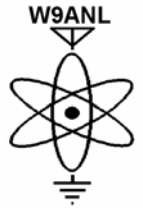


RADIOACTIVITIES

NEWSLETTER OF THE ARGONNE AMATEUR RADIO CLUB



Volume XLVII, Number 9

September 2006

Club Meeting

Nothing received.

The Treasurer's Report

by Jack Albert, WA9FVP

Members: East 20; Associate 39; Newsletter 6; Retired 12

Balances: Checking \$3,525.69; Cash \$0.00; ANL fund \$30.00

Distributed as: Club \$2,769.44; Repeater \$564.16; Newsline \$55.00

For the period Jul 27, 2006 thru Aug 31, 2006:

Income: Dues \$11.00; Club \$1.88; Rptr \$0.36; Newsline \$0.00; ANL \$0.00

Expenses: Club \$0.00; Rptr \$0.00; Newsline \$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 August

02	AA9N	Clarence	Yorkville, IL
07	NF9NF	David	Orland Park, IL
10	N9HOH	Harold	Minooka, IL
12	N9FPQ	Raymond	Lemont, IL
15	KB9CTJ	Loren	Minooka, IL

August Board Meeting Minutes

by Jack Albert, WA9FVP

Item 1: Observation of Emergency Training Exercise on August 23rd. Moshe, Torben, myself are all Candidates. Who will do this? Torbin volunteered

Item 2: We need two other amateur radio operators to become Emergency Communications Coordinators (ECCs) For the ANL Emergency Operations Center (EOC). An ECC would help coordinate communications using Amateur Radio and DCERN (DuPage County Emergency Radio Network) during an emergency event at ANL. Mosh, Torbin, Bruce and Tim Smith volunteered as ECC's.

Item 3: Jacks telephone answering device and the new repeater. I would like to see developed a plan, which would include, at minimum, schematics and a block diagram of the system. This is simple stuff correct? Then lets get on the stick and make sure that it gets done. In fact I believe that a new logbook for the new repeater should be generated; one of the hardbound editions for long-term durability. This device should be a good short-term solution while we figure out what we want to do for a controller for the new repeater. It should give us the control that we need to be legal and do the other things that want to be able to do in a basic way.

Item 4: We spent 250 or so dollars buying the new repeater antenna and I think that we should start making it useful.

Point 1: I believe that the new antenna will help the current lack of repeater coverage. I believe this would be due to two things: greater gain and less corrosion. 8.9dB gain as compared to 7dB can help in a repeater situation. This will help on both receive and xmit. The old Hustler G7-144 has been up in the air for quite some time and is probably suffering from corrosion to the point where its efficiency has dropped. Aluminummmmm...

Point 2: Whilst we are going to go to the effort of replacing the repeater antenna, I thought it would be a good idea if we checked out the main transmission line and associated connectors for loss factor. This is a simple process wherein we put in a certain amount of RF power, measured at the input end with a Bird 43, then measure at the other end with the same Bird 43 to see how much power we have lost. This takes only a small amount of time and we will have

Why do Hams Use the Wrong Coax?

by Deni, W9DS

Do you search for aerial resonance measure it or adjust it? The half wave dipole is 72 ohms at $\frac{1}{2}$ wave height in free space. Why use 50 ohm coax? That's a standing ratio 72/50 ohms of 1.44:1. So, you trim your coax away until you reach a minimum and claim it is "resonant"; wrong! Don't people buy aerial books with all of the formulas and math done by the pioneering engineers? They did it by trial and error always with savvy and come to terms with aerial production.

So you buy a book about aerials full of confusing terms algebarde symbols and get scared off. That's why we buy some aerial someone else made, but sometimes their engineering is wrong. You think it will work. Nobody can hear you. Why? You see anybody can invent an aerial and patent their idea, the aerial by using mathematics to twist and claim higher gain. The fact is the aerial is a looser and are a current sucking animal. The radio wave aerial gain is over rated in advertising and is just puffing and you can't return it, or if you do, they say it is fixed and it is your fault because you are not operating it correctly. Your second, third, fourth, etc. times you follow the instructions to no avail – get the message. It's crap! Try again, because some small aerials do work well.

Most magazines have articles about new aerials that work with open line best! Coax is the most widely used feed line in the ham world wide. Old timers however almost always use open lines because even SWR ten to one can radiate big signals. Coax at 3 to 1 forget it losses are too high. If your stubborn then fiddle around with stubs and do the math you know so well. Ha! Or is it Hi! Ok you still want coax. Here we go for one to one SWR.

We use a transforming bridge balun, tapping the line a little up on a ground plane grounded vertical with a stub with a LC matching network or $\frac{1}{4}$ wave transmission line transformer. References .1 Bill Orr "Wideband Bridge Baluns" Ham Radio December 1968.

Find resonant frequency by a one turn coil in the antenna and grid-dip it. This may move the resonant frequency down 100kHz and must be accurately found in a calibrated receiver. Keep a distance from the aerial, as capacity will lower the frequency. Another way, and more satisfactory, is to make a pick-up loop of several small turns across two feet of insulated wire with ends one foot long and jumper this across two feet of aerial. Grid dip oscillator can now be coupled to the small coil without it being in series with aerial. Thus, results are more accurate. Works on quads too.

The aerial load impedance doesn't match our coax feed line. Adding coax sections until the rig loads the aerial, but the SWR will remain the same. What to do, oh what

to do? Turn the page and another solution comes. Add a homebrew coil and/or add a series or parallel capacitor to the line to cancel the reactance. Narrow band with vis-à-vis small aerials can be overcome by in-band RF traps, coil switching, aerial end clip-on wires several feet long or a stub of fan-out wires to create series capacitance with 10 percent more bandwidth and less than 2 to 1 SWR. Choose a good matchbox. Yes, a T-match works good, but when that fails, you need a type of link coupler box; the old-timers favorite matchbox.

Now K6KA, E.H. Conklin, wrote in Ham Radio Feb 1970, an aerial, thru coil and capacitor use was able to operate on two bands 40 and 80 meters. My uncle W4ACK while here in Berwyn in the 1950s used what he called a doublet aerial. It was used by me as a novice on 80 meters on his DX-100 CW with output around 75 watts. This doublet worked 40 and 20 meters as well.

I looked up doublet in the ARRL Antenna Handbook 1964; it was called "fictitious type of elementary dipole". I looked up in the Webster dictionary the word "fictitious" and one of its meanings is found under "fiction" which is something invented or imagined or false. Then I looked up the word "doublet" and it has two meanings: 1) time – the fastest marching pace next to a run and 2) [L. latin duo, two]. Interesting, isn't it? My uncle K9IZJ/W4ACK worked with 2 traps, a coil, and a capacitor in each leg from the center of the aerial the trap was plastic sealed you could see the ceramic insulator and the capacitor leads across the insulator soldered and the doublet center of trap coil leads also are soldered across the ceramic insulator.

Ham, K6KA, built an "L" aerial which resonated at $\frac{5}{4}$ wavelengths to the 40 meter trap and $\frac{3}{4}$ wavelengths on 80 meters. He used no coax, but aerial was led to transmitter terminal and no matching or coupling devices or feed line. The wire was trimmed for the high end of both bands then to move it to the low end of both bands about 10 turns of 2 inch air-dux coil mounted on the wall with shorting clip for 40 CW 4 turns were added for 80 CW 9 turns were added. SWR 1.5 to 1. Shocked! No feed line to show a standing wave – A Heathkit SB200 and Henry 2k kilowatt amplifiers fed the aerial easily which was 15 feet above ground at its mid point. Never the less using CW and SSB contest contacts were made to Malaysia and Singapore on 80 meters. At his location the land was prevented by a building program. All proposals to the use of a vertical and radials was rejected without a fair test.

A few months ago I purchased a Time Wave ANC-4 noise phase canceling box. I bought it for 160 meter use. I have S-9 to 10db to 20db noise. I was able to copy only 4 stations south of me before I put it into use to cancel

power line noise. Well, I work Indiana stations now and many more that are out there on the air my FT857d puts out about 40 watts into my 160 meter dipole. The only HF aerial I use until the quad gets fixed again. I have used the Time Wave on 20 meters also with success, but I'm still troubled with atmospheric noises. Today solar index is at 100, so have we hit bottom time will tell. My next purchase will be a noise dsp canceling speaker cost in the \$150 range. 73's. Bought the gap dsp speaker 20db noise canceling fantastic WA9FVP, KA9QGT, KC9EUY, W9ZEW, and others have heard it over the air on 20 or 160 meters. 8 filters I use 6 of them. Made in England. Fantastic listening now by W9DS.

W6SAI and Minibeams

by Deni, W9DS

Bill Orr has been building and designing one kind or another beams. He is an author of several books on the subject and well versed! In this article he recognizes the revolution of solid state digital communication. It is Mar 1982 Ham Radio magazine his article appears. The last of doing your own thinking experimenting with unorthodox aerial designs. I tell you there are UHF and microwave lots of action in aerials even laser frequency aerials are on the rise in patents in the hundreds across the world I am sure. W1PLH 15 meter mini-beam is interesting but lacking forward gain information.

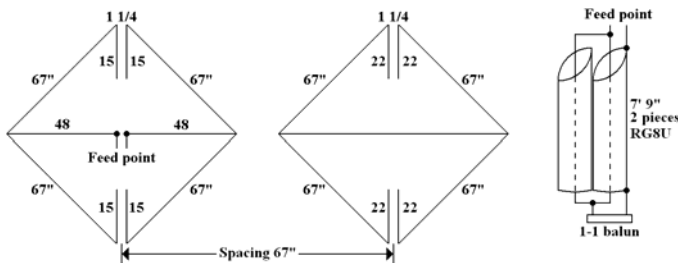
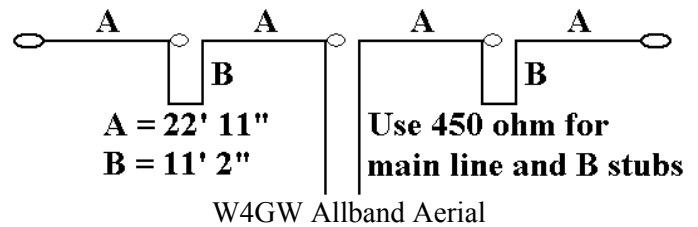
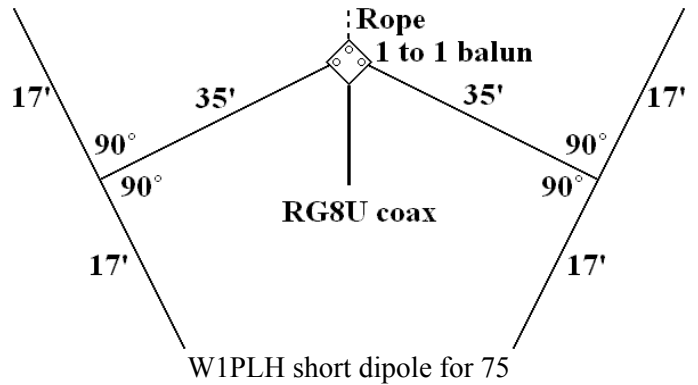


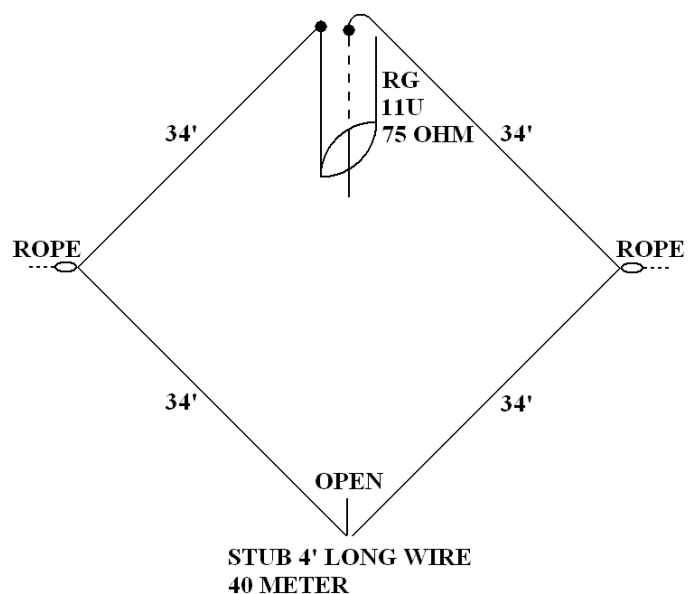
Fig 1 is the W1PLH yagi beam 5 feet 7 inches on a side 5 foot 7 inch spacing between elements design frequency 21.200mHz 15 ohms at resonance. Simple linear matching transformer 2 parallel $\frac{1}{4} \lambda$ sections of RGS8U. The SWR curve is 2.5 to 1 at 21.0, 1.2 to 1 at 21.2, and 2.5 to 1 at 21.4. The front to back ratio at 21.2 was 12db. I'd guess forward gain to be about 3.5db. Charlie has worked plenty of DX with his beam and is able to hold his own in competition.

W1PLH also adapted the wing dipole for 75 meters the overall length is 70 feet with 17 foot wings at each end establishes resonance. It is 25 feet high at center; ends are 15 or 20 feet high. It is fed with a 1 to 1 balun with 100 feet of RG8U. The resonant frequency can be adjusted by trimming the 17 feet sections ends.

Resonance also is affected by height above ground. The 2 to 1 SWR points are 3-7 to 4.0mHz.



This all bander tunes on any frequency 3.5 to 30 MHz good quality glass insulators should be used as high voltage across the insulators at certain frequencies. Use a suitable tuner for your power. If load problems exist in tuning up at any one frequency change the feed line length a foot or two will clear up the problem.



80 – 40 meter loop W7EJB. Two band quad hung 40 feet high on 80 it operates as dipole folded back on itself. On 40 it acts as a quad loop horizontally polarized the bottom end is left open for 80 meters. Closed with adjustable stub shorted on 40 meters.

With the bottom of the loop closed, the legs are trimmed to resonant in 40 meter band. The loop is then opened

and 80 resonance checked and fold back equal lengths of wire. You can then clip this off and use a four foot stub to short the aerial for 40 meter operation.

used to estimate field strength and power density or see FCC website OET at www.fcc.gov/oet/info/documents/reports/#ASD-9601>. See also www.fcc.gov/oet/rfsafety.

Dateline May 2006

by Deni, W9DS

The ARRL just sent me my ten year license renewal 605 form. This form says "All applicants now sign an RF safety certification." It says "I have read and will comply with section 97.13C of the FCC rules regarding radio frequency (RF) radiation safety and amateur service section of OST/OET bulletin number G5." The FCC hasn't as of this date, May 31, 2006, released these new rules and bulletin G5 information hasn't been put on the 605 form, but in general here it is: "Before transmitting from any place where RF exposure to RF fields of excess levels of those allowed under 97.13(c) 1.1210 of this chapter, licensee must take this action: 1. Licensee must do a RF routine environmental evaluation prescribed by 1.1307(B) of this chapter, licensee must take action if the power of the station exceeds the limits given in the following table: wavelength evaluation is required if power in watts exceeds:

160 – 40 M = 500 watts	10M = 50 watts
30M = 425 watts	VHF all bands = 50 watts
20M = 225 watts	UHF 70cm = 70 watts
17M = 125 watts	33cm = 150 watts
15M = 100 watts	23cm = 200 watts
12M = 75 watts	SHF/EHF = 250 watts

Height above ground level to lowest point of aerial less than 10 meters 33 feet and power over 500 watts ERP. Building mounted aerials power over 500 watts ERP where power is PEP input to aerial. If the evaluation shows RF electromagnetic fields could exceed the limits licensee must correct it and be in compliance.

Such actions include modifying aerial patterns by relocating the aerial revising technical parameters as power, emission type, and frequency, and other remedies.

Limits for occupational / controlled exposure:

Limits for maximum exposure				Average time
Freq MHz	Electric field (E7)	Magnetic field (tI)	Power density (LS)	E ² H ² or S minutes
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89f	900/f	6
30-300	61.4	0.163	1.0	6

This includes the operator, family, friends, and neighbors. Know about your aerials gain. Analyze fields, frequency, power, and other factors. Read the ARRL Handbook for Radio Amateurs for the equations to be

The ARRL has more info under RF safety in the January 1998 QST (pages 50-55). Hints and kinks Jan 1986 QST ran an article by KD7MW, which points out to be not a very bright thing to do.

He extols the use of HT's with $\frac{5}{8}\lambda$ aerial using a TR-2500 and other gain aerials other than the $\frac{1}{4}$ wave whip supplied with his equipment. Adding anything to increase the gain of the aerial may and can give you RF burns on your face and hands. These new rules in force now make it plain and clear that the responsibility is on your shoulders to test and correct all RF emissions that impact all the people in its path. Play it safe and not the KD7MW's way.

The V-Loop Beam For 15

by Deni, W9DS

It was Feb 1962 issue that I read an article by W2NOS. Seems that angel's aerial was the only V beam I have seen. I think the construction of it may have a lot to do with its rarity. This type of V beam requires a platform to work from. The beam is a loop and therefore the whole aerial covers an area 18 feet high and 12 foot boom, thus a six foot turning radius. The beam is fed coax at the top of the aerial and at the bottom are variable capacitors with stubs, 72 feet each of wire from both elements each loop uses the same type matching network. The upper and lower sections are in phase. The aerial is bi-directional. The overall gain is 7db. Each leg is $\frac{1}{8}$ wavelength long. The angle of V is 90 degrees. The driven element and reflector is 0.15 wavelengths spaced, front to back ratio of 36db. The V's are $\frac{1}{4}$ wave apart vertically. A stub and variable capacitor is placed in each of the lower V's to promote fine-tuning of the beam. The bottom of the beam should be 30 feet and higher from the ground. Connect coax $\frac{1}{2} \lambda$ RG8U to the top of segment solder. Tape the cable at several places all the way down the vertical boom. At the other end of the transmission cable hook up SWR bridge. Twist the knob on the capacitor for minimum reading at your resonant frequency desired. Turn array into a signal so you can tune the reflector for minimum S meter reading, then turn back to check the SWR try for a lower reading. Done? Stubs are hair pins 18 inches long 3" wide #8 copper wire 140pf variable, 2 needed.

This beam can be used on the other bands by interlacing for example, a 15 and 24MHz V wire on the same boom. Happy Hamming.

<p>ARGONNE AMATEUR RADIO CLUB P.O. Box 741 Lemont, IL 60439</p> <p>Officers</p> <p>PRESIDENT Bruce Epperson KA9H VICE PRESIDENT SECRETARY Jack Albert WA9FVP TREASURER Jack Albert WA9FVP DIRECTOR Dick Konecny K9IB DIRECTOR Torben Lauritsen KF9MI DIRECTOR Charles Doose KB9UMF DIRECTOR Jim Jorgensen K9RJ 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>
---	--	--