



# The Wisconsin ARES/RACES Emergency Coordinator



VOLUME 1 NUMBER 7

AUGUST 1999

## WISCONSIN SECTION EMERGENCY COORDINATOR AND EDITOR:

Stanley Kaplan, WB9RQR  
105 Martin Drive  
Port Washington, WI 53074-9654  
(414) 284-9346  
skaplan@mcw.edu  
WB9RQR@N9PBY.EN63BI.  
WI.USA.NA

The WEC Newsletter is sent monthly to all American Radio Relay League Emergency Coordinators in the State of Wisconsin. It is intended to provide a forum for ECs to share ideas concerning the organization and training of their respective groups, and as a source of news concerning ARES and RACES activities in the state.

Comments, suggestions and articles (finished or in rough form) are solicited from the readers.

Permission is granted to reprint articles from this newsletter provided credit is given as follows: "Reprinted from The Wisconsin Emergency Coordinator Newsletter, WB9RQR, Editor".

## Y2K Exercise of 1999 June 29

Stan attended the exercise at WEM (Wisconsin Emergency Management) in Madison. Aimed at state agencies, the morning was devoted to an overview of the function of WEM, while the afternoon was a genuine tabletop exercise involving several scenarios. Each agency reported on how it would cope with the problems generated by the scenarios. The exercise was well coordinated and executed, and everyone present learned from it.

Among the presenters were Steve Sell (WEM Director), Major General James Blaney (Adjutant General, Department of Military Affairs) and other members of WEM and the National Guard. Participants represented the following Departments: Corrections, Natural Resources, Health and Family Services, Public Instruction, Workforce Development, Agriculture, Administration, Justice, Veterans Affairs, Employee Trust Funds, Transportation, Employee Relations. There were also representatives from the Educational Communications Board, Public Service Commission, University of Wisconsin System, Wisconsin Conservation Corps, Investment Board, American Red Cross, Salvation Army, and the offices of the Governor and Lieutenant Governor. Two county representatives (Dane and Taylor) represented an urban and rural county, respectively.

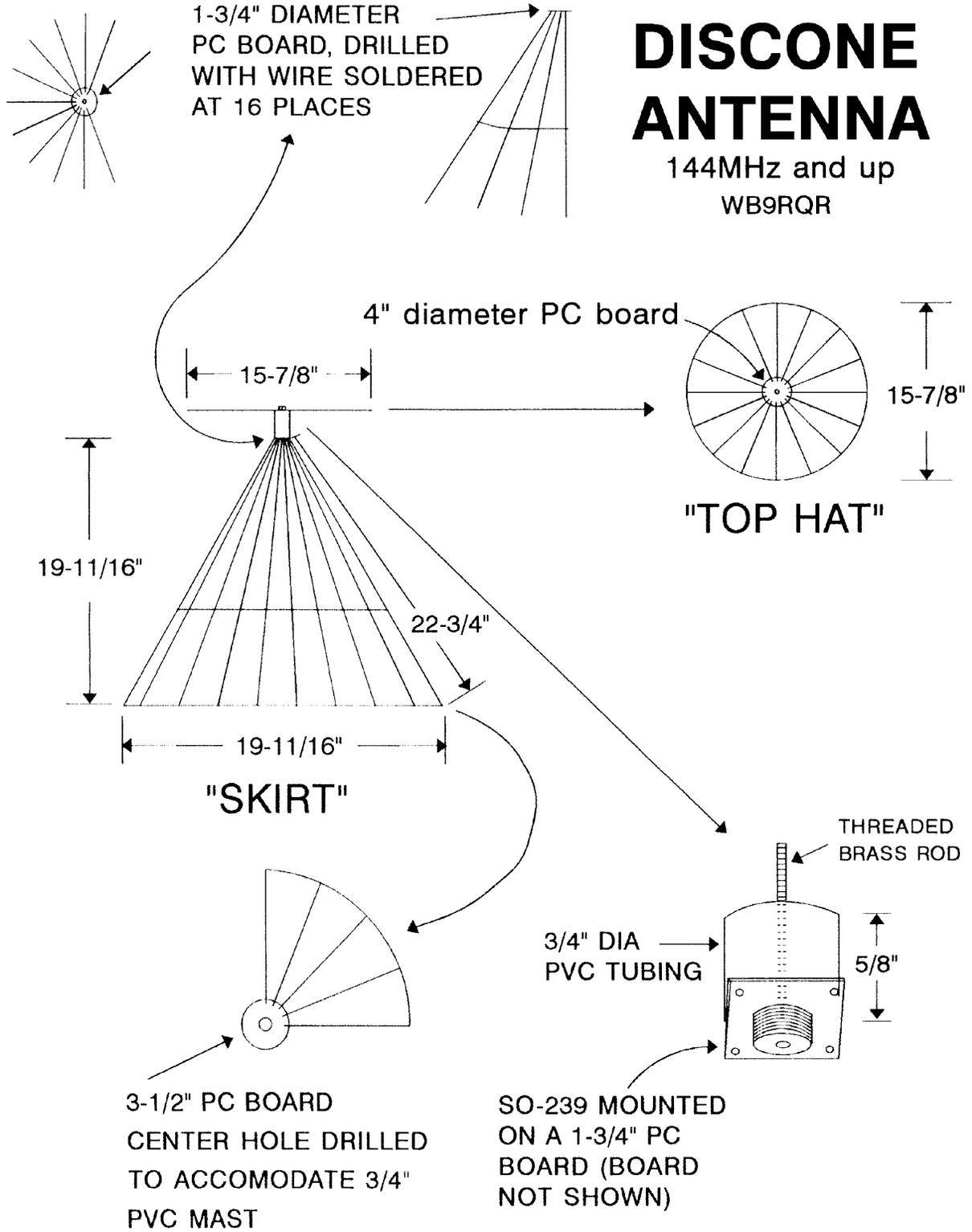
Once the various agencies began to report on how they would handle communications to the State EOC with phone lines down, it became apparent to your SEC that many agencies did not have the slightest idea of the potential resource represented by Amateur Radio. Acting true to my nature (large oral orifice, alias a big mouth), I launched into a 3-minute thumbnail of who ARES/RACES hams are and what they can do in these situations. I spoke about our free services, the equipment we own and maintain ourselves, the large portion of the frequency spectrum we have at our fingertips, and our decentralized nature which means that at least some of us will always

be available for emergency communications. I also reminded those present that the time to get hams involved is NOW, not near midnight on December 31<sup>st</sup>. Judging from the wide eyes, open mouths and requests for cards that came later, I suspect that a number of agencies will be requesting our services. Later, when it was announced that several agencies were planning tabletop exercises of their own, I requested of those groups planning to use hams to include hams in the exercises. We shall see.

Mack Brophy (N9TDB), WEM Hamshack Honcho was present, too. And your SEC had the pleasure of a first time eyeball QSO with new SM Don Michalski (W9IXG).

## A Discone Antenna for 2 Meters and Up

Stick it up on top of a pole. Lay it on a flat portion of your roof. Suspend it by monofilament fishing line under the Emergency Management roof. This antenna's small size and somewhat unusual geometry makes it particularly easy to install in a wide variety of locations. It is a terrific "listener" and a super "talker" with an omnidirectional pattern. An attractive feature is that, provided you are a good scrounger, the only cost is the coax to feed it and a single SO-239 connector. The bulk of the antenna can be constructed of #12 or even #14 solid copper wire. Look for discarded cutoffs



from nearby housing projects for |

raw materials. One OZARES member event made one of these out of welding rod.

The antenna is composed of two parts. The disc or "top hat" is simply a disk about 16 inches in diameter (see the diagrams for exact dimensions). The base or "cone" resembles an upside-down ice cream cone (just the cone, not the ice cream!) about 20 inches high (base to apex) and 20 inches in diameter. The top hat and cone are electrically insulated from each other. Both the cone and the top hat could very well be made of sheet metal, but the use of wire to form the two elements greatly reduces weight and wind loading without degrading performance, and the wire versions are simply much easier to build.

It works this way, at least to my non-electrical engineering mind. The signal from your rig travels up the center conductor of the coax, which is electrically connected to the top hat. The signal spreads out over the top hat, drops over the edge, and falls toward the ground, just as water would if it were poured on the center of a dinner plate. As it falls toward the ground, the signal hits the cone all around it at some point between the cone's base and apex. The exact distance down the cone at which the signal contacts the cone depends upon the frequency of the signal. The cone, being at ground potential (it is connected to the braid of the coax) reflects the signal horizontally. The signal leaves the cone and travels toward the horizon, almost parallel to the earth's surface, in an omnidirectional pattern.

The discone antenna is said to be broadbanded, because it works well across all frequencies in a particular band. However, this antenna takes the concept of broadbanded to an extreme. It not only works well in a particular single band, it also works over several octaves of frequency. That is, a

discone designed for 146 MHz will work fine on 220 MHz, 440 MHz and higher. A two-meter signal, which spills off the top hat, will fall nearly all the way to the base of the cone before it is reflected off toward the horizon. A 220 MHz signal will fall only part way down before it hits the cone, and a 440 MHz signal will hit the cone considerably closer to the cone's apex. Thus, the antenna accommodates to 2 meters and all higher frequencies in much the same sense that a basketball backboard designed to reflect basketballs will do a fine job reflecting tennis balls, too.

So, here is how you build it. Your first job is to remove the insulation from the wire. Clamp a 6 to 8 foot length in a vise. Run a smooth object like a screwdriver handle along the wire while maintaining tension, to smooth out any bends or kinks. Then, at the end near the vise, cut into the insulation with a sharp penknife or razor knife at about a 45° angle until you hit copper. Then, turn the knife almost parallel to the wire and pull the knife along the wire. If the blade is at the correct angle, you will slice the insulation all along the axis of the wire without nicking the copper. Then pull off the remaining insulation. Cut the pieces at least 2 inches longer than what you will need. For example, for the sides of the cone (base to apex), cut pieces at least 2 feet long.

Straighten the cut pieces. Lay a piece on your garage or basement floor, then cover it with a 2 x 6-inch board longer than the wire. Push the board back and forth, parallel with the floor, while exerting pressure on the board. This will cause the wire to roll underneath. If the floor is straight and true, the wire will be perfectly straight in a couple of passes with the board.

Soldering. Use at least a 100-watt iron so the solder flows nicely. For the top hat, bend a ¼ inch right angle at one end of an 8-inch wire.

Insert the bent end into the PC board (the holes are drilled about ½ inch in from the edge). Do the same with the remaining 15 pieces of wire for the top hat. Working on a flat surface, align all 16 radial wires so they are evenly spaced and "point" back at the center hole in the PC board. Solder each joint, making sure the solder flows nicely. When cool, cut each radial off 7-15/16 inches from the center hole in the PC board (the top hat is twice this length in diameter, or 15-7/8 inches). Now, bend about a 50-inch piece of wire into a gentle circle. Tack-solder one end of it to a radial. Using care to keep the radials evenly spaced, tack solder the 50-inch wire to each radial in turn. When you get back to the first radial, trim the circle and tack solder it to its other end and the radial. Using short pieces of #20 or smaller wire, jumble-wrap each radial to the wire of the outer circle. Now re-solder the joint, taking care to completely cover the fine wire with thoroughly melted solder.

Do the cone in a similar manner, but be sure to solder the SO-239 to the apex PC board before you begin to do the radials. Insert 24 inch radials (you will trim their length shortly) in the PC board and approximate their angle before soldering. Tack-solder them, wrap with fine wire and re-solder them as you did with the top hat. Now cut them to 22¾ inches as shown in the diagrams. Prepare the cone's base by soldering 7 inch wires to holes in the 3½ inch PC board, which you prepared by pre-drilling a center hole large enough to accommodate a ¾ inch PVC mast. Trim the 7-inch wires so their ends are 9-7/8 inches from the center of the center hole in the PC board (19-11/16 in diameter, across two of the wires). Tack solder the perimeter (start with a 6-foot length of wire for this), wrap the joints with fine wire and re-solder, as before. Now solder the base to the 22¾-inch wires coming from the apex, using

the fine wire wrap technique once again.

The SO-239. Solder a 1½ inch threaded brass rod into the center of the soldering ferrule on the back of the connector. This can be a #6 or #8 brass machine screw with the head cut off and with the shaft sharpened so it will fit inside the ferrule. Make this as good an electrical and mechanical joint as you can. Next, prepare a test setup. Using any convenient length of coax with PL-269 connectors on both ends, connect one end to your rig and snake the other end up through the hole in the base of the cone and screw it onto the SO-239. Run a brass nut down the threaded rod to a position about 5/8 inch above the ground flange of the SO-239. Put on the top hat and finger-tighten another brass nut to hold it in place. Check the SWR. Lower the top hat another ¼ inch and check the SWR again. Find the height at which the SWR is the best at the frequency of your choice. Then cut a piece of ¾ inch PVC pipe that length, remove the top hat and slide the PVC spacer on the threaded rod. Replace the top hat and tighten everything up with a brass nut and washer. The spacer provides necessary mechanical support for the top hat. Without it, wind or handling might flex the threaded rod enough to cause it to break.

I just checked a model I made some years ago, using an MFJ-259 SWR Analyzer. It reports an SWR of 1:1.3 or lower from 123 MHz through 172 MHz! I couldn't test higher freqs since that is as high as the test unit goes. Most readings were 1:1.2, and the antenna was "flat" (1:1) at 160 MHz. The SWR began to rise (to 1:1.5) at 122 MHz. How is that for broadbanded? Have fun!

## John Glaeser, WB9ESM, SK

Sorry to report that John Glaeser, EC for Manitowoc County, died in early July. I did not have the privilege of meeting or getting to know John, but I wish I had. Our heartfelt condolences to his family.

## Still Waiting for your Roster!

Once again, your help is needed in updating and consolidating the RACES roster for the State of Wisconsin. It is getting simpler for you to respond. All I need is a current roster of your membership, including name, call, address, city, state, zip, home phone and class of license. Surely you have that data now for your people, and can share it with me for updating purposes. The counties below have been updated so far:

1. Adams
2. Burnett
3. Calumet
4. Eau Claire
5. Green
6. Ozaukee
7. Rock
8. Washburn
9. Washington
10. Wood

When I get your roster, I will cross check each ham against the current database, making sure the address, phone and all other data is correct. If a ham on your list is not in the RACES roster, I will add them. If there are RACES hams listed for your county who are not listed on the roster you send me, I will delete them. Then, I will promptly supply you with a printout of the data for your county so you can examine it yourself.

To be a RACES operator in our state, a ham must be a member of an ARES group. To hold membership in an ARES group in

our state, a ham must be a registered RACES member. Simple enough, and cross membership is easy to accomplish. But I definitely need your help in updating the data.

Membership in RACES adds not one whit of extra duties or paperwork (other than submission of your roster) for you or your people. It does insure that, if a wide area emergency occurs and RACES is activated, you and your group can seamlessly continue to supply needed emergency communications services, to the ultimate benefit of the citizens of your county.

So what is the true difference between ARES and RACES? As you well know, ARES is under the jurisdiction of a private organization, the ARRL, and it is designed to provide emergency communications to any kind of group - a county's sheriff, a Red Cross shelter, a private nursing home, and so on. RACES is under the jurisdiction of WI Emergency Management, a governmental body. When activated, RACES is primarily designed to provide emergency communications for governmental units - a county's sheriff or emergency management department, a municipal shelter, and so on. However, nothing precludes the assignment of RACES communications personnel to support a Red Cross shelter, evacuation of a private nursing home, etc. You say you don't see much difference? Well guess what? You are absolutely correct!

Oh, there are some differences. One is managed by a private organization and one by a governmental body. But the guts of the two organizations are the people who do the work, and in each case WE are those people. We just "switch hats" if RACES is activated..

Please, get me that roster!