MIDWEST VHF-UHF SOCIETY

Vol. 21 No. 7 **www.mvus.org** **September 2007**

MVUS Sunday Net at 14:30 UT **(currently 10:30** AM **local time, EDT).**

The net frequencies are primarily 144.280 Mc and 28.960 Mc.

Meeting Friday 22nd of Sept. at the Hometown Buffet Near SR 725 and Yankee Rd. in Centerville

Contents

Upcoming Events

2007 Fall Sprint Schedule on Backpage

HF Frequency Measuring Contest : Sat Oct 13

Microwave Update 2007. Oct 18-20

Price still $89 and will be $99 starting Oct 1**.** **www.microwaveupdate.org**

We have a great speaker line-up, a nice hotel for the meeting, and along with the usual schedule of activities we are announcing a "Microwaves for Beginners" course on Sat afternoon--so recommend a newcomer to join us. There will be a 1 day Sat only admission for $69 for the beginners course, but also includes any of the Sat AM meeting, a copy of the proceedings, AND the banquet and door prizes Sat eve.

AMSAT Symposium: Oct 26,27,28 Pitsburgh, PA… www.AMSAT.org

We are inviting Papers/Presentastions for the **2008 Dayton Hamvention** to be presented at the VHF Forum on Sat, 17 May 2008. Submit Abstract & Bio to: Red Dakin, W8ULC 4519 N Rt 123, Franklin, OH, 45005

Proceedings

We have a few 2006 Microwave Update Proceedings left. Available for $ 15 (including postage) or at the meetings for $ 10.50. Send check to Gerd Schrick, 4741 Harlou Dr, Dayton, OH, 45432-1618

Our annual picnic cum measurement madness was marred by rain this year, but we were not deterred. Wisely, we set up the equipment mostly in Daun's garage and were able to proceed with minimal disruption or panic. Antennae were measured and food was cooked in between the cloudbursts, and as always we had plenty of opportunity to chat about matters of interest. Some of the ladies went to the outlet shops that are nearby (I keep wondering why there are so many stores there specializing just in outlets) to help keep the county's economy growing, so I think that a good time was had by all. Once again, a big thanks to Daun and Karen Yeagley for allowing the hungry hordes to invade their normally peaceful domicile.

I have set the dates for our next several meetings (which means that I have called the restaurant to reserve our room), and here are the dates: Sept 28, October 26, November 23 (the day after Thanksgiving), and December 28. The December date is our annual holiday dinner party, so the family is invited as well. Actually, your family is always welcome at our meetings, but we try to make the December session less techie and more fun. So mark your calendars for these upcoming dates.

I won't be at the September meeting as I will be in Hartford, CT, attending the annual TAPR Digital Communications Conference, along with N8UR. This is the leading amateur radio activity of the year for hams who prefer bits and bytes over keys and mics. So Gerd or Steve will be in charge of the meeting.

Speaking of Gerd and Steve, at the picnic we held the annual pretense of an election of officers, and the three of us have once again preserved our three man junta. Abe Lincoln was right; you can fool some of the people all of the time. I'm not sure, though if it is you or the three of us who re being fooled, though.

Also, on Saturday October 13th, MVUS will be sponsoring a Midwest Frequency Measurement Test. You may have spotted the PR blurb for it in the October QST on page 85. Also, check out our web site dedicated to the event, www.febo.com/time-freq/FMT . There will be two sites where you can be involved. The signals will be transmitted from the home of Mike, W8RKO, and there will be our official arbiter of frequency to the nearest fractional Hertz at the home of John, N8UR. Both will likely be very occupied with their respective tasks, but some extra hands and observers are welcome, I'm sure.

Still not much news on the 1296 beacon front, but the antenna should be ready to go when the tower climbers are. The antenna that KA8ABR has cooked up ought to outlast the tower it will be mounted on; it is really ruggedly built. I think that one last SWR check is needed to verify some final design changes.

October 19 – 21 is the Microwave update in Philly. Let me know if you are planning to attend. I won't be able to go due to work commitments, but I do want to know who I should be jealous of. MUD is another of the outstanding ham radio technical conferences held each year that should be especially interesting to MVUS members. We will again be sponsoring, in partnership with the Mid-America Microwave Society, the Earl Price award for an outstanding 'microwave Elmer.' Bob Matthews, K8TQK, deserves the credit for organizing and perpetuating this award.

Well, that's enough for this month. Don't forget Lunch-with-the-Geeks is our weekly informal get together (as if our regular meetings have any formality to them). Contact Daun (daun@yeagley.net) to get on the e-mail distribution so that you'll get the word on which bistro is being invaded.

73, Tom, N8ZM.

Achtung: Someone didn't get last month's newsletter. A copy came back with the label missing! Let me know, if you are the one. Will then send you the June/July copy. **WB8IFM@AMSAT.ORG or postcard.**

This and That 9-07

Oil Lamps and Candles. Edison became the owner of his birthplace in 1906, and on the occasion of his last visit in 1923 was shocked to find his old home still lighted by lamps and candles. [Birthplace Brochure]

Secret Documents. The truth is that most government documentation is worthless within minutes of its production and certainly after the passage of time. [Aftergood]

Moon Craters. Back in 1924 somebody counted the craters visible on the surface of the moon and came up with 30,000. That makes a total of 60,000 if you assume a similar number for the other side of the moon that we can't see. [*Scientific American*]

Streetcar Propulsion. To replace the horse, all kinds of systems were tried to propel streetcars. One employed compressed air, which was carried in six twenty-foot long cylinders 9 inches in diameter. [S/A 1896]

Eternal Child. I think that inside every adult is the heart of a child. We just gradually convince ourselves that we have to act more like adults. Nintendo wants to make it easier for people to never grow out of video games. [Shigeru Miyamoto in *Time*]

Traveling with Kids. Aside from the DVD player, we had two computers, three MP3 players and three cell phones. We had daily "tech checks" to make sure everything was charged. There were so many cords traversing the minivan, it looked like a fully equipped kidney dialysis unit.
[Lisa Segelman in *Time*]

Cardinal Rule. A cardinal rule in writing is that less is more. I love that anecdotal quip I've heard attributed to Mark Twain: "I apologize for the long letter but I didn't have the time to write a short one." [W.E. Reinka]

Motto. Aim high at a high mark and you will hit it. No, not the first time, nor the second, and maybe not the third. But keep on aiming and keep on shooting. For only practice will make you perfect. Finally you'll hit the bull's eye of success. [Annie Oakley]

Kingdom. Exercise is king, nutrition is queen. Put them together and you've got a kingdom. [LaLanne (92)]
Progress. The trouble with progress is that it never knows when to leave well enough alone. [D L Stewart]

All You Can Eat. After gobbling down mountains of chips, rivers of cream, stampedes of beef and poppin' fresh boxcars of baked goods, many of us fret over which best-selling book can salvage our health and help us see our toes again. [John Rennie in *Scientific American*]

Old Message. The simplest message may be the best: do not overeat, exercise more, consume mostly fruits, vegetables and whole grains, and avoid junk foods. [The Editors, *Scientific American*]
Another Runway. "At the present rate of airport expansions Britain will cease being an island and become an aircraft carrier.
[George Walden, in the *London Times*]

Miles Per Plastic Bag? Every year Americans throw away 100 billion plastic bags, most of which are made from petroleum. That's the equivalent of dumping almost 12 million barrels of oil. *[Salon.com]*

Instructions. …4. Replace the power supply and screw it up…. [Submitted by reader to *Consumer Reports*]

Daddy is Driving. "Once he drove down an unfamiliar road with a stream flowing across it. He solved the depth problem by having my sister walk ahead of the car with a stick while he drove slowly behind her." [Anne J Basile]

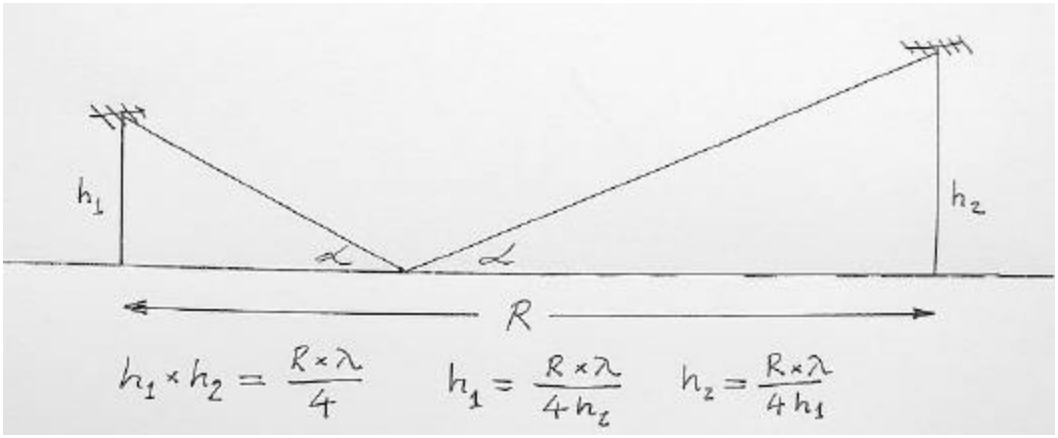
Annual MVUS Picnic (8-25-07)

By Gerd, WB8IFM

It was a nice summer day but with the typical Ohio humidity, and although the temperature only got up to 86 the heat felt oppressive. Tom, N8ZM, had set a time of 10 AM to start with the measurements and the picnic was announced for 1:30. Steve, K8UD, and myself were running one hour late, but only a handful of guys were there and nothing had started. We did set up the tents, unloaded the test antennas, masts, cables etc from my van, then retreated to the shade of the house, had a drink and munched on chips. As more and more people showed up, we still could not do much as Tom was going to bring the bulk of the measuring equipment and, of course, the meat and stuff for the picnic. So this was a slow day.

A nice breeze was going, but storms were in the forecast for the afternoon and when Tom with xyl Barbara finally showed up (around 1PM) the weather started to look threatening. We didn't want to take a chance of getting the expensive HP equipment wet and decided to set up in the garage. However, to get to our "range" we had to employ a bunch of RG8 cables, which meant big losses, and we didn't go beyond 1296 in our antenna measurements. One of the cables (88' in length) in particular gave Daun fits, with one bad connection somewhere. Also he claimed to detect some coupling between the cable that ran to the source antenna and the one that ran to the test antenna. If we keep the "garage set up" in the future, we need dependable and lower loss cables (or booster amps).

While Tom was checking and measuring various equipment: converters, couplers etc Daun was running his pattern test with Adam, N1GX, Joe, WA8OGS, and me setting up the range and aligning the antennas. Adam had further improved his range program on his laptop and will report on it in an upcoming issue of this newsletter. I was just using the plain old formula to calculate the 1st lobe for a ground reflection range

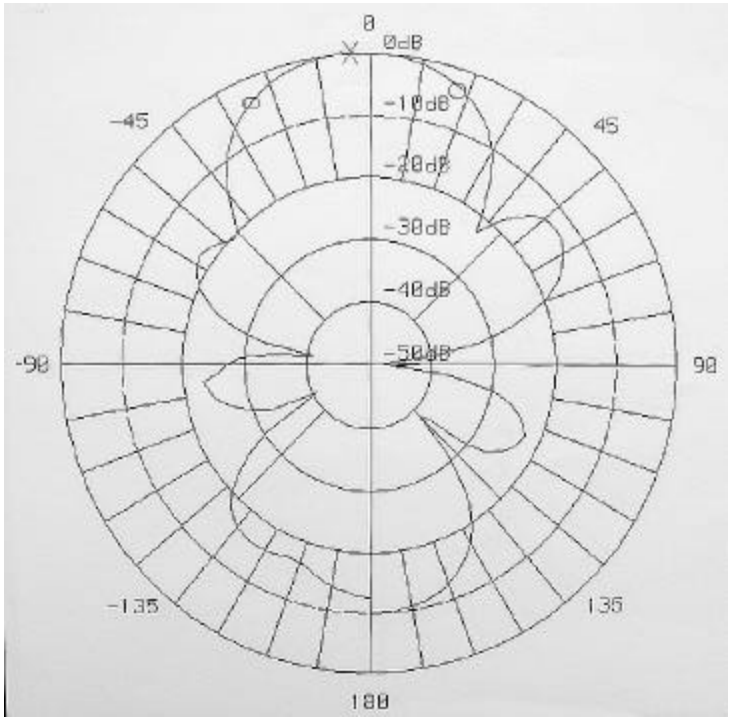


Antenna Range

Bob, K8TKQ and xyl Carolyn had to leave, and so did Ken, N8AEG. If memory serves me right, it was around 4:30 or 5 o'clock when we finally got started on our picnic. The hamburgers and hot dogs were excellent. There was a choice of potato or macaroni salad and chunks of watermelon. However, the veggies were represented only by relish and tomato ketchup. When it came to dessert, we had 4 different kinds of brownies/chocolate chip and coconut cookies.

Some time during the afternoon the clouds got bigger and looked more threatening and we did actually get a few drops of rain. So the move to the garage was justified. We picked up measuring where we had left off, but it was slow going. Then the women got back from their shopping trip and shortly thereafter we had the traditional birthday singing for Marilyn, Red's xyl, who was ready with the knife to cut the cake. This concluded the day. Packing up completed Steve and I headed home observing a beautiful sunset to our left after the rain and incoming cold front had swept the skies free from dust and haze that had hung over the area for many hot days.

Here a list of the attendees in no particular order: John, N8VZW; Mike, W8RKO; Ed, WR8A; Tom, W9NBS; Ken, N8AEG, Adam, N1GX; Bob, K8TKQ & xyl Carolyn; Red, W8ULC & xyl Marilyn;
Tom N8ZM & xyl Barbara; Bruce, ND8i; Daun, N8ASB & xyl Karen, N8CSX; Joe, WA8OGS; Steve, K8UD; Mike, N8QHV; and Gerd, WB8IFM



Typical Pattern recorded by Daun, N8ASB

Frequency 430 MHz
Ground Reflection Range

9 dBi Beam

42deg Beamwidth (measured)

Some Measurement Results By Steve, K8UD

I had a couple pieces of equipment checked out by Tom. Here is what we found out.

Downeast Transverter 1296 MGz to 144 MHz
We first checked the receiver sensitivity

Useable to about -125dbm to -130dbm (this is taking into account the 20dbm equipment noise)

Next we checked the transmit side.
We found out that the transmitter (at 1296) saturated at +13 dBm output (20 milliwatts) with an input of -7dbm from the 2-m signal That is a start, but I will need a brick to get the power up a bit.

Varying the voltage from +10V to +16V, the LO did drift very little, just a few 100 Hz. We measured the following frequency relationship: 1296.100 in 144.1034 out

Drake Down-Converter
This is a simple 2.4GHz down-converter with 144 Mhz out. The conversion factor is +18db
The noise floor was measured at about -130 dbm

The frequency conversion pairs measured were
2,400.00 MHz>>>143.730 MHZ
2,400.272 MHz>>>144.00 MHz
2,401.00 MHz>>>144.72524 MHZ

This points to an oscillator frequency of
2256.27 MHz., 270 kHz (or .01%) away from a nice round corresponding frequency reading. But this might be the most stable position for the oscillator and stability is more important than accuracy. One can always use a correction table or use a programmable counter for the frequency readout.

Looks like I will be ready for P3E when that satellite goes up next year. I did pick up the short-lived AO-40 when the 2M link worked, but that lasted only a few weeks. It is best to be prepared for the next bird. I hope that the next bird stays operational longer, but first, we have to get it up.

MVUS Picnic (8-25-07) – a few Snapshots:

Cat of the House

Bob, K8TKQ & xyl Carolyn

Joe,WA8OGS

Tom, N8ZM, doing his Cooking Duty

John, N8VZW, waiting for Action

Making a Point, Daun, N8ASB and Adam, N1GX

Threatening Clouds

Locking a DEMI 10GHz Transverter to a 10MHz GPS Source

By Dave Powis, ND8P / G4HUP

This article is a brief introduction to a novel Direct Frequency Synthesiser, designed to produce a 94.667MHz output from a 10MHZ GPS controlled input. It was borne out of experience gained with a DEMI 10GHz transverter last year whilst trying to establish the EME capability at WC8VOA. The transverter uses a 189.333MHz crystal in the MICRO LO (W1GHZ design), which is multiplied up to 1136MHz on the way to the 10,224MHz injection frequency. However, we discovered that the LO was consistently low in frequency, and had considerable variation with temperature. Taking this into account with the doppler at 3cm of up to ±20kHz, means that it is easy to miss a QSO simply due to incorrect frequency setting!

I had seen DFS examples – WA1ZMS, G4DDK, WW2R – for locking transverter LO's, and decided to investigate. I found that unlike the examples above, 94.667MHz (half the DEMI LO freq) could not be constructed from a single mix. Fig 1 shows a simple, single loop DFS.

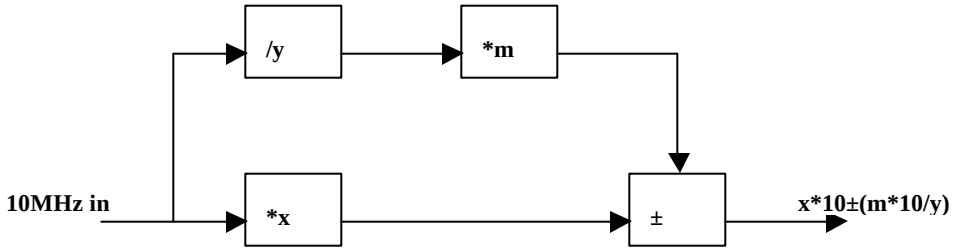


Fig 1 – Single Loop DFS function

In Fig 1, *x* would typically be 9, giving an output for that stage of 90MHz. This would be mixed with a lower frequency signal derived by dividing the 10MHz and multiplying the resultant – for instance, 10MHz / 5 gives 2MHz, which multiplied by 3 will give 6MHz. Added to the 90MHZ, we have a 96 MHz output – thus we can lock our 23cm transverter LO to GPS – and we know exactly what frequency we are transmitting on!

To get 94.667MHz, I needed to create a 4.667MHz signal to mix with the 90 – this cannot be obtained directly by any reasonable division ratio from 10MHz! The answer was to create the signal in two stages: 10MHz /5 gave me 2 Mhz, which can be multiplied to 4MHz. Taking the 2MHz and dividing again, this time by 3, gave me 667kHz, which could be mixed with the 4 MHz to give the wanted 4.667MHz.

I have built a prototype, ugly style, to prove the concept – particularly to investigate the filtering required, and am quite pleased with the results – generally I am seeing better than -45dBc for spurious signals, which considering the construction method is rather better than I expected. I have just received the first PCB's for the design, and will be constructing one over the next few weeks, which will then be installed at WC8VOA.

The two loop concept outlined here is extremely flexible, and gives a wide variety of options for frequency generation – I will be giving a presentation on this aspect of the DFS technique at MUD in October.

Mystery Man

In last month's newsletter in the report about the 10 GHz activity and the accompanying pictures the operator was falsely identified. It is really Dave, G4HUP. I had first met Dave at last year's Microwave Update, which was held here in Dayton, when he kindly jumped in and presented the VOA (Voice of America) EME story. The mix up occurred when I thought to look him up in the proceedings. But the substitution was made after the proceedings were printed and I got the wrong person. Dave's US call is ND8P. Dave's son lives in Middletown, so he and his family visit regularly, and we are happy to have him in our area.

Dave was first licensed in 1968 as G8BPJ and later became G4HUP. He had interest in the higher frequencies from the start and worked his way up to the microwaves today. He made his first EME contact, still on 2m in 1991. When Dave worked in Munich, Germany, he acquired the DL4MUP call and got interested in 23 cm. After three years he returned to England and pursued building a 23cm EME station, He finally got on the air in August of 2006 and started working stations in Europe and the US. When he tried for Australia, he found out that the operating window was rather short and that foliage from some trees was even cutting it shorter. He still has not achieved that elusive QSO with the antipodes! This is not entirely due to the foliage however, since family and work have kept him away from radio operating for too long – he's trying to get a better balance through the winter!

Dave uses a 2.4m Channel Master prime focus dish on homemade Az/El drive mechanism, with a W2DRZ control system. The feed is an RWST (Rectangular Waveguide Septum Transformer) feed, with a .28dB LNA (NE32585 in a WD5AGO circuit) and a 200W solid state PA. The feed focus is remotely adjustable, to optimize the sun noise performance of the system.

Dave is quite involved in the VOA 10 GHz EME, station. Last year he built a noise amplifier with a large meter, which is very useful in zeroing in the antenna on moon noise for an excellent fix. Presently he is working on local oscillator designs and there is a write up elsewhere in this newsletter.

Dave is a committee member of the UK Microwave Group, Chairman of the Leiston ARC and a member of the West Chester, Ohio ARC. Over the years he has contributed to magazines, books and often made presentations at local, national and international events. Dave will be making presentations on both his remote feed adjustment system and his new Direct Frequency Synthesizer LO at this years Microwave Update in Valley Forge, PA.

BTW the ham Dave was confused with was Jim, N8ECI, who is also a Microwaver and member of the VOA group. We promise to report on him in one of the upcoming newsletters.

Dave, ND8P working 10 GHz portable

A Miracle (by Gerd, WB8IFM)

A few months ago I wrote about the longevity of a garden light that had done service at our front door for a number of years. Guess what; it finally gave out. The solar cell(s) in this light were charging a couple of NiCds rated at 550 mAh. One of the cells was bad (probably shorted) but the other one checked out ok! I put this good one in my trusted LaCrosse charger and used the charge/refresh mode. The cell came up with 719mAh, which is 31 % above the nominal capacity. I never had a cell before that was above the stated capacity; usual they were not even close. And this cell was indicating this capacity after years of faithful daily service. I put in two new matched cells of slightly higher capacity and the light now shines until dawn. I will be keeping an eye on it (hi).

New Lights. My son just visited and gave me four brand-new solar powered garden lights. They appear to be from the same manufacturer, looking alike from the outside. But there are big changes inside: only a single cell is used, the circuit board and the IC are smaller and the yellow Led shines brighter and the surrounding diffuser is more evenly illuminated. However, it doesn't quite shine until dawn, unless there was a lot of sunshine the day before.

2007 Fall Sprint VHF/UHF Schedule

Object: To work as many amateur stations in as many 2 X 1 degree grid squares as possible, using authorized amateur frequencies on the 50, 144, 222, 432 MHz and Microwave (902 MHz and above) bands during the contest periods.

Contest Periods:

The 144 MHz Sprint will be from 7 PM to 11 PM local time on Monday, September 17, 2007.

The 222 MHz Sprint will be from 7 PM to 11 PM local time on Tuesday, September 25, 2007.

The 432 MHz Sprint will be from 7 PM to 11 PM local time on Wednesday, October 3, 2007.

The **Microwave (902 MHz and above)** Sprint will be from 6 AM to 12 PM local time on Saturday October 13, 2007. Notice the time change from last year's sprint. The Microwave Sprint is one Sprint and certificates will be awarded for highest total score. See section 4.5 below for scoring. Please note changes from last year!

The 50 MHz Sprint starts 2300 UTC Saturday, October 20, 2007 and ends 0300 UTC Sunday, Oct 21, 2007.

The Fall Sprints are sponsored by the Southeastern VHF Society. www.svhfs.org

VHF	**100-300 MHz**	**X**	**8-12.4 GHz**
UHF	**300-1000 MHz**	**Ku**	**12.4-18 GHz**
L	**1-2 GHz**	**K**	**18-26 GHz**
S	**2-4 GHz**	**Ka**	**26-40 GHz**
C	**4-8 GHz**	**mm**	**40-100 GHz**

Frequency Chart

Bird Attack at WB8IFM (8-07)