

Annual Picnic and Antenna Measurements: Saturday, **9 August** (raindate Sunday 10 August)
Measurements start at 1pm the picnic around 5pm, other than antennas you may bring equipment that needs
“tweaking” (we have access to some pretty fancy test equipment courtesy of Daun and HP) More about the
picnic on the next page.

This is a family affair and as always friends and guests are welcome! Let Tom (**937-667-5990**) or Gerd (**937-253-3993**) or Bob (**937-847-8082**) know you are coming, so we have an approximate “head count”. Bring a side dish (salad, fruit, veggies or a dessert) plates, tableware and lawn chairs.

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- Upcoming Events:** Aug. 16-17 & Sep.20-21 ARRL 10 GHz + Cumulative Contest
 Sep. 13-14, Weinheim VHF Conference, Germany
 Oct. 4, Midatlantic Conference (Packrats), Horsham PA
 Oct. 10-12 TAPR Digital Conference, Baltimore MD (near A/P)
 Oct. 17-19 AMSAT NA Symposium, Toronto Canada
 Oct. 23-26 Microwave Update, Sandusky OH, WA8WZG

Correction: The e in the May newsletter (Vol.11 No.4) on page 10 should read . E.g. in the line following “F” it should be... 89.0 -j 2.0 or (89.0-j2.0)

Radar detectors are still available, see May issue. .

The Big News This Month

is the **4th annual picnic cum antenna measurement contest** (or is it the other way around?) at the home of Daun and Karen Yeagley, N8ASB and N8CXS respectively, on **August 9th (Saturday)** starting around noon. I probably shouldn't mention it, but we have managed to have great weather every year for this event, but if not, there is a backup plan to hold off until Sunday (the 10th) and try again.

If in doubt, call Daun at 937-382-8262 for the latest forecast. As always, the MVUS will provide the burgers and dogs, as well as softdrinks. Please bring a salad, dessert, plate of munchies or whatever to share. And an antenna! We should be capable up through 10 Ghz, courtesy of Gerd and Daun. It is always interesting to see who, (and what!) wins on each band.

As an added attraction, Steve Whitefield, WA3OJX, plans to stop by in the afternoon with the new Drake 270 for us to drool over (but not on...save that for my exquisitely grilled hamburgers!). Also, Gerd and Red (and possibly others) have just returned from the Central States conference, so we'll get that report fresh and first hand.

If anyone would like to snag a radar detector, 6 meter amplifier, or Quintron master oscillator (5 Mhz xtal oven), let me know so I can bring them along.

Finally, the Microwave Update conference is coming up soon..October 23-26 at the Holiday Inn in Sandusky. From Dayton, that's less than a three hour drive, so there is really not much available in the way of plausible excuses for not seeing at least one day of it. Tom, WA8WZG, is putting a great program together as well as tours of some of the regions best surplus electronics emporiums (empori-i?). This is a DO NOT MISS event.

See you at the picnic!.....de N8ZM.

This and That from Central States

On the 8th day God invented contesting. Joel, W5ZN

Cable TV coax. Get it before fiber takes over. Larry, K1CA

Appliance operator. Another expression would be “checkbook construction”. Larry, K1CA

The S-meter. What got Paul, N6TX hooked on looking for aliens? Visiting W5UN’s super station and watching the S-meter jump as the big antenna (144 MHz) was trained on Cassiopeia A, one of the 5 big known noise sources in the sky. Paul is the Director of the SETI league.

That kid can’t build this! This comment from his mother gave Steve, N4PZ the right jolt to get started on his first high power amplifier (W9OJI design) in the 50s.

One and one equals two? You always get more than double from a pair of tubes. Tom, WD5AGO

Is the element’s length OK? To check this out, fasten a small strip of sheet metal to the end of a wooden pole and approach the tip of the element with this. Observe the gain; if it goes up, the element should be made a little longer. Kent, WA5VJB

Metal mast in the antennas field. Attaching a vertical yagi to a vertical mast introduces a loss of between 2 and 8 dB. (a) It is best to mount a cross yagi in a way that the metallic mast or boom stays away from the tips of the antenna. (b) Kent, WA5VJB

(a)

(b)

What’s the first thing you do? When building a microwave antenna you run to the kitchen first where you can find a wealth of suitable materials; cans for dish feeds for example: a coffee can for 1296, a soup can for 2304 and a tomato paste can for 3456. Kent, WA5VJB

It takes 5 Watts into a dipole on 2m to get to the radiation danger zone! (that’s when you hold a 5 W HT to your head) Bill, KORZ

The clam shell is the worst construction to keep EMI either in or out. And, use lots of screws to fasten the lid on equipment. The computer, especially the monitor, is the worst EMI source in your shack. Position it away from sensitive equipment, shield noisy cables or do as the command: “hit any key” recommends, hit the “off” key. Wes, WA5TKU

Falling forever. This is what it means “being in orbit”. And, updating Keplerian Elements by hand (the way it used to be) is the equivalent of a “root canal treatment” by your dentist. Mike, W9IP

Last Chance to see “BIG EAR”

At 8PM on Friday, **August 15**, exactly 20 years after “Big Ear” detected the famous “Wow” signal, scientists from around the world will gather in Delaware (near Columbus) Ohio at the site of the big antenna for a “Farewell Party”.

This famous "radio telescope" was designed and built and operated by Prof. John Kraus (W8JK) and the Ohio State University. It will be dismantled to make way for a golf course. (SETI League)

Bug Killing Rover by Jim, WB9SNR

Here are some observations after driving my rover car 1400 miles around Lake Michigan, and sending at least 1400 bugs to an early death on my windshield.

The longest path I worked on 10 GHz was 495 km (307 mi), from Manistique, MI (EN65vw) to W9ZIH in Malta, IL (EN51nv). This was without much help from band conditions, at best just a little early morning enhancement. My best DX over land has been 426 km (264 mi), and band conditions were way above normal when that happened. On 5760, my best DX was 552 km (343 mi), from St. Ignace, MI (EN75ou) back to W9ZIH, again without any help from band conditions. My best overland DX on this band under normal band conditions has been 465 km (288 mi), and this was from a spot that was at least 100' above the surrounding terrain for 100+ km along the path back to the other station. I didn't work any greater distances on the lower bands, although signals at 552 km were strong enough from 1296 down that I could probably have worked out to somewhere in the 600-700 km range, if there had been any very well equipped stations within that range. It should also be noted that 500 km is about the maximum length for a purely over water shot across Lake Michigan.

So far, I'd have to say that paths over water are significantly better than overland paths, even when the body of water is just a large inland lake and part of the path at the opposite end is over land. I estimate that this "lake effect" is worth about an additional 50-100 km of workable path length under normal conditions, and perhaps much more when there is some "ducting" over the lake. Given the very weak signals at the longest distances on both 5760 and 10 GHz, I'd also say that this is the best DX I'm going to get without making big improvements to my station, or stumbling into a band opening. For reference, I was feeding about 2.5 W into a 2.5' dish on top of my car when making these contacts. W9ZIH (I believe) gets a comparable power level into a 4' dish on a 70' tower. We both have noise figures of 3 dB or better at the antenna. I also made microwave (2304 & up) contacts with K3SIW/9, K9UIF, K2YAZ, and WW8M.

I worked several other stations on the 222-1296 MHz bands, but perhaps not as many as I could have if I hadn't spent most of my time on making microwave contacts. Several of my operating locations were also much less than ideal for non-microwave QSO's. Being right down at lake level doesn't hurt microwave propagation any, in fact it may even help, but the low antenna height really takes its toll at frequencies below 1 GHz. To make things worse, the land elevation often rose about 200' going away from the lake, which completely cut me off from all the stations "behind" me when I was down at lake level. In retrospect, I'm glad that I didn't take this trip during a contest, or there would have been a lot of operators trying in vain to contact me under "impossible" conditions.

If I ever do take another run around the lake for a contest, I'd spend most of my time in grids where there are open, high ground areas to operate from. I now know of reasonably good locations in the EN7x grids, from EN73 through EN76, but would like to get better spots in a couple of EN6x grids, preferably EN65 & EN66. Even if I don't run up an impressive score, the summertime climate is a lot more pleasant in northern Michigan than it is here in Chicago.

53 km at 145 GHz by DB6NT

To obtain good distances at mm-waves (at 145 MHz λ is 2mm) you have to have: 1) line of sight, 2) rifle scopes to align the antennas, 3) low humidity and low temperature. After our two stations had been in the trunk of the car for 6 weeks the right day finally came on 7 April. Visibility was very good an absolute requirement for lining up the antennas which have less than .5 beamwidth.

We started with a distance of 18 km. Signals were 20 dB above the noise or S4. This gave us the opportunity to align the rifle scopes with the antennas. We now proceeded to a distance of 24 km, the Ahornberg. During the drive to the new location we left the transceiver turned on to minimize oscillator drift. Another success with somewhat weaker signals. Next came distances of 32, 34 and 42 km. These were all points along a line and had good landmarks making alignment easier. Now we were running out of suitable locations.

There was another 620m high mountain at a distance of 53 km. Time was running out (getting dark), but we made a run for it, and at 19:30 local (17:30 UT) we established contact. Reports were 52. Calls and locations were: DL6NCI/P in JO50va and DB6NT/P in JO50xl. Checking with the weather bureau we found the temperature to be 7C at the start of our tests and 3C at the end. Relative humidity was at 31%. Antennas were 25 and 40 cm dishes (46/50 dBd), transmit power ran 50 to 100 μ Watts, and the receiver used a harmonic mixer with a noise figure of about 25 dB.

Mars Pathfinder Mission Status July 29, 1997 4:30 p.m. Pacific Daylight Time

Imaging the atmosphere of Mars -- how clear or dusty it is and whether there are traces of water vapor -- was the focus of science activities on the surface of Mars today.

The Mars Pathfinder imaging team also photographed the lander's wind socks, three small socks attached at different heights to a 1-meter mast. Visual images of these small socks provide scientists with information on wind strength and direction.

Temperatures on Sol 25 were typical, ranging from highs near minus 12 degrees Celsius (10 degrees Fahrenheit) and lows of minus 79 degrees Celsius (minus 110 degrees Fahrenheit). Today the Earth rose over Mars at 1:28 a.m. PDT and the Sun rose at 4:32 a.m. PDT.

The Atmospheric Science Instrument/Meteorology Package (ASI/MET) instrument team reported a very successful day of data return, said Flight Director Jennifer Harris, receiving more information than ever before on the pressure of the Martian atmosphere. Also included in the downlink sessions was more imaging data for the high-resolution "super panorama" of the landing site. In all, a total of 48 megabits of data was successfully returned.

A sequencing transmission error prevented the rover from executing its daily traverse, Harris said. The situation was quickly corrected and the rover was able to complete an accelerometer diagnosis sequence, which involved making a 120-degree turn in place. Sojourner will complete its traverse to the rock nicknamed Mini Matterhorn tomorrow and then turn to image the lander.

The Earth set today at 3:03 p.m. PDT and the Sun will set at 5:22 p.m.PDT.

John L. Callas Jet Propulsion Laboratory

Mail Stop 169-327

1-818-354-9088 (Office)

4800 Oak Grove Drive

1-818-354-1004 (Fax)

Pasadena, California 91109

John.L.Callas@jpl.nasa.gov (E-mail)

Think like Lightning

As we go through another thunderstorm season we can sure use ideas to protect valuable equipment from lightning damage. Good advice comes from Paul.M. Schumacher (Ademco,Inc.). While serving in the Army, he was operating a microwave terminal sporting an antenna on top of a 25m high mast on a very exposed and flat terrain. The site got hits about once a day. Lightning would travel simultaneously down the mast but also down the waveguide to the equipment which was ruined. Tabs were brazed to the side of the waveguide junctions and double-0 multi strand copper wire bolted to these tabs. This "bypass" reduced the current to the equipment to the point where no damage would occur.

"The lesson learned was that to protect against lightning, it is necessary to **think like lightning**. Lightning is lazy; it will follow the path of least resistance to ground. It will also seek ground through all possible paths from its point of connection. It does not know which is the best path until it reaches ground, and those other poorer paths can lead considerable energy into places you do not want it."

As to the ground, he used seven rods clustered about a foot apart as a good start. This, of course, depends on the soil. In arid ground it might take 500, preferably 1000 feet, of ground wire buried at least one foot deep to dissipate a lightning bolt.

Report from Central States 25/26 July 1997 by Gerd, WB8IFM

After driving 700 miles in 12 hours we arrived at Hot Springs AR, the place of the '97 Central States VHF Society Conference. The temperature hit the 100F mark on Thursday night and climbed to 106F (42C) by Saturday. The antenna measurements on Friday morning took place in great heat and sunshine. For the first time I could really try out my safari helmet with the solar powered forehead cooling fan. As usual, Mark, WB0TEM and Kent, WA5VJB with their helpers did a great job conducting the measurements. About 100 antennas were tested, fewer than in other (cooler) years. A new feature was added this year: a home brew antenna building contest. Materials and tools were provided to participating parties (team work encouraged) to build a 70cm yagi. Results are listed below.

In the afternoon presentations started. We heard the bad news from Bill, W3XO, AMSAT NA President, that P3d is not ready in time for the launch delivery date on August 10, and unless the 30 September launch date does slip for about one month (not likely at this point), we will have to look and wait for a future Ariane launch. Interesting presentations included contesting, EME and high power generation at microwaves. Very impressive was a slide presentation by diminutive K6QXY showing his successive huge (as things are supposed to be in California) 6m EME arrays.

Since the conference took place on the 7th (top) floor of the hotel (Clarion), a satellite station was set up in one corner and connected to a bunch of antennas, including for 10 & 15m on the balcony. In the evening Keith, W5IU made contact with a number of LEOs. Of course, the traditional flea market and the noise figure measurements (four noise meters were in action!) were also taking place Friday night. See table!

Finally, someone (WA5VJB) built a low noise preamp (NF=.15dB) for 6m. Not that it is needed, but it was strange that at the low frequency the noise figures measured were always mediocre, to say the least. Up to the lower GHz bands the noise figures are now counting just a few tenths of a dB. Now it would make sense to start using noise temperature as is done by "commercial" enterprises. At the higher microwave bands noise figures are getting better also, but since Zack, KH6CP did not show up this year, we don't know how good these numbers would have been. In any case, interest is great for 10 GHz and Down East announced a new converter for September!

Saturday morning brought more interesting talks about SETI (Paul, N6TX), high power (tube) amplifiers (Steve N4PZ) and antennas (WA5VJB) and multiple dish feeds (W5ZN & WA5LUA). In the afternoon presentations and demos dealt with radiation danger from a ham station (does not exist) and EMI in the hamshack (computer noise). The youngest presenter (17 y.) Matt, KB8OIU (Tom Whitted's, WA8WZG son) told us old timers, how to set up a web page on the internet. He had one complaint, (for me, who is basically typing with one finger, hard to understand): "Boy, this is hard to type with one hand!". He was holding the mike with the other. The conference was attended by 177 people and in my book a great success.

In the evening the big finale, the banquet, counted 242 and, unfortunately, the food ran out. Some had to go w/o dessert and some had to wait a long time before the hotel scrounged up some more "edibles". The SETI group had a half dozen "emergency" pizzas brought in. Awards were presented: the John Chambers Award went to Paul Wayne, N1BWT; the Melvin Wilson Award to Dave Meier, N4MW and Special Recognition was given to Wanda Chennault, WB5NAF. Donations in the amount of \$ 500 were given to AMSAT and \$ 200 to SETI. This brought the total for AMSAT to \$ 2500 which was rewarded by Bill Tynan, W3XO with a beautiful plaque. This is only the 2nd such plaque awarded, no.1 went to the ARRL. The plaque shows the P3d spacecraft and contains some real photo cells. Next came what everybody had been waiting for: the prize drawing. Red, W8ULC was lucky this time: he was no. 3 in picking a prize and walked away with a 220 transverter (a \$400 value). Yours truly was closer to 3rd from last. At that time only a few packages of 51/4 diskettes and a P3d booklet was left. So I got the booklet. There were plenty of ladies' prizes and they went around more than once.

After it was all over, we felt like dipping into the resort's pool, but they locked the gate at 10pm already and would not open in the morning before 8:30. By that time we had already left for some sight seeing in "downtown" Hot Springs, taking advantage of the more tolerable morning temperatures before heading North.

Next years conference will be in Kansas City.

**Central States VHF Society 1997 Antenna Gain Measurements
conducted by WA5VJB & WB5TEM**

<u>144 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	KBØHH	11 el 20 ft boom	HB	13
	W5UC	8 el 12 ft boom	HB	11
	K5LLL	modified Cush Craft 4 el	HB	8
	WA5VJB	log periodic	HB	8
	N9LHD	3 el 3 ft boom Swiech COY2M3EL	Comm	8
	W5OZI	PAR Halo	Comm	1
	WBØTEM	reference yagi	Reference	9.8
<u>222 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	WA5VJB	log periodic	HB	7
	WBØTEM	reference yagi	Reference	13.3
<u>432 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	WØDQY	J beam 88 el	Comm	15
	KD4NOQ	Mosley 14 el 5 ft boom	Comm	11
	WA5VJB	log periodic	HB	8
	N4MW	M Squared 432 Sqloop	Comm	2
	WBØTEM	reference yagi	Reference	15.2
<u>902 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	K5LLL	4 ft grid dish, dipole feed	HB	16.4
	K5LLL	12 el yagi	HB	13.5
	WA5VJB	10 el Cushcraft	Comm	12.6
	WB5AOH	#1 12 el yagi	HB	11.3
	WØZQ	10 el yagi	HB	11.2
	WB5AOH	#2 12 el yagi	HB	10.8
	W6OAL	11 turn helix	HB	9.3 dBic
	WA5VJB	4 el yagi		7.5
<u>915 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	WB5AOH	#1 12 el yagi for spread spectrum packet	HB	11.9
	WA5VJB	10 el Cush Craft yagi	Comm	11.7
	WB5AOH	#2 12 el yagi for spread spectrum packet	HB	11.7
	W6OAL	11 turn helix	HB	9.1 dBic
	WA5VJB	4 el yagi	Reference	7.5
<u>1296 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	K5LLL	DEM 24 el loop yagi	HB	19.5
	KGØMW	25 el loop yagi	HB	18.5
	WVØK	24 el (1270 MHz) loop yagi	HB	18.5
	N5EM	20 el yagi (1255 MHz)	HB	16.3
	W6OAL	11 turn helix	HB	14.7 dBic
	WA5TKU	EEMCO #3115	Comm	8.4
	WØAUS	Triple coffee can	HB	8.5
	WA5VJB	10 el yagi	Reference	12.5
<u>2304 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	K1WHS	52 el DEM 1352LY	Comm	22.1
	KØGCJ	25 in dish, log helix feed	HB	20.2
	KGØMW	25 in dish, RMX feed	HB	17.2
	W6OAL	15 turn helix	HB	15.6 dBic
	WA5TKU	EEMCO #3115	Comm	8.8
	WØAUS	double coffee cans	HB	7.2
	WA5VJB	Watkins-Johnson A6100	Comm	6.3
	DJ9HO	dish feed	HB	6.2
	WA5VJB	AT-67/AP	Comm	4.9
	WA5VJB	Narda reference horn	Reference	13.4
<u>3456 MHz</u>	<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
	WØAUS	14 turn helix	HB	19.5 dBic

KØGCJ	25 in dish log helix	HB	19.1 dBic
WØAUS	5.5X4.25X12 in horn	HB	13.0
WA5TKU	EEMCO #3115	Comm	11.0
WA5VJB	Watkins-Johnson A6100	Comm	9.2
WA5VJB	AT-64/AP	Comm	7.3
WA5VJB	Narda reference horn	Reference	16.8

5760 MHz

WB5LUA	17.5X11X19 in horn	HB	20.4
W5ZN	5.5X4X5 in horn	HB	17.3
KØGCJ	25 in dish, log helix feed	HB	14.5 dBic
WA5VJB	Watkins-Johnson A6100	Comm	13.3
WØAUS	flared horn	HB	12.9
WA5TKU	EEMCO #3115	Comm	11.0
WA5VJB	reference horn	Reference	15.5

10368 MHz

<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
WA8WZG	15 in dish/AT 68UP feed	HB	27.7
WA5VJB	SAR planar slot array	Comm	20.5
KØGCJ	25 in dish, log helix feed	HB	19.7
WB8IFM	AT68UP & Poly Rod	HB	16.9
WA5VJB	Watkins-Johnson A6100	Comm	15.2
KA8EDE	7 in Poly Rod	HB	13.2
WA5TKU	EEMCO #3115	Comm	13.0
WØAUS	single flared horn	HB	12.7
KA8EDE	4 in Poly Rod	HB	11.9
WØUC	18 in dish, WG dual dipole feed	HB	11.2
WA5VJB	reference horn	Reference	17.7

24192 MHz

<u>Call</u>	<u>Design</u>	<u>HB/COMM</u>	<u>Gain (dBd)</u>
WØAUS	horn	HB	25.0
WØAUS	horn	HB	20.0
WA5VJB	reference horn	Reference	20.8

Central States VHF Society

1997 Home Brew Antenna Building Contest Results

Objective: Build a high gain antenna using readily available materials.

Central States Frequency

supplied:

Six foot wooden boom
Aluminum wire for elements
Ruler and cutting tool

Builders supplied ingenuity and technical expertise.

Group participation was encouraged.

<u>Builder(s)</u>	<u>Initial Gain</u> <u>(dBd)</u>	<u>Final Gain</u> <u>(dBd)</u>
K5LLL/KK5DK	7.0	10.7
W7XU	6.2	10.3
KØDAS/NØLNO/WØPPF	-4.8	8.3
KBØPE	7.6	7.7
N4MW	-0.8	5.6
K5LUU	-0.6	-0.6
Theoretical best gain		13.0
Reference antenna		15.2

