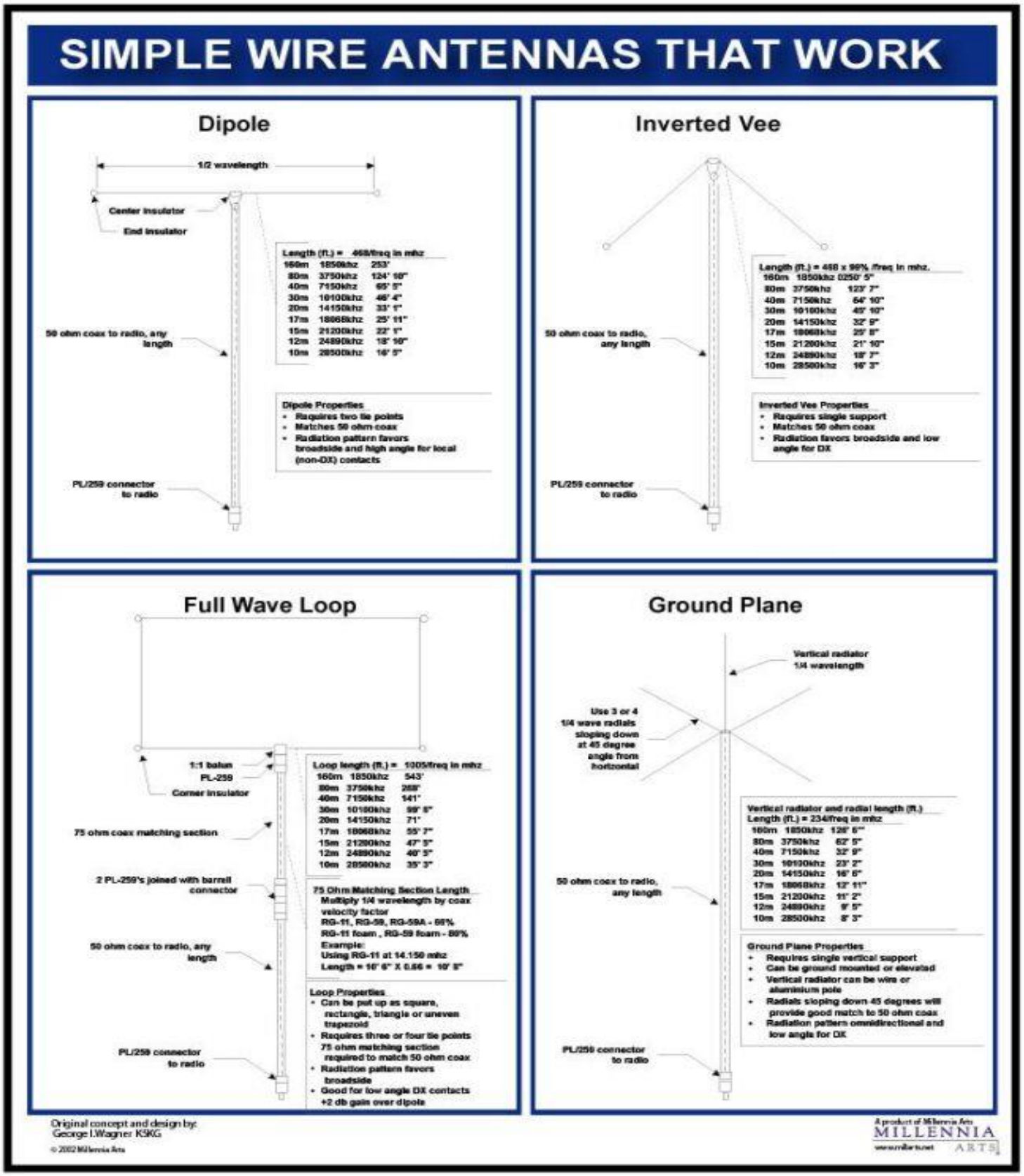
Note:
Cut wire slightly longer to allow for connecting insulators and pruning.
Height above ground, nearby wires, trees, etc. will change tuning slightly.

MILLENNIA ARTS

NOTE:

ALL MEASUREMENTS ON THE CHART IS PER LEG

Written Permission by VE3ELB
Original Concept and Design *by George I. Wagner K5KG*



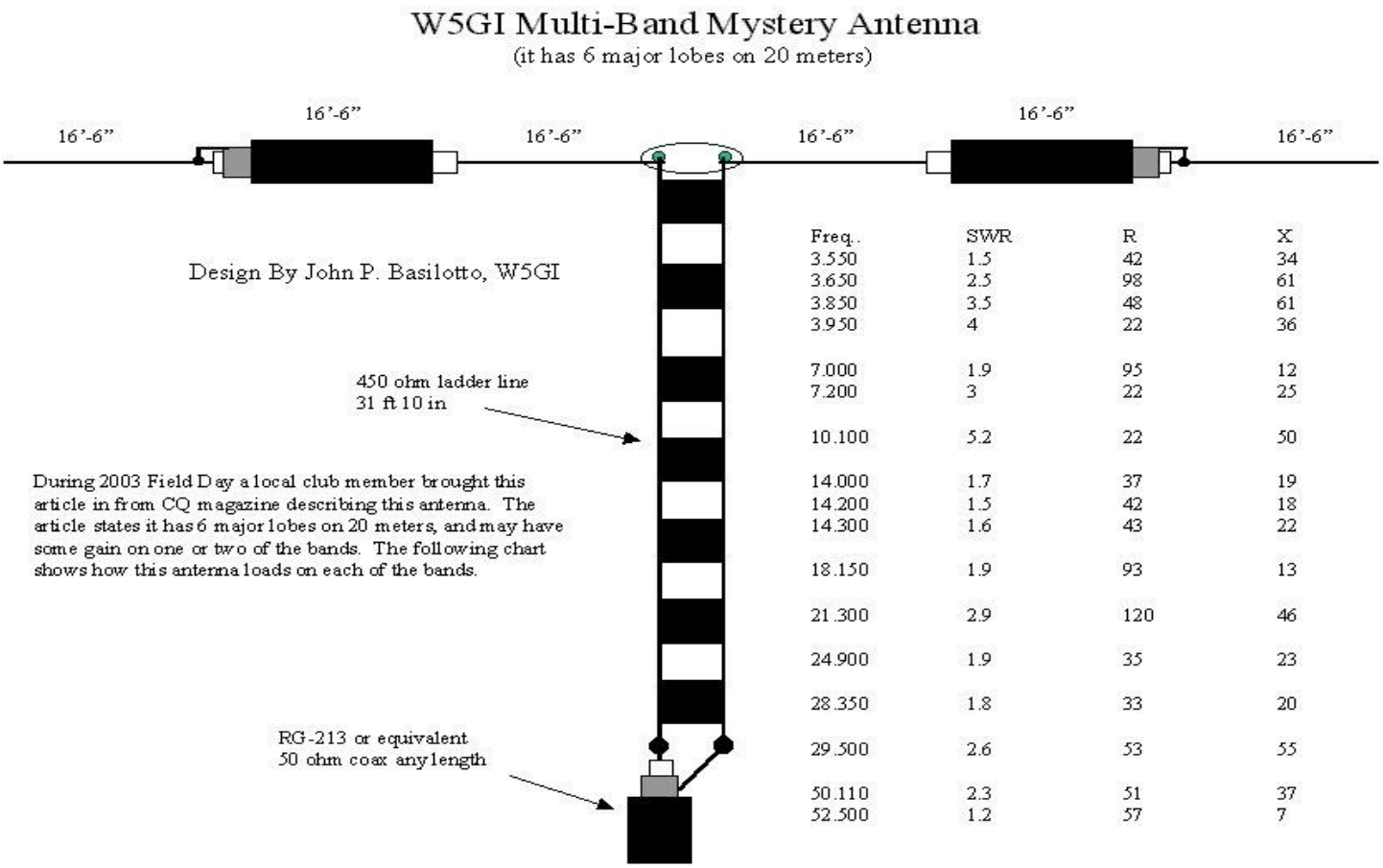
CLICK ON THE PHOTO FOR A LAGER IMAGE

AN ANTENNA THAT WORKS

Read The Eham Reviews

Written Permission by VE3ELB

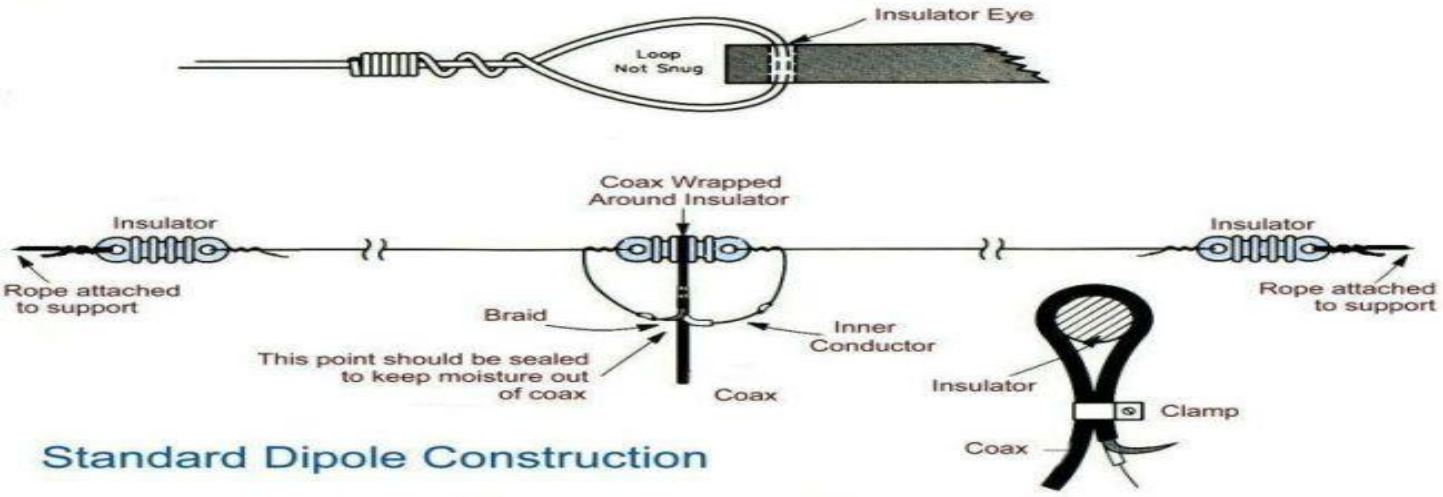
Original Concept and Design *by George I. Wagner K5KG*



Freq.	SWR	R	X
3.550	1.5	42	34
3.650	2.5	98	61
3.850	3.5	48	61
3.950	4	22	36
7.000	1.9	95	12
7.200	3	22	25
10.100	5.2	22	50
14.000	1.7	37	19
14.200	1.5	42	18
14.300	1.6	43	22
18.150	1.9	93	13
21.300	2.9	120	46
24.900	1.9	35	23
28.350	1.8	33	20
29.500	2.6	53	55
50.110	2.3	51	37
52.500	1.2	57	7

STANDARD DIPOLE CONSTRUCTION

Written Permission by VE3ELB



ODE TO A TOUR OF DUTY AS NCS – THE FIRST 15 MINUTES

By R. Bruce Winchell -N8UT (Reproduce freely)

Sent in by Barry / KB1PA

Your EC just woke you up in the middle of your favorite TV sporting event. He wants you to start an emergency net from your shack. He is at the EOC. There is a ruptured gas main in a heavily populated part of town.

Other than the location, he didn't give you any more information. You head for the shack, turn on the 2 meter rig, and grab a clipboard. Your training kicks in. You begin asking yourself questions and writing down the answers.

OK, broken gas main ... police, fire, gas company, and EM involved ... possible evacuation ... possible need to open shelter ... transportation possibly needed ... likelihood of handicapped people in the area ... danger of asphyxiation ... might go all night

1. What kind of net should I start? Open? Directed?
2. How many people am I likely to need?
3. How long do I estimate the event will last?
4. Do I need to hold some people in reserve for a shift change?
5. What agencies are likely to be involved? A. Do we have special liaison people for these agencies?
6. Do I have any operators who live in the affected area?
7. Which way is the wind blowing?
8. What will be the safest route into the area?

Don't have enough information. EC said he will call back with more. Better find out what I have available right now. Pick up the mike and announce that there is an emergency situation developing. Use open format standby net.

Take check-ins. Ask two operators to go to other local repeaters and recruit people for the upcoming net. Check-ins begin coming in. Tell everyone to prepare for participation assignments. Recruit someone to come to your shack to do logging and phone calls for you.

EC calls back. Says to prepare f or an all-niter. You are going to need relief shifts. Evacuation will take place. Need to activate Red Cross shelter at high school. Red Cross has been notified. Wants voice and packet for shelter. Requests 5 operators to report to staging area to do head counts on city buses being used for evacuation. Needs 2 RACES members to man 2 meter and packet stations at EOC ASAP.

Back on the air. Formalize the net. Request 2 RACES volunteers for a 4 hour shift at EOC . . . one has to be able to run packet. Recruit 2 more RACES volunteers to pick up the portable packet station stored at the clubhouse and dispatch them to the high school shelter. Recruit 5 volunteers to handle head counts and assign one of them as team leader to compile the reports. Send them into the area from the North.

Ask for volunteer RACES qualified base station close to the staging area to liaison traffic from the Staging area volunteers to the Red Cross shelter on simplex so that HT's can be run on low power to conserve batteries. Ask liaison station to relay only compiled totals to NCS.

Request a qualified NCS volunteer to set up a resource net and two shift reliefs on secondary repeater. Instruct all remaining individuals not yet assigned to a task to check- in on the resource net. 8 minutes . . . not bad . . . smooth as silk. Call EC and give progress report. Can't reach EC.

8 minutes, 15 seconds: Logging volunteer shows up.
8 minutes, 30 seconds: Your wife informs you that the toilet is plugged and she can't find the handle to the plumber's plunger. You smile. It's taped to the tower ... holding your new wire antenna.

9 minutes: Your 6 year old tells you that there is a big fire in a warehouse across town ... he thinks it's where you work ... it's on TV ... and a half mile upwind from the gas leak.

9 minutes 30 seconds: Over in the corner, under a big stack of radio catalogs, the weather alert receiver begins to screech ... it's tornado season.

9 minutes 50 seconds: The phone rings, your assistant drops it, hiccups loudly, and then hands it to you . . . it's the EC. The telephone receiver is broken but you manage to understand that the EC now wants you to set up a Skywarn sub-net and send out the Amateur TV guys to the warehouse fire. You tell the EC, "No Problem"

10 minutes 30 seconds: Hang up the broken phone and call the resource net for manpower to fill the new requests. Resource NCS says "No Problem".

11 minutes: Resource net calls back. One of the available ATV guys is on his way to the shelter as the packet operator and the other one is your hiccup afflicted logging assistant. The other ATV team is out of town on an experimental, underwater, dual satellite linked ATV Dxpedition near Easter Island ... bunch of retired guys with too much money. You console the frustrated Resource NCS and tell him to work it out.

12 minutes 10 seconds: You call the EC and tell him there will be a bit of a delay but there is "No Problem".

13 minutes 5 seconds: Your pager goes off with a message from your boss telling you not to bother reporting for work in the morning.

13 minutes 8 seconds: Console wife about income loss by giving her a hug and saying, "No Problem".
13 minutes 20 seconds: The computer printer connected to your packet station begins spitting out paper. The packet station at the EOC is still programmed to your station from the last test you did. Fast and frantic search begins ... and ends. The right software for it is in your briefcase ... at work ... where the fire is...

13 minutes 35 seconds: The liaison station calls on the radio to report that one of your staging area volunteers has just gone into labor . . . her water broke and ruined her shoes; and he wants to know if it is OK to let her go to the hospital.
13 minutes 55 seconds: The 16 year old kid, who took the test 10 times to get his Tech license, calls in a "priority" message on his HT, with a half-dead battery, on the rubber duck, from 15 miles out of town, to report that the wind just blew over the outhouse with grandma inside. Grandma got confused after she rolled out of the outhouse and fell in the pit. After 8 more broken transmissions, you find out that grandma is OK . . . "but she smells sumthin' awful!!!"

Welcome to the first 15 minutes of an emergency net from inside a net control station.

Out on the resource net, there is much grumbling about going to bed ... because nothing is happening!!

Broward Emergency Management
ARES / RACES Membership Application

Please type or print clearly

EOC Use Only

RACES # _____ RACES POSITION

Effective _____ _____

Expires _____Approved by _____

Name

Address

City Zip Code County

Home Phone Work Cell

Amateur Call License Class Expiration Date Date of Birth

Emergency Contact Phone

Completion of this Application DOES NOT OBLIGATE YOU

Enrollment in RACES qualifies you for County insurance in the event RACES is activated, and you are performing duties.

This information provides a database of qualified Amateur Radio operators available for ARES/RACES emergency activation.

ARES/RACES participation is voluntary.

By submitting this application you consent to a background check.

Email Address to receive Broward County ARES / RACES Alerts / Bulletins

You reside at the above address during what months? From _____ To _____

Are you capable of setting up a station in the field? Indicate what, below, if yes YES NO

What languages are you fluent in? _____

In the event of an emergency do you have family members you must assist? YES NO

Are you willing to Staff a shelter during a hurricane? YES NO

Is your home station capable of operation without commercial power? YES NO

Could you serve another area in Florida by joining the Communications Away Team (CAT)? YES NO MILES AWAY _____

Indicate below any capabilities you have i.e. big beam, tall tower, high power, special mode etc. that could assist in the event of an emergency.

Modes	160	80	40	30	20	17	15	12	10	6	2	1.25cm	70cm	Add. Bands/ Comments
SSB- Power in Watts														
CW- WPM														
TOR- RTTY, PSK31, WinLink, Pactor II, etc.														
SSTV, DSSTV, NBTV														
Mobile / RV- Modes and Power in Watts														
Packet- Baud 300, 1k2, 9k6														
APRS- GPS, WX, DF, Tracker														
ATV- AM, FM														
FM- Power in Watts														
Satellite- AO, FO, RS, SO etc.														

Other modes or special operation / capabilities / equipment i.e. CERT, CAP, Coast Guard, Marine, MARS, REACT, Contest Station, Remote Control, ect.

Do you have ICS 100 200 700 800 Do you have Emcomm 1 2 3 (circle those that you have) Please submit Certificate Copies.

Signature Date

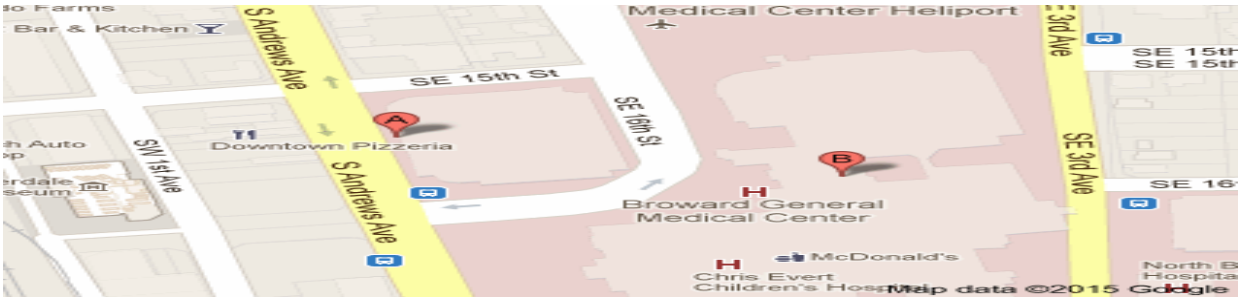
Use back of this application for additional space. Please be as detailed as possible with all information.

Please list experience, qualifications and other special considerations or capabilities. Use back of this application for additional space. Revised 04/2014

Broward County ARES® /RACES

3rd Tuesday of the month, at 7:30 P.M. Meeting in the Oak Room.

Broward Health (The old Broward General Medical Center)
1600 South Andrews Avenue, Fort Lauderdale, FL 33316
Meeting is held In The Oak Room



Parking will be in the 7 story parking garage, (see A Above). The entrance to the building is on the first floor directly across from the parking garage. You will need to go in the main entrance and sign in at the security desk and they will issue you a pass to wear. Bring a driver's license with you or a picture I.D. Do not by-pass security. They will tell you how to get to the Oak Room.

<u>From I-95 or 595</u>
Take I-95 or 595 to SR 84. Go east on 84 until you get to Andrews Avenue turn left (North) until you get to the hospital on your right. 1600 South Andrews Avenue

<u>From I-95 to Broward Blvd</u>

Take I-95 to Broward Blvd. East on Broward Blvd until you get to Andrews Avenue turn Right (South) until you get to the hospital on your Left. 1600 South Andrews Avenue

Talk-in will be on the 146.910 Mhz. -600 PL 110.9 Hz.
If you get lost or need directions, please call our cell phones:

Robin Terrill, N4HHP RACES Officer 954 *249*-5343
Carol Sjursen, KJ4AWB ARES® EC 954 803-6338

Sign Up to Receive Your Free Tropical Weather Emails

If you would like to receive this training Newsletter when they come out, please reply to n4hhp@comcast.net.net