

Next Meeting: Dec. 28 at the  
MCL Cafeteria in Kettering

Dec.2018//Jan.2019

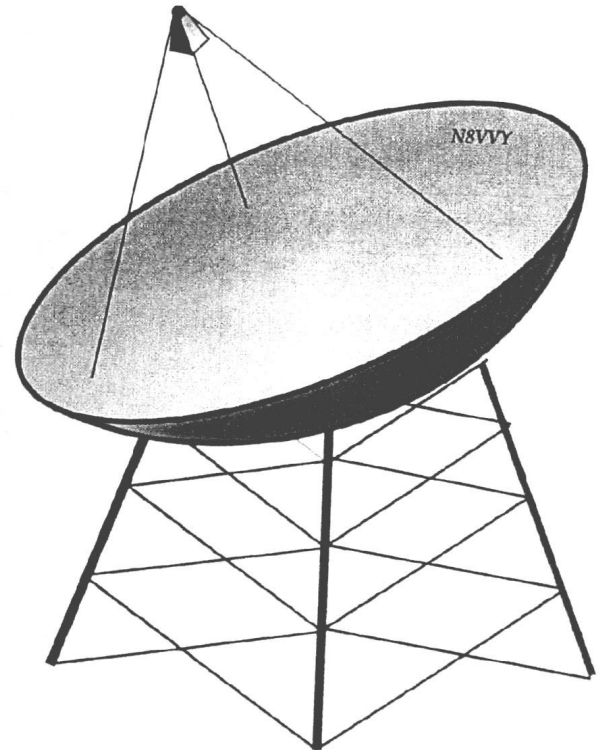
# ANOMALOUS PROPAGATION

Newsletter: *The Midwest VHF/UHF  
Society*

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Please make checks payable to Joe Muchnij, N8QOD.



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Dec. 2018-Jan 2019

Beacons: 1296.079 W8KSE EM79ur Dayton, OH---- 2W to Big Wheel at 800' AGL.

Listen for the **K9AYA Beacons** at EM79qk, 2W @ 10,368.000 MHz  
both are copied by K4TO daily. 1W @ 5,760.000 MHz

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**To all our Members and Friends  
A Very Merry Christmas  
And  
A Happy New Year**

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**De N8ZM:** Well, it's that time again. The holidays are here and free time is harder to come by for, for instance, writing this column. But, now that I've started, other tasks can wait. According to Gerd, this will be a combined December/January issue of Anom Prop, for reasons only he knows. (now I'll learn if he ever reads my column!).

I mentioned last month that we have obtained a transmitting converter for a 2304 Beacon, but I haven't had time to check it out yet (see paragraph above). I do have an enclosure for it that will mount on a tower and is large enough to hold all the pieces. I'm planning to power it and feed it with a 10 MHz GPS-derived reference signal over a single piece of coax, probably some old Radio Shack RG-8, since Loss is not a big concern. The feedline from the box to the antenna can be very short that way. The antenna is 4 Directive Systems loop yagis, configured to aim in 4 directions to provide a decently omnidirectional, horizontally polarized pattern. Thanks to Terry at DS for this design! Each yagi is 9 elements, so reasonably short to minimize bird and ice problems. Plan is to locate it at the Urbana contest site, which would put it about 1325' ASL. Since Winter is here, it will have to wait for Spring for installation there, but I may put it on here at the house for a while to shake out any problems. More to come...

Recently, Mike, W8RKO, accompanied me to Newark, OH, to give a talk on VHF operation and contesting to the Newark ARA. There were about 15 in attendance at the Newark Red Cross building so it was a nice sized crowd. There was a lot of interest and even a few fellows there who we have worked in recent contests. I think we at least were able to get a couple of them interested in trying it out, especially when I mentioned that FT8 is used a lot even at VHF. Thanks to Steve Katz, N8WL, for the invitation and to Mike for tagging along at the last minute. Remind me to tell the story of how the city of Newark heralded our arrival on that rainy Saturday night.

For the purpose of marking your calendars, We will meet on December 28<sup>th</sup> this month, and January 25<sup>th</sup> next month, at the usual place, of course.

Happy Holidays to all and best wishes for 2019 to let you play radio as much as you can stand!  
de Tom, N8ZM.

### **Kids against smart phones.**

"Your kids hate your smart phone addiction," said Ian Sherr in CNET.com. The average American now "spends about five hours a day on a mobile device," and a growing body of research suggests kids resent competing for attention with the gadgets. One Louisiana elementary school asked students to write essays "on an invention they wish had never been created." Four out of 21 chose the smartphone. "I hate my mom's phone," a second grader wrote, "and I wish she never had one." One study of parental behavior found that the more parents used their phones, the more their preschool children whined, sulked, or became irritable, easily frustrated, or hyperactive"-even if the phone use was well within "normal" level. Most troubling: Even babies became uncomfortable when they saw their parents' distracted "phone face.

**Thermistor.** A resistor that changes its value with temperature.

**Wrong Lane.** When everything is coming your way, you 're in the wrong lane. [Comedian Steven Wright]

**Facts** do not cease to exist because they are ignored! [Alduous Huxley]

**History.** That men do not learn very much from history is the most important of all the lessons of history. [Alduous Huxley]

**Food.** Just about anything you want to eat or drink now is available in a "light" version. Not new this food fixation. From Louis Mercier's cookbook of 1782: "The dishes of the present day are very light... The new cookery is conducive to health, to proper temper and long life." [L.M. Boyd]

**War** does not determine who is right – only who is left. [Bertrand Russel]

**PVC Pipecutter:** A tool to make plastic pipe too short... [Tongue in Cheek]

**Fear.** No passion so effectually robs the mind of all its powers of acting and reasoning as fear. [Edmund Burke]

**Japanese Saying.** Come on, you can learn Japanese. Can you say, "Ichi Oku So Hakuchi"? Good. That's what the Japanese call a TV set." Means for 100 million idiots.

**Perfect World.** If the world were perfect, it wouldn't be! [Yogi Berra]

**Distance.** It's not too far, it just seems like it is. [Yogi Berra]

**Good People** are good because they've come to wisdom through failure. We get very little wisdom from success, you know. [William Saroyan, American Author and Playright]

**Thought for Today.** "Half the world is composed of people who have something to say and can't, and the other half who have nothing to say and keep on saying it." [Robert Frost, American poet]

**The World.** "If God created the world, his primary concern was certainly not to make its understanding easy for us." [AlbertEinstein]

**Best Business.** "The social contract between humans and dogs might be the best business we have ever done." [Paul Howard, Irish journalist]

**Industry Conferences/Shows:** There are a lot more than "Ham-Events". I counted a total of 21. There were 3ea in Mar. April & Sept. 2 ea in May, June, Aug. and Oct. and one each in Feb. July, Nov. and Dec. [Gerd]

**Fashions.** Every generation laughs at the old fashions, but follows 'religiously" the new. [Henry David Thoreau]

**Evil.** There are thousands hacking at the branches of evil to one who is striking at the root. [Henry David Thoreau]

**Infinite.** Two things are infinite: the universe and human stupidity; and I am not sure about the universe. [Einstein]

**Science.** Without religion it is lame, religion without science is blind. [Einstein]

**The Irish.** They ignore anything they can't drink or punch. [Old saying]

**Computers.** The computer is down, I hope it is something serious. [Stanton Delaplane]

## VHF/UHF Microwave Signal Source By: Joe - WA8OGS

I had been looking for an easy-to-use vhf/uhf/microwave signal source to check or work on receivers, to use to tune antennas, to use for antenna gain measurements, or to use as a test beacon. I wanted something small, self-contained, with its own power source/battery.

Searching eBay led to a number of possible solutions. I would copy/paste any interesting items I found into a Notes app file on my iPad as I continued my search. On W6PQL's website, I found a VHF OCXO (oven-controlled crystal oscillator) - see #1 below. I also found a lot of transmitter and beacon info on the "Homebrew RF Circuit Design Ideas" website page (#2 below).

Paul Wade, W1GHZ, has a number of project boards of interest on his website (#3 below). If you have not look at this site lately, it's well worth spending some time looking through - maybe during those football commercials on a Saturday or Sunday afternoon.

Using "UHF Radio Beacon" as a search term lead me to a cheap (about \$10; #4 below) 4-pin board that is used by hobbyists with R/C planes, lost balloons, model rockets - or perhaps hidden transmitter "fox hunts"! (#5 below).

Raspberry Pi or Arduino are other signal source options to use. You can find a lot of info about a WSPR transmitter using a Raspberry Pi on the LF/MF/HF/VHF bands. Here is a neat picture with details about

a standalone WSPR transmitter with a built-in GPS module and external GPS antenna (#6 below). The high-frequency model covers 15 through 6 meters, and costs \$129.

Searching eventually led me to Wayne, ZL2BKC's site (#7 below) listing his ZLPLL Local Oscillator, based on the Analog Devices ADF4351 PLL chip. This self-contained board can be used as a local oscillator for VHF, UHF and Microwave projects (#8 below). Wayne also has details on his Multi Beacon Controller project on his website.

I also found similar related options, such as a cheap evaluation board "35MHz-4.4GHz PLL RF Signal Source Frequency Synthesizer ADF4351 Development Board" for about \$20 (#9 below).

I decided to go with the ZL2BKC solution for my VHF/UHF microwave signal source - a "Standalone Signal Source" with a thumbwheel to select the frequency. So I ordered the following:

- ZLPLL Board - TCXO
  - BCD Switch Option
  - Programming Cable
- (Maybe also the 10 MHz OCXO?)

I then started searching for a metal enclosure to mount this in. I found an "Aluminum Project Box Enclosure Case Electronic DIY Instrument Case 100x76x35 mm" on eBay for about \$7. This enclosure was gold in color, and during assembly I discovered that this coating was non-conductive. So I had to scrape/sand the seams where the enclosure fits together to insure good shielding...not a big deal, but something I did not expect. Guess I'm just used to using the more common Bud/Hammond boxes that are bare aluminum.

I drilled round holes in the front enclosure cover for the two SMA connectors, an on-off switch, an LED indicator light, and a rectangular hole for the digi-switch. I drilled the back cover for the power plug, a 5.5mm x 2.5mm .320 mounting hole panel mount power jack that I got at MicroCenter for \$2.99. I also drilled holes in the bottom of the case to mount short standoffs to support the pc-board.

I wanted this signal source to be totally self-contained, so that meant I needed to select a battery and holder/mount. The signal source device works well on 7-to-8 volts. So I decided to go with a 7.4v li-ion np-f550 battery. I ordered a "Battery Pack Charger" package that included two NP-F550 batteries and a charger - for \$20 on Amazon. I also ordered a "Battery Adapter Base Plate" for the NP-F550 battery, that I mounted to the underside of the source enclosure to hold the battery.

Wayne, ZL2BKC, had told me that the SMA Connectors supplied with the ZLPLL are not long enough to use if mounting the circuit board in a metal case, so I had to change these. He agreed to supply the longer SMAs since I was also getting the 10 MHz OCXO that included the longer SMAs. I decided not to mount the 10 MHz OCXO in the same enclosure, as I may have other uses for it. I may later add a connector on the back of this signal source for the 10 MHz OCXO input.

ZL2BKC gives the signal source frequency range as 31MHz to 4400MHz. But output inductors vary depending on the frequency. So ZL2BKC uses a splitter and has two separate SMA output connectors to cover the entire frequency range. A 50 ohm termination is placed on the unused SMA output. In one of the pictures, you can see a SMA termination attached with a short chain to the front panel corner screw, insuring that the termination does not get lost. The left SMA covers frequencies above 2 GHz, and the right SMA for the 1.296 GHz and below.

I downloaded the driver software so that I can set any ten frequencies that I would want. The source is currently programed for the following frequencies:

50.050/144.050/222.050/432.050/902.050/1296.050/2304.050/3456.050/5760.05/10368.050.

This signal source device supports 4 amplitude settings which you can program for each channel. Tone modulation is not available. So a future project will be to build a small amplifier board that this source will drive. I will then turn the amp on/off at a 1kHz rate to obtain the 1000 Hz modulated signal that is frequently used when performing antenna gain measurements.

I hope this project has given you some ideas for your future projects. Joe - WA8OGS

#### References:

- #1 [http://www.w6pql.com/vhf\\_ocxo.htm](http://www.w6pql.com/vhf_ocxo.htm)
- #2 [https://www.gsl.net/va3iul/Homebrew\\_RF\\_Circuit\\_Design\\_Ideas/Homebrew\\_RF\\_Circuit\\_Design\\_Ideas.htm](https://www.gsl.net/va3iul/Homebrew_RF_Circuit_Design_Ideas/Homebrew_RF_Circuit_Design_Ideas.htm)
- #3 <http://www.w1ghz.org>
- #4 <https://www.instructables.com/id/433-MHz-UHF-lost-model-radio-beacon/>
- #5 <http://www.instructables.com/id/433-MHz-tape-measure-antenna-suits-UHF-transmitte/>
- #6 <https://www.zachtek.com/1012>
- #7 <https://zl2bkc.com>
- #8 <https://zl2bkc.files.wordpress.com/2013/03/zlpll-user-manual1.pdf>
- #9 <https://www.fasttech.com/product/9355700-35mhz-4-4ghz-pll-rf-signal-source-frequency>



## Three in a Row

By Gerd, WB8IFM

I went to three ham radio events recently in just a few weeks' time: first to our own MUD, the Microwave Update at the Holiday Inn Fairborn, then to the AMSAT Symposium in Huntsville Ala, and thirdly to the Fort Wayne Hamfest. For the trip to Huntsville we teamed up with Steve, K8UD and both xyls. To Fort Wayne Steve and I went together. The ARRL held a banquet there which we also attended.

All three banquets were memorable. At MUD we got an excellent presentation about the Dayton history, in Huntsville the banquet was held at the US Space and Rocket Center right under a Titan 5 rocket. The talk was about plans and activities of NASA. And in Ft. Wayne The ARRL speaker was an older ham and he talked about the future of Ham Radio and how old and young hams could serve each other promoting our hobby.

So, of course, there were a lot of presentations over a wide range of subjects. In the microwave area the emphasis were on the ultra high frequencies, which requires special equipment if you plan to work on that kind of hardware. In addition to good eyes and a steady hand you also have to magnify the hardware to handle these small components. For this you use a large magnifying glass or even a microscope. There is an exhibitor at the Ft. Wayne Hamfest, and has been there many years, who specializes in this kind of set-up. I always stop there and visualize working with one of these. I would definitely pick one of the magnifying glasses over the microscope. They are intuitive, meaning you can start working with them right away, while with the microscope it needs practice and a learning period. The dealer is from Indiana: AEA Sales.

When talking about the mm waves most often we use GHz. This is not very practical. I suggest to use wavelength since it immediately relates to the size of the components. Like our famous 10 GHz band translates to 30 mm, which is just a few mm (3mm) over one inch.

There was one presentation at MUD about a weekend of trying out mm waves around Lake Michigan. Propagation was very similar to 10 GHz. So why not concentrate on 10 Gig and up the activity, make it more "mainstay!"

AMSAT has shifted gears and puts major emphasis on the cube satellites and new young members. The cube satellites come cheap, easy to build and relatively easy to launch. But as the saying goes, not always true, but here it is true: you get what you pay for. However, AMSAT is aiming high: we might eventually have cubesats in orbits comparable to the phase 3 spacecraft.

A highlight of the symposium was a balloon launch of a small repeater. The wx was fine, everybody went out to watch the event and listen to the repeater maintaining contact with the ground.

The U.S. Space and Rocket Center was well worth a visit and was included in the activities. We know from the Airforce Museum how difficult it is to acquire space hardware. Huntsville, however, has not one, but several Titans or parts thereof on display. The banquet took place in the Titan hall, where the 3 stages were suspended overhead and at the end an Apollo capsule and a Moonlander were on display. Also there was a big parachute from the Apollo program with an inscription from an astronaut, proclaiming: The parachute was the most beautiful sight of their trip, indicating they had made it and are on their way back to earth. Werner van Braun is also big in Huntsville. His office with desk is at the museum and there are other items. The gift shop has a good collection of "rocket books". The city of Huntsville is close-by. We went there once for breakfast and once for dinner. The entire area is still a center of rocket and space research. A tour was available but was for Sunday morning when we were leaving to make it home before dark. I had been there years ago. Get this: I was measuring rocket exhaust characteristics at x-band (10 GHz).

Fort Wayne is the last hamfest of the year, at least for us mid-westerners. It takes place in a convention center with a huge main hall: a third is for big known dealers and two thirds are for smaller sellers and include a radio clubs/fleamarket mix. B.T.W. At the fleamarket I saw a real old-time magnetron, sporting a huge permanent magnet, priced for a museum. I was satisfied taking a picture of it for the memory!

# Midwest VHF/UHF 2019 Roster

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N8SPY	Gary D	Turner	4828 Tall Oaks Dr	Dayton	OH	45432-3226	937-313-2487C	TurnerG@gmail.com
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KB8U	Russell	Dwarshuis	1260 Creal Cres	Ann Arbor	MI	48103-2414	934-619-1257	kb8u_vhf@hotmail.com
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KC8VEB	Bruce	Lerner	734 Suntree Dr	Westerville	OH	43081	614-985-4818	bdl7431@sbcglobal.net
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N8ZM	Thomas	Holmes	1055 Wilderness Bluff	Tipp City	OH	45371	937-667-5990	THolmes@woh.rr.com
KB8ZOB	Tony	White	4545 Addison New Carlisle R	New Carlisle	OH	45344	937-572-0617	ezine@earthlink.net
KB8ZR	Mark	Tessneer	2970 Indian Ripple Rd.	Beavercreek	OH	45440-3641	937-426-1355	kb8zr@amsat.org
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