# WIRELESS HILL BEACON

## Delaware Valley Radio Association


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Hamfests
Open

### Meeting – April 10th 2013

The regular monthly meeting will be held at 7:30 PM on Wednesday, April 10th, at Our Lady of Good Counsel Church, on Upper Ferry Road at Wilburtha Road in West Trenton. The site is easy to reach from I-95 or NJ-29. Talk-in is available on the 146.67 (PL 131.8) and 442.65 repeaters. The directors meeting is 1 hour earlier at the club shack.

## Meeting Minutes

Minutes of Mar.13, 2013

1. New Magic Jack phone installed at the shack. This saves $480 per year, cost$20-30 per year! Free long distance included.

2.Bob & Hi to check outdoor lighting to try to save $ (possibly use led lights if only a new base is needed)

3.savings from magic jack adds $480 to the budget

4.DVRA needs to apply to VOAD to be eligible for new gear.

5.DVRA maximum family membership rate is $100 per year.

6.Name tags-need minimum order of 12, cost $15 ea.

7 Frank Paluchek is looking into club hamfests as a fund raiser. Start small only tailgaters only, need good location and parking. Also need PR to notify area clubs.

8.Alex's wife requests NAMI walkathon at ETS May 18th.

9.Consider another auction as a program, KC2POC ran the last one.

General meeting called to order at 7:45 p.m.

1.Treas. Ron says balance at the end of the month is $1200. We are in much better shape now.

2.Bob & Hi to check on outdoor lighting at the shack (see above). Bob needs a signal emitter to check out the problems on the 2M repeater thru the antenna. Mark has one available possibly.

3.Joe has computers available all have been tested .

4.Lance, KC2MTO turned over $450 to Ron. He had 9 responses to the dues notices. Lance is the membership chairman. Good job!

5.Loyd reports soldering class was well attended.

6.Don, AA2F has license exams on Mar. 23rd. 5 scouts plus 2 parents will take the test after self study.

7.Frank Paluchek led discussion on hamfests (see above). An Ebay auction was discussed also. Frank will need the cooperation of all our members.

8.Work party planned for 2nd Saturdays in April, May, and June.

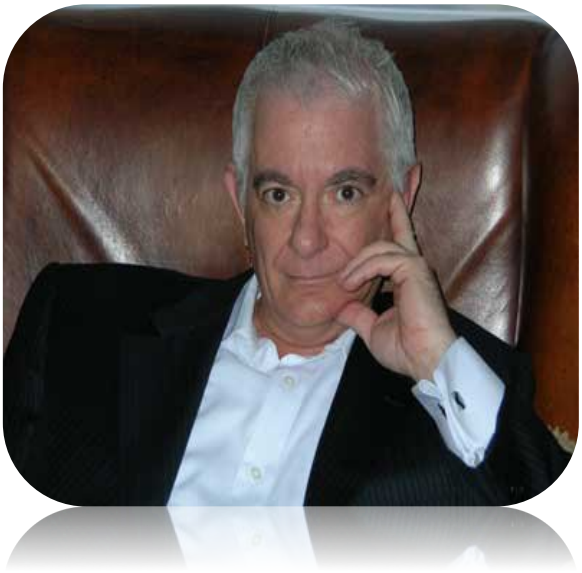
9.Need volunteers for the 5k run at ETS on May 18 9am-1pm. For mental health NAMI walk. Other events include the triathlon July 20th & 21st this is our main fundraiser for the year. We get $25 per person per day!

10. ETS bike tour is June 9th. Need 10-12 people.

11 March of Dimes walkathon is April 21st.

. Submitted by Cal Moon KC2CKI

BALANCED LINES 2013 Installment 4
by Bob Schroeder, N2HX

## THE POWERS THAT BE

Last month we dissolved the confusion and mystery about logarithms. This time we'll talk about the ABC's of dBs. When you mention the name Alexander Graham Bell (1847-1922), most people think of the man who invented the telephone. And indeed, in 1876 at the age of 29 and only after considerable legal battles with his rivals, Bell did in fact invent the telephone. That same year he founded the Bell Telephone Company and also married Mabel Hubbard. But there's more to Bell than most people realize. He was related to Gilbert Grosvener (pronounced "grove-ner"), founder of the National Geographic Society, and was also related to Theodore Roosevelt. He was also an avid pianist and an accomplished ventriloquist. He became fascinated with his mother's progressive deafness and invented a kind of finger language that predated the ASL. Perhaps most significantly, Bell became interested in acoustics and speech.

The eponymously named unit of sound power that we're all familiar with is the *decibel* or one-tenth of a Bel. In acoustical terms, zero decibels or 0 dB is the sound level at just the threshold of hearing. The dB is also used to define the smallest discernable difference between two sound levels. No doubt you have seen the various tables that list the softest sounds to the loudest sounds in terms of the threshold of pain all measured in decibels of sound pressure level. Since you can't have sound without air pressure, the decibel is mechanically defined in this manner. Many other definitions and citations can be found on the Web. Be careful to notice the difference between sound *intensity* (sound per unit area) and sound *pressure* (expressed in terms of air pressure variations).

In the cgs system, 0 dB = 0.0002 dynes/cm$^2$ of sound pressure level, or 0.002 microbars.

In SI units, 0 dB = 0.1 newtons/m$^2$

In 1931 the Bell Telephone Company adopted the decibel as a means of measuring audio power gain or loss on a copper wire circuit. As we all know, transmission lines display a certain loss per mile, so it logically follows that engineers need to describe this in terms of a power ratio. And so it was that the Bell System adopted these units of measure to describe line loss and amplifier gain.

1 dB = Mile of standard cable (MSC) or loss of audio power over one mile at a reference frequency of 795.8 Hertz. The MSC was eventually replaced by the convenient term, *transmission unit* or TU. The choice of 795.8 Hz. has to do with octaves and decades, which goes beyond the scope of this article.

1 TU ≈ 1 MSC = 10 log (measured power/reference power)

In electronics the power ratio expressed in dB can be either positive (a gain) or negative (a loss). Transmission lines and attenuators display losses, while amplifiers and certain antennas (hopefully!) display gain. Just remember that you can't mix the proverbial apples and oranges. The reference figure used in the denominator of the above definition must be used throughout all your tests, otherwise loss or gain figures will not be accurate. For example, many audio measurements have the standard of dBm, or referenced to one milliwatt. Similarly, the characteristic impedance of the audio circuit (usually 600 ohms) must be observed. If this load impedance (whatever it may be) isn't kept constant during your measurements, the gain or loss will be inaccurate. For example, you can't just wire a panel meter calibrated in dB or VU across your 8 ohm stereo speakers. Proper load impedance, which is part of your reference system, must be present.

Besides the power ratio formula 1 dB = 10 $\log_{10}$ ($P_{measured}/P_{reference}$), you can also express the ratio of amplitudes and voltages in dB in this way.

dB = 10 $\log_{10}$ ($P_{measured}/P_{reference}$) = 10 $\log_{10}$ ($A^2_{measured}/A^2_{reference}$) where amplitude A can be expressed in volts V.

You can simplify the voltage ratio and eliminate the necessity to square the voltages by using one of the properties of logarithms, thus. $\log_b (x^p) = p \log_b (x)$

10 $\log_{10}$ ($A^2_{measured}/A^2_{reference}$) becomes 20 $\log_{10}$ ($A_{measured}/A_{reference}$). Either way works.

So what's the deal with this magic number of 3 dB that we all read about in the Amateur Radio literature? Simply this. When you make a measurement that shows a doubling of power, such as 100/50 in the above equation, the ratio obviously equals the number 2. Plugging in the numbers and taking the log, the answer is 0.30103. Multiplying by 10, the answer is 3 dB. Thus, when you have a

gain of 2, it's a 3dB gain. In practical terms, an antenna that doubles your effective radiated power has a gain of 3 dB. There is a tradeoff that comes with this gain, however. In a vertical antenna like a VHF or UHF fiberglass "stick", the more gain you have in the antenna, the more the radiation pattern will change. What changes is the "close-in" coverage because the RF "droop" beneath the vertical becomes more and more horizontal with respect to the antenna's base. A lot of commercial and police agencies learn this the hard way when an unscrupulous communications contractor installs a high gain (8 dB or more) vertical antenna on a repeater. The coverage improves a little on the extreme fringe of the repeater, but the coverage near the repeater decreases.

Another misunderstanding about gain involves antenna height. The formula for effective radiated power is:

ERP = output power X system loss X antenna gain X height above average terrain

Many hams think that changing the height of a VHF or UHF antenna by a few feet will make a significant difference in ERP. Not so. In order to make any significant difference in, say a repeater's coverage, you have to DOUBLE the height of the antenna in order to see a 3 dB improvement. So moving from a 50 foot tower to a 75 foot tower won't buy you much. You'd have to go from a 50 foot tower to a 100 foot tower to see more than 1 S unit of improvement. In practice, this doesn't quite equal a 3 dB gain in ERP because you've also just doubled the amount of transmission line loss, too.

Watch out for misleading gain figures when you shop for pre-amps and antennas. Antenna performance figures should be measured with respect to a dipole, a unity gain antenna. The former reference of "dB over isotropic" (dBi) is rarely used anymore. In the early days of audiophile equipment, amplifier power output was often measured in something called IHF or Institute of High Fidelity. No longer.

**CORRECTION**

In last month's column about logarithms I made a typographical error. I had written the log of 0.8 is -9.691. That's wrong. It should be -0.0961. Thanks to WB2IPF for making the call.

All for now.
Comments invited.

Bob Schroeder, N2HX
Past President, DVRA

## Help Needed With Research Project

I need help with a small project for my Research Methods in Social Informatics course.

I need to identify a small group (10-25) of people by a common thread and gather a bit on information about cell phone usage. For the group, I have chosen the readers of this fine publication, and all that I ask is that you answer the following questions and email the answers back to me ab2rc@ab2rc.net .

Age & Gender -

Do you own a cell phone?

If you do not have a cell phone, what is the MAIN reason that you do not have one.

Is your phone considered to be a smartphone?

If you have a plain vanilla phone is there a reason why?

How often do you use your cell for calls?

How often do you use your cell for texting?

If the answer for the above two questions is never - why?

optional - tell me anything specific about your cell usage, have you noticed any usage patterns on your own?

Thanks in advance. You will not be identified in the study, and all help will be greatly appreciated.

73 de Alex/AB2RC

**DVRA Nets**
2-meter & 70-cm nets on the club repeaters 146.670 pl 131.8, 442.650 pl 131.8

2-Meter Nets:
The Pepper Net 10:00 PM Daily
Mercer Co. Emergency Net 7:30 PM Tuesdays KB2EGI, coordinator.

**Training & Upgrade Classes**
Don Wright, AA2F, periodically holds Technician and General classes. Classes are held at various locations. Call Don at 609-737-1723 to register.

**Logbook of The World**
Mike AB2IO reports that the current W2ZQ LOTW stats
As of: 3/23/2013
# of QSOs 16,555
# of LOTW QSLs 5,168
Latest QSL matches 2/23/2013

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EA3IN  2008-03-02 18:56:11 20M SSB 14.17300 SPAIN
HA8JV  2008-02-17 05:27:56 80M CW   3.54554 HUNGARY
ON6AB  2007-11-25 14:08:17 15M CW  21.07310 BELGIUM
SX5P   2007-10-28 20:29:09 20M SSB 14.27000 DODECANESE
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**Fame and Fortune Await**
Want to become rich & famous – write an article for the DVRA Beacon. Fame among local hams almost guaranteed – fortune is up to you (and your luck in Powerball). Deadline for submission is one week before the monthly meeting (that would make the deadline the first Wednesday of the month). For details contact Alex / AB2RC – ab2rc@ab2rc.net

Member Profile – Gary Wilson – K2GW

I've been licensed since 1975 and have had the present call since February 2001. I live in Hamilton Square, which is between Trenton and Princeton in central New Jersey.

My major interest is Public Service and helping Boy Scouts learn about Amateur Radio. I'm currently an Assistant Section Manager of the Southern New Jersey Section Section of the ARRL and a Disaster Services Technology Associate with the American Red Cross. Public Service events I've helped in include two New York City Blackouts, Hurricane Andrew, the WTC Attack on 9/11/01 and Superstorm Sandy among many others. I encourage all hams to complete the ARECC courses and NIMS training .

I recently completed my 50th year in Scouting and currently serve as the Assistant District Commissioner for the Mercer Area District of the Central New Jersey Council of the Boy Scouts of America. I also serve on the National Radio Scouting Committee of the National Council of the BSA. I encourage every ham to use the materials on my webpage http://k2gw.tripod.com/radiomeritbadge/to develop a Radio Merit Badge Day program in their area to introduce Boy Scouts to Amateur Radio. It's easy to do and a lot of fun for the boys and for the hams!

I'm a Life Member of the ARRL and member of the Delaware Valley Radio Association (W2ZQ), the David Sarnoff Radio Club (N2RE) and the Amateur Radio Lighthouse Society. I'm also the trustee for W2MER and W3AEQ.

Other interests include, DXing, Lighthouses, foxhunting and traffic handling. I QSL 100% direct or via the buro. Non-ham interests include stamp collecting and birding. I'm a graduate of Lehigh University, have an MBA from Pace University, and manage digital security programs and standards for the pharmaceutical industry. I'm married to Jill, W2JIL and have two children, Dave, and Pam, W1PAM.

My home station consists of a an Icom 7600 and a Kenwood TS-2000X integrated together with a RIGblaster duo audio interface and controlled by Logger32 software. These feed an Ameritron ALS-600 4 FET Amplifier, LDG AT-1000 Autotuner, an Alpha Delta DXCC multiband dipole at 10 meters AGL, a 6 meter dipole, and a Diamond 6000 144/440/1200 MHz vertical.

All are powered by an Astron RS-45 float charging a75 AH gelcell through a RIGrunner. I also have an ICOM 2m/440 DStars rig and a Bearcat 780XLT

scanner for supplemental monitoring. Digital NTS packet traffic handling goes through an AEA PK-232MBX and a Kenwood TM-231.

I've worked all states, all CQ zones, and over 225 countries using just a multiband dipole. I use "Logger 32" software to track all of these things.

My go kit consists of a Kenwood F6A HT, Yaesu FT-897, and ICOM-7000 all with spare battery packs, two 35 AH Gellcells, 52 Watts of folding solar panels, a Buddipole system and three thirty foot antenna masts and antennas. Supplemental power is a pair of Honda EU2000i's that can also power the house through a transfer switch.

Enjoy the many aspects of our hobby! Good DX & 73

Gary, K2GW