MOUNTAIN SPARK GAPS

NPARC—The Radio Club for the Watchung Mountain Area

Website: http://www.nparc.org
Club Calls: N2XJ, W2FMI

VOLUME 49 NO. 5 May, 2014

UPCOMING EVENTS

Regular Meetings
Mon. 7:30
6/9 Salt Brook School Cafeteria
6/23 NP Senior Citizens Center
Hudson Division Director,
Mike Lisenco, N2YBB, will attend

FIELD DAY 2014
June 28 (2 PM)–29 (2PM)

Please come to operate, help with setup, tear down, and socialize.
It is always a great event

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd Monday of each month at the
Salt Brook School Cafeteria
Springfield Ave. and Maple St.
New Providence

Informal Project Meeting: 7:30—9:00 PM
4th Monday of each month at the
Salt Brook School Cafeteria
Springfield Ave. and Maple St.
New Providence

Everyone is Welcome
If a normal meeting night is a holiday, we usually meet the following night. Call the contacts below.
When Schools are closed, meetings are held At the NP Senior Citizen Center

Club Officers for 2013

President: K2MUN David Berkley
908-500-9740
Vice President:KC2WUF David Bean
973-747-6116
Secretary: KD2EKN Tim Farrell
908-244-6202
Treasurer: K2YG Dave Barr
908-277-4283
Activities: W2PTP Paul Wolfmeyer
201-404-6914

On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Digital Net
First & Third Mondays 9 PM
Details as announced.

Club Internet Address

Website:http://www.nparc.org
Webmaster K2MUN David Berkley
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim

MOUNTAIN SPARK GAPS

Published Monthly by NPARC, Inc.
The Watchung Mountain Area Radio Club
P.O. Box 813
New Providence, NJ 07974

Editor: K2EZR Frank McAneny
Contributing Editors:
WB2QOQ Rick Anderson
WB2EDO Jim Brown

Climatological Data for New Providence for April 2014

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 33 years.

TEMPERATURE -
Maximum temperature this April, 82 deg. F (April 13)
Last April(2013) maximum was 84 deg. F.
Average Maximum temperature this April, 62.8 deg. F
Minimum temperature for this April, 27 deg. F (April 16)
Last April(2013) minimum was 26 deg. F.
Average Minimum temperature this April, 38.3 deg. F
Minimum diurnal temperature range, 6 deg. (45-39 deg.) 4/4
Maximum diurnal temperature range, 37 deg. (69-32 deg.) 4/21

Average temperature this April, 50.6 deg. F
Average temperature last April, 52.4 deg. F

Number of days this April with daily minimum temperatures of
32 deg. or lower - 7; last April - 4.

PRECIPITATION -
Total precipitation this April - 0.25" snow; 7.26" rain/melted snow.
Total precipitation last April - 1.97" rain.

Maximum one day precip. event this April; April 30, 4.48" rain.
Measurable rain fell on 11 days this April, 11 days last April.
Measurable snow/sleet fell on 1 day this April.

==========

Rick Anderson
5/9/14
243 Mountain Ave.
New Providence, NJ
(908)464-8912
rick243@comcast.net

Lat = 40 degrees, 41.7 minutes North
Long = 74 degrees, 23.4 minutes West
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

PRESIDENTS COLUMN
By K2MUN

Last month, as I entered my 4th decade, I skipped a column to celebrate the event. This month I'd like to return to my discussion of antennas. The focus for this month will be digging a little deeper into antenna modeling using EZNEC, created and sold by W7EL (http://www.eznec.com/). As I said in my previous antenna column (March 2014) there are a number of other modeling programs, many also based on NEC base modeling (http://www.nec2.org/other/nec2prt1.pdf), which is the case for EZNEC. I have made liberal use of the EZNEC instruction manual both in doing my modeling and in this column.

In my previous columns I discussed how I used the free version of EZNEC for my first modern antenna design, an off-center fed dipole. I showed the model SWR output plot and a few elevation plots. I also mentioned that some moderately complex antennas, including a simple Yagi, can be modeled with the free version. However, today I want to dive into a model which seems simple at first, my fan dipole. As simple as a fan dipole may seem, modeling it is not simple at all. To understand why, it's necessary to dig a bit into how a NEC simulator actually works, without going into all the gory details.

NEC is a type of simulator based the underlying physics of an antenna and/or feed lines. The exact equations for electromagnetism, Maxwell's Equations, are modeled and solved by the simulator with many limitations that require a lot of mathematics to describe and understand. As mentioned, these elements are small segments and the limitation in the free version of the program is primarily the number of elements. In general, a straight wire can be modeled with a number of elements where each individual element is small compared to a wavelength. The program checks the model and warns the user if the elements are too large and there are not enough of them

However, if the radiating elements come too close together, the modeling becomes more difficult since the radiation from one element directly couples to the adjacent element. When the antenna has elements that meet at an angle, the region near the crossing point, as happens in a fan dipole, can be especially problematic. In fact, this problem is so hard that there is a specific mechanism to automatically scale the lengths of the segments as they approach the connection point. This special feature, called 'segment length tapering', and the large number of elements needed to solve the problem, are only available when you pony up the cash for the paid EZNEC version ($89). Segment tapering can also be used for radial field modeling.

However, I also tried another approach, a large number of small segments, which seems to work quite well. To get comparable results I needed 93 segments, twice the number required with tapering to get comparable results. Since the running time of a model goes as the square of the number of segments, this would be costly on a slow computer. However with a modern PC modeling takes only seconds, even with this many segments. In general, the easiest way to see if the model uses sufficient segments is to experiment. If an increase in the number of segments in a model causes a significant change in results the segment size should be decreased and, hence, the number of segments increased. For the fan dipole described here, the difference in the two approaches was only fractions of a dB — less than could be measured in any reasonable experiment.

Finally, feeding a fan dipole requires simply adding a short segment at the point where the Balun is connected. The Balun connects at the center of this segment and the two legs don't come close together. This approach avoids trying to feed the antenna where all the wires meet at a point and is also physically reasonable.

As a result the antenna description becomes more complex but, overall, it's not very hard to model even multiple fan dipoles. Of course, the geometry is harder to write down and takes care to get it right. Once done, a modern computer can run the simulations in a flash. I'll be glad to share the design specifications on request but, for now, let's just take a look at the simulation of a 10/20 meter fan as seen in Figs. 1 and 2. The next step is to figure out what has to be done to enable my antenna to tune on 40 meters which is the problem I was trying to solve when I began this series of columns on designing, measuring and modeling simple antennas. I try to take the final steps in the next antenna column.

Spring is really here, and there are hints of a hot summer to come, with Field Day coming up fast. The Memorial Day parade should be just past and I hope you participated in some form. Either way, plan to come to Field Day the weekend of June 28 - 29! This is one of the premier events of the year. Don't miss it — even if you only come for a bite to eat or for a short stint on the air — it's well worth your time and effort! Of course, the more people who participate in the full event, from setup to teardown, the better. I hope my next column will discuss Field Day, although this is about as late as Field Day can occur, so getting a column written that fast may be a challenge.

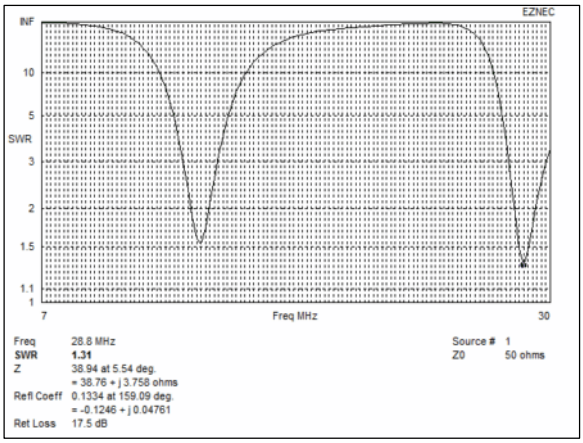

Figure 1.
Ten meter SWR.

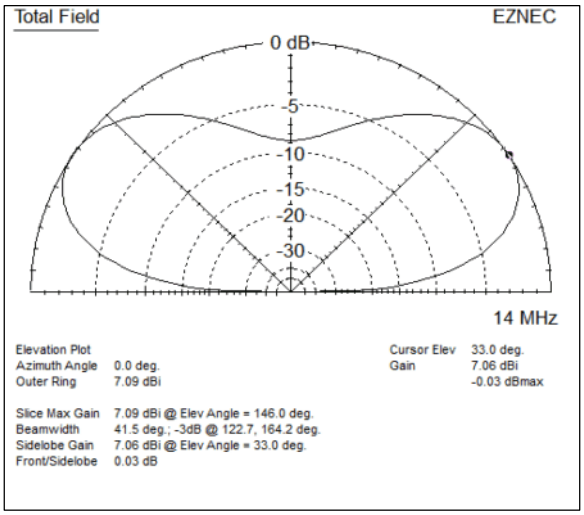

Figure 2.
Twenty Meter Vertical field.

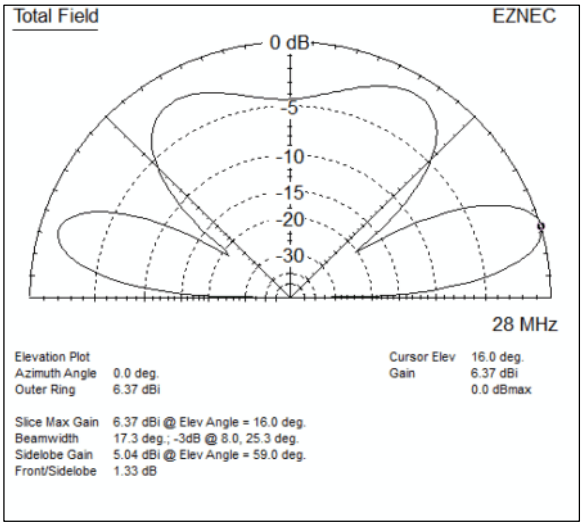

Figure 3.
Ten Meter Vertical Field

New Providence Memorial Day Parade

Rick, WB2QOQ, did a great job of beating the brush to get marchers this year.
If anyone has a good picture, please send it along

Last years contingent.

SCIENTIFIC TIDBITS

You Will Not Believe This

With everything else in the average household becoming wired, digitized, and automated, it was only a matter of time until plumbing fixture manufacturers came up with a super high-tech toilet. It looks like a Japanese company (INAX) has become lord of the loo with its Regio line, incorporating every technology possible today including the highest levels of water conservation and automated convenience.

The Silent Stream flush unit is powered by an air-drive mechanism, so all you will hear is the sound of a murmuring brook. The lid opens and closes automatically, and plays digital music via remote control while you inhabit the throne. INAX's Plasmacluster technology takes care of disagreeable odors, and the bowl is even illuminated with LEDs so you can make sure everything comes out all right. Of course, the unit is equipped with both front and rear cleansing nozzles offering a choice of spray modes, including a massage feature.

The white model is priced at $6,903, but you will no doubt want to upgrade to black for only about $1,700 more. There is a gold-plated model for about $40,000 but, after all, you wouldn't want visitors to think you are cheap. Unfortunately, none of these versions include the remote control stand which will cost another $595. It all adds up to such an elegant experience that you will be making extra stops at Taco Bell just to encourage nature to call.

ENIAC

ENIAC has turned 70. It was back in 1943 when work began on the Electrical Numerical Integrator and Computer (ENIAC) at the University of Pennsylvania's Moore School of Electrical Engineering, under the direction of chief engineer J. Presper Echert and chief consultant John Mauchly. Thus, construction was initiated of the world's first electronic general-purpose computer, which was not revealed to the public until 1946. Designed to calculate artillery firing tables for the U.S. Army, it was 1,000 times as fast as electromechanical calculation devices of its day. The ENIAC cost about $6 million in today's money, which is not bad for something that is 3 x 8 x 100 feet, weighs 27 tons and draws 150 kW. That is quite a bit of power, but it takes a lot of juice to run 17,468 vacuum tubes. The machine was capable of performing up to 5,000 instructions per second, assuming those instructions were additions. The number dropped to 357 for multiplications and 38 for divisions. In contrast to today's Intel Core i7 processors, that can do 82.3 billion per second when running at 2.66 GHz. The machine was shut down forever at 11:45 p.m. on October 2, 1955. Pieces of it are still on display in various museums.

Jim WB2EDO