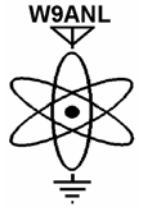


RADIOACTIVITIES



NEWSLETTER OF THE ARGONNE AMATEUR RADIO CLUB

Volume XLVIII, Number 5

May 2007

Club Meeting

Unless otherwise noted, AARC general meetings are the second Tuesday of the month at the Argonne cafeteria at a table on the north end of the room. Any club member is welcome. To arrange for a gate pass contact Bruce Epperson at epperson@aps.anl.gov phone 630-252-3495 or Chuck Doose at doose@aps.anl.gov phone 630-252-6037.

The Treasurer's Report

by Chuck KB9UMF

Members: ANL 13; Associate 25; Newsletter 5; Retired 10
Balances: Checking \$3,679.18; Cash \$0.00; ANL fund \$30.00
Distributed as: Dues \$16.00; General Fund \$3,072.30; Repeater \$574.88; Newline \$32.00
For the period Apr 1 thru Apr 30, 2007:
Income: Dues \$16.00; General \$0.00; Rptr \$0.00; ANL \$0.00
Expenses: General \$0.00; Eqp \$0.00; Rptr \$0.00

REMINDERS

CLUB BREAKFAST: Always the 2nd Saturday of each month, 8:30 AM at:

Old♦Country Buffet♦

59th Street and LaGrange Road in LaGrange

CLUB NETS: Thru our Club Repeater 145.19.

SKYWARN NET: Mondays in season
at 7 PM with Deni, W9DS.

THE CLUB'S 9PM NET: every Monday with
Jack WA9FVP.

THE NIGHT PATROL: every night at 10:30 PM
with Paul, W9FNM.

THE BREAKFAST CLUB: every morning at 8 AM.

THE NOONTIME NET: every weekday at noon.

Mil's Corner for April

07	WB9TRJ	Roland	Downers Grove, IL
11	K9QPM	Larry	Homer Glen, IL
17	WB9OAY	James	Aurora, IL
26	KA9OSW	James	Naperville, IL

Summer Signals

by Deni W9DS

Short skip DX is good in June, July, and August and a week or two into May and September. It comes from the region of the ionosphere and that is 100 miles above the earth with maximum distance for a hop of 1,200 miles. The ionization moves horizontally by electro current from a geomagnetic electric field into highly dense ion clouds that are about 40 by 500 miles wide and 6 miles thick.

These ions during daytime are excited by suns ultraviolet light on the E layer, which supports a maximum signal on 3.8MHz about noon during sunspot maximums. The location of these clouds is like scattered weather clouds in the sky and called sporadic E. This is the only sunspot effect on midlatitude E layer. It is almost constant and occurs every summer.

Sunspots effect propagation by increased geomagnetic disturbances. E clouds come about where geomagnetic equators are widely spaced in latitude; southeast Asia, South America, and Africa. Now the solar wind increases when sunspots flare then many E clouds help VHF auroral propagation develops.

Right now the international DX Internet is loaded 80% with European and Africans. 50 and 144 and higher frequencies are seeing use and loads of fun for packeteers, moon bouncers, and aquarid meteor shower bouncers on 144MHz too.

Short skip openings are happening now in July. I worked 4N9HQ a Serbian Radio Club in the new country of Montenegro since June 28th, 2006 on 21MHz at 7 p.m. July 8th in a contest, which brings out the DX. I got the QSL card today, Dec 11, 2006. They work late into the following morning. The very best time to log DX to your hearts content This was the farthest contact that I made that night 7 p.m. using 60 watts into my 160 meter dipole. DX was fading out, he caught my call, I gave my report as he popped up and call again until he got it, then he faded away and I lost him. That contact was multi-hop 4,963 miles and a great opening for me to work another new one. Only 3 more to go.

There are propagation openings during spring equinox summer solstice, and winter solstice fall solstice.

The table suggests the best height on each band for the range of optimum angle of radiation geometrically determined for the ham bands.

Band	Angle of Radiation	Aerial Height
7Mhz	12° – 40°	above 45'
14MHz	10° – 25°	above 40'
21MHz	7° – 20°	above 38'
28MHz	5° – 14°	above 34'

Hams also stack aerials two on a tower one above 70 feet to 110 feet and 35 feet to 50 feet. Beyond local ordinances thus regarded best for rural areas.

We just have to mention the long path propagation and many of our DX fraternity are mostly aware of these F2 layer path frequently takes place along the long circle path around the earth rather than the short direct path. Take India for example, long path comes from the South Pole and I worked India Andaman Island in December 2004 over the North Pole on 20 meters very short QSO and he was gone, he had heard me whoopee! And I needed only 3 more. My aerial 2-element quad up 60 feet FT101B 140 watts and no linear was used. Well back to long path.

This long path occurs daily in HF region and on all bands that are open. Awareness of propagation conditions over the globe at times propagates along the long path to some distance points on the globe that may be the only path for low power signals. Hey that's me. Signal strengths over paths up to 18,000 miles with 100 watts (that's me again) are surprised. Signal intensities of 5 meter readings of S3 to S8 can be observed [some never move my needle].

The long path starts on the dark side of the earth with short path a very sunny path. Strongest when close to most usable frequency (MUF). Time is one two three hours past dawn at the eastern end of path, with western path in afternoon or early evening then absorption eats up the short path signals. These long paths are over water or ice seawater with the 9 to 12 hops or skips.

I testify that in mediocurr times 20 meters by far has most consistent observation of long path openings for the greatest part of the 11 year period. During sun spot lows 7MHz east coast to east Australia is active and in high sunspots 21MHz long path opens up also 28MHz between north and south hemispheres. In 1982 AF9J was shook up when at 9 to 10 a.m. local time on 28.560 I told Glenn to point his beam due north and call 9,810 miles to YB land Indonesia, the YB call slips memory. The YB was fed his call the day before by me. It was great

fun for me happy times, but very sadly Glenn passed away a few weeks later. I felt the loss for several years.

The long path is open for 3 hours to just minutes. Best north south paths seem optimum during spring and fall equinoctial periods. In September favors short great circle path over the North Pole because of sunlight of the short path. Even during magnetic disturbances cases of Indian signals favor the long path, but days earlier they had been coming by the short path.

DX; what frequencies at what times? Try 28.4MHz to 28.6MHz 5 a.m. to 10 p.m. and around the clock at sun peaks. DX is a daytime activity. About 2 a.m. the Pacific Island countries are on the air on 20 meters look for DX nets they will help your totals especially for weaker stations if the net control can hear you. Don't give up, change location, up the power, get extra class license, and raise up that aerial. Sky is the limit for DXing.

DDRR Aerial Compact Design

by Deni W9DS

This aerial was developed and patented by W6UYH, J.M. Boyer, but the article CQ June, 1964 was authored by Clifford Hicks, W4MIP, performance on 2 through 150 MHz is efficient. It's vertical polarized, omni-directional, and smaller than a ¼ radiator. It can and has been built for 160 meters.

Best performance comes when diameter, D, of the circular radiator is 0.078 wavelength (28 electrical degrees in this case) the electrical circumferential length will be a quarter wave and naturally resonant. The ring is mounted on insulators at a distance of 0.007 wavelength (2.5 degrees) above ground plane and it is left open for a short distance. One end of this gap is connected to the ground plane.

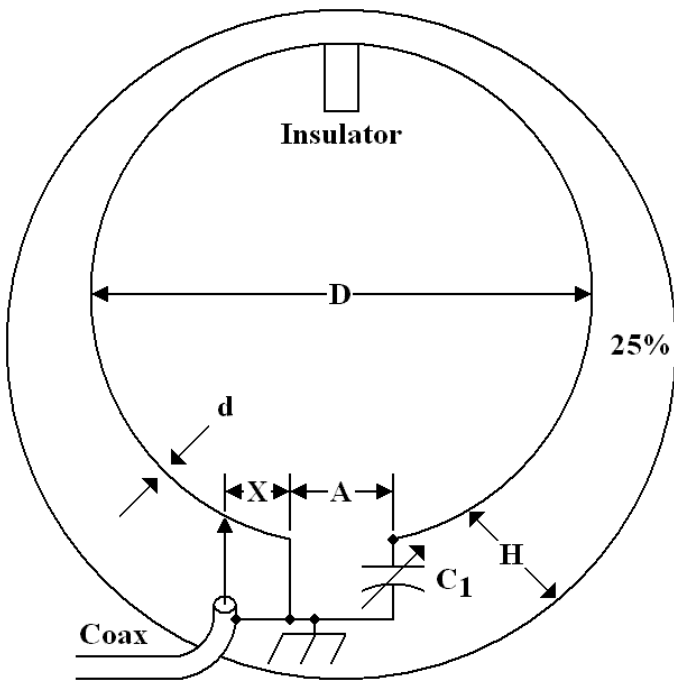
Where operation is at a band of frequencies the diameter of the ring is made little less than usual by reduction of circumferential length, thus a capacitor variable hooked up between ground and the other end of the gap the capacitor may be tuned exactly to quarter wave resonance shunt-feed is used. The shield of coax connected to ground. The inner wire hooked up to a tap on the ring to get the correct impedance match. Better performance and lower angle of radiation may be enhanced when the ground plane is extended beyond the boundaries of the ring. This can be done by a large number of ¼ wave radials also a sheet metal disc a bit larger than the radiator. In comparing a ¼ λ at 68 feet a 4MHz a height reduction of 30 to 1 is attained.

Efficiency at 4 MHz is 2.5db less than a 68 foot ¼ wave vertical. When operated over a 2 to 1 frequency range efficiency dropped 15db compared to 110 foot quarter wave vertical but a 2MHz diameter was 0.036 wave and height 0.004 wave but best at diameter 0.078 wavelength this aerial isn't noisy caused by high Q and it is tunable over a 2 to 1 frequency range.

For 100 watts input the variable capacitor which should be rated at 4,000 volts. A KW input requires 15K volt capacitor rating. The ground connection for the ring, feed line, and tuning capacitor must be securely soldered. Any resistance at these points can be fatal to DDR efficiency. Tune up. Vary the capacitor to lowest SWR at that frequency. Look for 1.2 to 1 or 2 to 1 will work. If working 2 bands, the feed line tap must be selected for lowest SWR can be 2 to 1. The ring can be made of copper tubing, aluminum, or copper lead. The aerial can be made of short pieces of pipe and solder.

The ground plane should be 25% larger than the ring and can be a polygon. Dual band operation requires the variable 500pf.

Band	cD	H	d	A	X
160	36'	48"	5"	18"	12"
80	18'	24"	5"	12"	6"
40	9'	12"	2.5"	6"	3"
20	4'6"	6"	1"	3"	1.5"
15	3'4"	4.5"	½"	2"	1"
10	2'3"	3"	½"	2"	¾"



Old Timers Aerials

by Deni W9DS

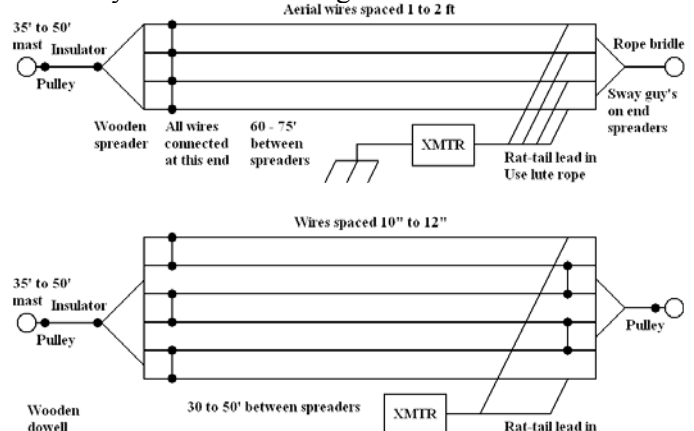
Your lot is small, how can you raise an aerial on a 100 foot lot? Here are solutions. Cut a ½ wave long; bend it around a horizontal plane to fit the space. You can drop the ends or use a vertical loaded by coil and capacitors. 75 and 160 aren't DX bands for you, but higher frequencies. If you want DX pick on 14, 17, 21, 24, and 28 MHz.

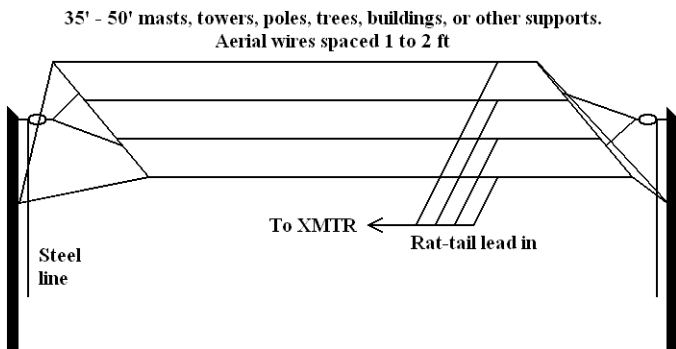
Aerial lengths are shorter and much power over 100 watts isn't necessary using beams; "now the world" is your oyster. The low bands can be worked with off center hertz or Marconi Windom. The top loaded vertical and "umbrella" type using lots of wire from top to bottom, more the better. Attach your feed line to a bunch of parallel wires or metal rain gutters. Use multi-wire random lengths then taking all the leads to the spark transmitter. Hi! Make feed point any where convenient end, middle, off center it radiates. The rule is whatever determines the resonant frequency of a wire in free space! Is the wire length and capacity to ground. Increase the number of wires shortening them to fit the available space. The number two to eight separated one or two feet. The multi wires formed capacity effect between the wires increasing capacity in our radiating system, thus lowering resonant frequency. If we want inductance we connect every other pair of wires together at opposite ends, forming a single length of wire in a "grid" formation.

One aerial for 200 meters used 8 thirty foot wires equally spaced on 6 foot spreaders and wires used on the "continuous grid" formation equals 240 feet in a 30 foot stretch plus large area capacity plate over ground ed.

These aerials come from the 20's spark gap days. They experimented for better signals and found their way for successful QSO's.

3 Yesteryear Aerials looking broadside



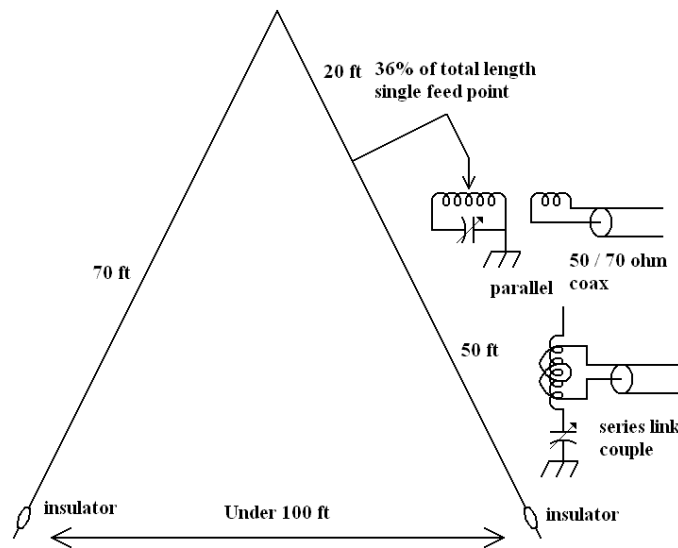


Inverted Windom

You have limited space and your boundaries are small coax is such a exposed thing. We need to use a single or two wires. Use a color wrapped wire that will match your aerial surroundings. We would like a compact multiband 1/2 aerial. We have to go inverted Vee so most of the energy radiates at lower angle and not up into the clouds. We must reduce ground space and elevate the important center half of our radiator by using one tall support. Most aerials use open feed line and matchbox. We want no traps. Ok, but your limited to bands harmonically. Like 7mHz & 21 MHz. Our inverted Vee enhances low angle radiation. Traps cause losses in isolation and matching networks.

Now comes the single wire Windom cut for your favorite band $492 / \text{MHz} = 140 \text{ ft}$ for 80 meters the lowest band we will use. What area will it cover? A 49 ft pole each leg 70 feet. Base is 100 feet or less between wires. A single wire is soldered to aerial 50 ft off one end and balance of wire is 90 feet. A single TV mast is used the aerial has a 90° angle at apex. Fed by a single feed wire reduces losses. Keep it away from metal. The whole radiator can be used on bands shorter than a 1/2 wave like Marconi a 1/4 wave. Use link coupling tuner. Tank components rated the same as your transmitter final. The feed line is tapped at 20 feet off center on this model. The tuner is mounted away from metal. Same as the wire itself traveling to the feed point.

Signal reports were better than any other configuration also 160 was worked as a Marconi 1/4 wave length, but tuner may need larger coil and more capacitance to work. Coil and capacitor must be series fed. The figure shows parallel feed for 80 meters and series link coupling for 160 meters.



More on the T2FD Aerial

As the years go by I look back to see what aerials people use. The old timers go to zepps, Ls, beams, quads, verticals, helical, Vees, rhombics, and a little known nonresonate sloper called the T2FD written in Feb CQ 1953. Authored by Capt. G.L. Countryman USN, W3HH.

The first time in print 1949 June QST and again in November CQ 1951. People wrote in its better than 500ft long wire, a center fed zepp, and verticals. The basic design: length of each leg from the center is $50,000$ divided by the lowest operating frequency in MHz, then multiply by 3.28; the answer is in feet. Next: spacing between radiating wires is $3,000$ divided by the same frequency in MHz then multiply by 3.28 to get the feet. The top to bottom is 30 degrees for non-directional pattern. Terminating resistor non-radiating and a rating to 35% of the xmit input power. The value of resistor is critical. Using 600 ohm feed line (#12 wire spaced 6 inches) a 650 ohm resistor seems best. Using 300 ohm twin lead requires 390 ohms. Any value 375 to 400 ohms gives excellent results. With 450 ohm feed line, 500 ohm resistor is required. For 40, 80, and below, a pole over 32 feet high. Base 40 feet to a 8 foot pole for this folded dipole. The worst part is the non-wire resistor let me check my desk drawer I have 2 big insulators. Well I have them but sold the high wattage resistors. I will try the next hamfest.

<p>ARGONNE AMATEUR RADIO CLUB P.O. Box 741 Lemont, IL 60439</p> <p>————— Officers —————</p> <p>PRESIDENT Bruce Epperson KA9H VICE PRESIDENT SECRETARY Kurt Boerste KB9ZFR TREASURER Charles Doose KB9UMF DIRECTOR Dick Konecny K9IB DIRECTOR Torben Lauritsen KF9MI DIRECTOR Charles Doose KB9UMF DIRECTOR Tim Smith N9UEB DIRECTOR Dale Travis AG9H</p> <p>e-mail: w9anl@bigfoot.com www.bigfoot.com/~w9anl</p>	<p>MEMBERSHIP is open to all who are interested in amateur radio. This club is sponsored by Argonne National Laboratory. Employees of ANL or DOE-Chicago are eligible for full membership. Auxiliary membership is available to non-employees.</p> <p>W9ANL/R is an open repeater, coordinated on 145.19 MHz (-600 input). The AARC repeater has been in operation on this frequency pair continuously since February 5, 1982.</p> <p>CLUB NETS: 2 meter fm 1) Regular, every Monday evening at 9:00 and 2) the Night Patrol every night at 10:30, both on W9ANL/R. The Peanut Whistle Net (PWN) every Sunday at 1:30 p.m., and many evenings at 8:30 p.m. on 1932 kHz (cw/am/ssb), QRP.</p>	<p>RADIOACTIVITIES is published monthly by the Argonne Amateur Radio Club as a nonprofit newsletter intended only for the use of its membership. Material appearing here does not represent the official position of Argonne National Laboratory or the U. S. Department of Energy. Please give credit to the author and to Radioactivities or the Argonne Amateur Radio Club, when using original material published here. Deadline for submissions normally is the 20th of the preceding month.</p> <p>EDITOR Dale Travis AG9H EVENTS SKYWARN ACTIVITIES Deni Lamoreaux W9DS</p> <p>Please send club and editorial correspondence to the club address, or to travisdj@bigfoot.com Please include "AARC" in the subject.</p>
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