

**August-Meeting:** Friday, the **28th**, at 7:30 PM at the Perkins Restaurant at SR 73 and I-75.  
Meeting topic: T B D.

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### Upcoming Events:

Mid-Atlantic VHF Conf. Oct 3, Horsham PA

Microwave Update Oct. 15-18, Estes Park, Co Contact: Bill, K0RZ 303-441-3069

AMSAT Symposium Oct 16 - 18, Vicksburg, MS

**For Sale: Rohn SSV Tower**, 80 ft, heavy duty self-supporting; 20 ft sections, supports **large antennas with no guy wires**. Bottom (7N) is 6 1/2 ft leg to leg at the base, requires 5 yards of concrete; other sections tapered: 6N, 5N, 4N. \$ 2600.- Also have various lengths of 50 Ohm **Hard Line** at 50 cents/ft  
Joe Burke, WA8OGS, 9168 Brehm Rd., Cincinnati, OH 45252. (513)385-4198

**Still Available: TTL Foxhunt Transmitters**, 147.455 MHz, with audio, miniature, potted, come with 9 V battery, antenna and audio tuning tool. \$ 30.- Kits are \$25.-  
Dave Pelaez, AH2AR, 4872 Trailside Ct., Huber Heights, OH 45424. AH2AR@ WebTV.net

De N8ZM

I've heard that the picnic was a big success, and I wish that I could have been there to enjoy the fun, but after a week of showing the grandson, age 3+, around Disney World, grampa slept past noon on Sunday. And it seems that a highly qualified replacement was found to fill in as chef, in the person of Bob French, N8EHA. As I understand it, Bob got off to a flaming start, which went unnoticed by many of the guests, while host Daun reportedly was nervously trying to decide whether the hose or the fire extinguisher would be the weapon of choice. All ended well, however, and the party went on with great food and antenna tests. Sorry to have missed it all.

While in Florida, I took some time to go over to see the P3D facility where the AMSAT team is still working to complete the bird since there are numerous tests needed, and the facilities for those tests have been scheduled meaning there are still due dates to be met. If and when we get a launch opportunity, all of this work will improve the reliability of the bird and have better assurance that all is in good working order. Pictures I have seen don't begin to have enough detail to show all of the cables, hoses, and wires that are needed to hook everything together. It is an impressive sight. The people who designed and built this thing have done an absolutely super job; it will be an absolute shame if we don't get a launch.

For the meeting this month, I had hoped to get Sam Laube to tell us how to make a radar detector into a 10 GHz transmitter, but he has a potential conflict which offers only 25% probability of him being able to make it. Anyway, he did commit for next month, so plan now to be there. This month we will meet at the Perkins Restaurant to discuss a recent endowment MVUS has received for generating activity on 1296, and other projects.

Finally, the September VHF contest is the weekend of the 12th, and I hope you will all take time to be active. Jim, W8PLZ, Dave, KD8FO, and I are putting together a rover station, and I believe that Jack, AC4YR, and Red, W8ULC, are also planning a similar effort. This past week the bands have really been open, and I'm hoping that there will be some left for the contest.

Gotta go, Gerd says I only have a half page this month. 73, Tom.

## **Dayton Hamvention May 15, 1998** **VHF Gathering Noise Figure Workshop conducted by Al Ward, W5LUA**

Call	Frequency (MHz)	Description	Gain(dB)	NF(dB)
K3MKZ	145	SSBLNA145	23.2	0.19
W4UDH	144	HB MGF1403	16.2	0.44
K3MKZ	432	SSBLNA435	22.5	0.30
N8ASB	432	SSBDX432	21.4	0.46
W4UDH	432	HB MGF1403	28.5	0.50
AA2GF	432	SSBLNA435	19.3	0.58
WA8WZG	902	HB AT-8250	14.3	0.28
N3FA	1296	DX1296	26.9	0.37
N3FA	1296	DX1296	27.0	0.40
K3MKZ	1296	SSB SLN1296	33.5	0.41
K7NQ	1296	DEM LNA	18.5	0.63
K9EK	1296	HB MGF1302	13.6	0.74
K9EK	2401	DRAKE 2880 CONV	20.3	4.59
K9EK	2401	DRAKE CONV /LNA	32.4	1.46
K3MKZ	10368	DB6NT LNA 101-B	12.2	0.64
K3MKZ	10368	DB6NT LNA 101COOL	10.6	0.71
K3MKZ	10368	SSB CONV XRM-2,XLO2	24.4	1.36

## This and That 8-98

**\*Blinking LED S-Meter.** Installing a Ku band satellite TV station and aiming the small 18" dish has never been so easy. It used to be that you had to have a small TV or special receiver with S-meter to look at while you were adjusting the antenna. Now the LNA has a slowly blinking red LED which picks up speed as you aim towards the satellite. Of course, you have to be in approximately the right direction, and to that end the receiver has AZ/EI data programmed into it; you just tell it your Zip code. For good measure a small magnetic compass is also provided. (W3/DJ7LC)

**\*The Heaviest Element Yet.** Three labs around the world have been putting in a major effort to extend the collection of elements. The labs are located in Berkeley, US, in Dubna, Russia, and in Darmstadt, Germany. In February of 1996 the Germans succeeded in producing element 112, the heaviest one so far. Some facts indicate how painstaking this particular process was: The yield was very low, they produced only two atoms, that had a half life of only .24 msec, in 24 days. (Scientific American SEP-98 pg 77)

**\*A Three Mile Long Track.** Hi Fi digital encoding of audio takes a lot of bits. How to get these all on and off a CD is a major achievement. Depending on playing time, the data spiral might contain 3 billion microscopic pits and stretch for about 3 miles. As the disk spins a laserbeam is directed to, then reflected from the track on to a photo diode array for read out. (Scientific American, Sep.98, pg 109)

**\*Dot and Dash.** The renowned telegrapher Thomas A Edison - he who invented everything - gave his first two children, Marion Estelle and Thomas Alva Jr., the nicknames "Dot" and "Dash". (L.M.Boyd)

**\*Praise of Middle America.** You get a lot of honest opinions there, say in comparison to New York City, which is basically a psychiatrist's office surrounded by a moat. (Vada Grantham, Des Moines IO)

**\*The Human Wrist** is a marvelous device with degrees of freedom not possessed by any other animal.

**\*The Human Body** as an engine has an efficiency of 11% which creates the motions, the rest is heat.

**\*Nutritional Requirement** for a human per day are: 1600 to 2000 calories from carbohydrates, 630 to 1000 calories from fat, 400 to 600 calories from proteins, and vitamins and minerals.

**\*Airborne Sanitation.** The first aircraft with an on board toilet was the DC-3 in 1934. But it was only an airborne privy. The Boeing 707 jet liner was the first one to have a flush toilet, the 747 Jumbo has 12 of them. (the above 4 from the book: "Living in Space" by G.Harry Stine, 1997)

**\*Microwaves to the Rescue.** On 24 June a tornado severed the fiber optics lines and knocked out the main phone system as well as the federal hot line of the Davis Besse Nuclear Plant on Lake Erie. The 900 Megawatt reactor shut down automatically, and danger could be avoided. A back-up microwave link then provided limited service until regular service could be restored.

**\*Nuclear Power.** The small country of Lithuania now ranks first in the generation of electric power by nuclear energy with 83%. France is second with 77%. Then come Belgium (57%), Sweden (52%), Slovakia and Switzerland (45%) and so on. The US ranks 18<sup>th</sup> with 22%. (Globus)

**\*Lots of Reading.** During the 188 days of her stay at the Russian space station MIR astronaut Shannon Lucid read 50 books. She used packet radio for personal messages. The worst part of her stay was the daily 45 minute exercise on the treadmill.

# The Nitty Gritty of Putting a Satellite Together

by Gerd, WB8IFM

I was going to label this report: "The Final Push". Many of us had high hopes of getting a ride for P3d on the Ariane 503, scheduled to be launched in October. In anticipation, the wheels were grinding to get this bird out of the door by July, since it would require a rigorous 3-month regimented schedule to final launch date. Then the bad news hit: P3d was not going to be on board. I guess, too many careers are at stake and who of those people, shaking in their boots, would trust us "amateurs". Some of us were not so surprised; "the right questions had not been coming" as in previous pre-launch negotiations.

**Red Tags.** So, with big disappointment we continued to get the final work done: examine the red tags, which meant an item had either failed in testing or was not quite making the specs. It had to be removed and worked on or sent back for repairs. And as it is with repairing or replacing parts in an automobile, it often takes the longest time to get at the "culprit". A number of perfectly good modules or parts might have to be removed. This was often a "two man job"; one had to hold the item in place while the other put the screws in (or out).

**Bending Metal.** A lot of intricate sheet metal work had to be done ... cutting holes for antennas, fastening body stiffeners and more. I learned a lot about the different type bolts and rivets and the special tools to use. We spent considerable time trimming off an eighth of an inch here, a quarter of an inch there. Often, work could be done away from the spacecraft, however, still great care was given to contain the filings and other debris that were generated. The vacuum cleaners do get some use here. There are several around, just like the various cleaning solutions, the paper towels and the Kimwipes. After hardware has been worked on it is thoroughly cleaned, and that includes every screw and washer before it is reinstalled in the spacecraft.

**Making Cables.** "These are the type coax cables you should use at home", Lou, W5DID, said, when I observed him putting connectors on various cables. These were space qualified Teflon cables of different diameters and length needed to make connections to outside test equipment. The cost for these cables, exclusive of the connectors, run about \$3.- per foot, not what the average ham wants to invest. Most of us do not particularly like to put connectors on coax, so I was surprised to hear Lou giving high prize to one N-type connector that was fastened to the cable, like the well known RG-8 rf connector. I tried one on myself but was not quite as enthused. I had to admit, however, the cables were beauties. Subsequently each cable was checked, and the attenuation at the working frequency or as close as we could get measured. All checked out fine.

**Hints and Kinks.** There is a column by this name in QST magazine. It presents clever little hints, submitted by "practicing" hams of how to do a special task. Spending time at the P3d lab, you get to see a lot of things that go unnoticed and you only marvel at the results that appear like magic. But if you look closer and dare ask some questions you can learn a lot. So, let me just mention two items that come to my mind: one by Bob, KF4KSS, he used scotch tape to fasten a screw to the tip of a screwdriver. That way he could get a screw into a tight place. Another clever hint came from Rick, KA1RHL. He observed us mix two component epoxy on a piece of metal (as everybody does) and apply it with a stick. "Why not try this?" he said. "Mix the epoxy inside a small plastic bag, then cut off a corner and apply it like you were decorating a cake!" This is an excellent method and permits you to squeeze the glue exactly where you want it. Again this is especially well suited to reach into tight spaces.

## Central States 1998

Compared to last year, when temperatures in Arkansas were over 100F, the weather was cool this time with occasional showers. There were three of us from the Dayton area: Red, W8ULC, Chuck, KA8SSB and myself taking turns at the wheel. We managed the 600 mile trip to **Kansas City, MO** in a little over 11 hours.

**Antennas.** There were close to 100, from 6m to 24 GHz, measured on Friday morning in intermittent rain. The microwave measurements (above 900 MHz) had to be halted at one point, as the equipment got soaked and quit working. But Kent, WA5VJB, with the microwave range, and Mark, WB0TEM with the VHF/UHF range could not be deterred. They and their helpers did a superb job as usual. One couple, KB0HH/KA0KUY, had set out to win all the awards given out for the highest gain antenna on each band, and they almost succeeded. They did, however, not bring a 6m antenna. There hadn't been any in several years and their 10 GHz feed system didn't work right. I have long argued, to make the antenna contest more meaningful, the gain of the antenna should be divided by its size (boom length, dish diameter etc...) Anyway, KB0HH/KA0KUY walked away with a whole box of plaques! See complete results on pg 9 and 10.

**Noise Figures.** Over 100 preamps, converters etc were tested for gain and noise figure. Under the skillful guidance of Al, W5LUA, and his many helpers measuring started at noon Friday and continued to noon Saturday. Nothing was rushed and often a unit would be taken apart and adjustments made to improve performance. Looking at the results it is obvious that on all but the higher GHz frequencies noise figures have reached an amazing "low". See page 7 and 8.

**Presentations:** We will give a summary next month.

**Banquet.** The food was adequate, we did not run out as last year and I even did see a few hungry souls get seconds. Occasionally, we did hear some loud thumping and singing from a wedding party in the room next to us. This was a big hotel with lots of activities going on.

The speaker this year was Bill Bunting, N5SAL, who works for the National Weather Service. His theme '**Storm Chasing**' had to do with his main hobby (yes, you can have 'ham radio' as a second hobby). I hadn't seen the movie 'Twister' but, of course, plenty of pictures of storms and foul weather on TV. Hearing these things, however, from the "horse's mouth" gives you a feel of presence not otherwise available. On top of it, Bill is an excellent photographer and showed fantastic slides illustrating his story. He answered many questions from the audience, but one exchange stands out. Since his wife was not with him, he had felt free to relate some of the moments of tension that occur when our hobby is not fully appreciated by the better half. So when Bill showed a picture of a car badly damaged in a storm, somebody in the audience remarked: "Your wife's car?" upon which the quick response came: "first wife's". The Banquet concluded with the usual prize drawing. There were not as many big prizes as in other years, but everybody walked away with something.

Sunday morning it was raining, we met with some of Red's relatives for breakfast, then headed east. Driving was difficult because of rain and fog and we encountered several minor accidents which slowed traffic on I-70. When we were about to cross the Mississippi the rain finally stopped.

**Next years conference** will be held at **Cedar Rapids, IA** .....CU there!

73, Gerd, WB8IFM.

## MVUS Picnic and Antenna Measurements, 9 August 1998

For the first time in memory, it looked very bleak in the morning. But I thought it probably would clear up in time for a nice afternoon. The event was scheduled for 2 PM at Daun's (N8ASB) country estate next to the Clinton County Airport, where we've had this now for many years in a row. Checking with Daun and Karen at noon the word was: it had rained all morning and it was still raining. So we decided to wait a little and postpone the measurements for at least an hour. I made a few phone calls and then it was wait and see. Around 1:30 Mike, WA8GXB, called: he had been in contact with Daun and reported that the rain had stopped. So we started to roll immediately and got there around 2:30 with all the antennas, cables, and masts ... and, since Tom, N8ZM, was on vacation, with all the main picnic food and drinks.

Set up was quick and smooth, lots of helping hands, and soon we were measuring antennas on 2m, then on 70cm. The range was 140 feet with the source antennas at 20.5 resp. 6.9 feet and the test antennas at 11.5 feet. Daun was operating the HP8753E Network analyzer, and we took gain data across a wide band of frequencies extending the amateur range on either side. Daun had also written a program to store, display, and later print the results. We probably have more in the next issue. The network analyzer fed the source antenna via a 163 feet RG-8 type cable and the reference / test antennas were connected by way of a 6dB attenuator and 30 feet of RG 213. The attenuation with the 11.1 dBd reference and +10 dBm power was in the order of 32 dB on 2 m and with the 13dBd reference on 70cm in the order of 43 dB. So we were well within the dynamic range of the analyzer (~100dB). There were few new antennas to check; even so, I forgot to get my recently built 70 cm fox hunt antenna out of the van. Results below.

In the meantime, Bob, N8EHA, showed his skill at the grill preparing the Hamburgers and Wieners; and, since we were running a little late, he tried to accelerate the process and at one time had flames shooting in the air several feet. In a crowd with cellular phones and/or walky talkies somebody sure would have called for help: no danger of that here. The yls and xyls spread out the rest of the food buffet-type style on 2 tables. As usual we had asked everybody to bring some side dish of their choice and we wound up with a nice mix of things. For desert, however, there was only one peach pie and two batches of chocolate cookies, and lots of good fruit, which, of course, is a lot healthier than the sweet stuff. A nice breeze was blowing on the large wooden patio, and everybody had a great time.

After the picnic we shortened the range to 50 feet for measurements on 903, 1296 and 2304 MHz. Source antennas were positioned at 3, 2 and 1 foot. The 75 foot feed cable supplied a cheap Yagi at 903 MHz, loops w reflector at 1296 and 2304 MHz for the sources. The reception, reference, and test antennas were hand held and positioned for best gain, which turned out to be at a 3 to 4 foot level. Attenuation levels were at 40dB, 56dB and 71 db resp. (6db and 30 foot RG213 at the receiving end and ref. antennas). Again data were taken at frequencies overlapping the amateur range. See results below.

Since no antennas were brought for the 3 and 5 GHz bands we skipped to the 10 GHz band. The range was again shortened, this time to 20 feet and an active source (Gunn diode oscillator at 10.2 GHz) installed close to the ground and vertically polarized. Reception was with the HP 8559A spectrum analyzer where our reference 3" horn (13 dBi) with the 6 db attenuator and a 6' RG 213 cable indicated ? dBm. There were two dishes with small feed horns: one 18" oval and the other 24" round. After some adjustments Sam's (WB8ZDF) 2 footer measured 25 dBi and Mike's (WA8GXB) 18 incher 23 dBi, his feed alone was 7 dBi.

It was 7:30 PM when we were finished with the measurements and tear down could commence. Thanks to all and special thanks to Rob, N8UVM, who stayed with us all the time and helped a lot to smoothen out the process. Bruce, KA8EDE, as usual, brought his variety of microwave antennas for the tests including the 10 GHz source, and was quite helpfull holding the sometimes long antennas in the proper position, so Daun, N8ASB, could get a good reading.

We had two visitors lured to the event by brother Bruce: Steve, KC8CCD and Gary, KE8FD. Gary had met me two weeks earlier at Central States and he signed up with MVUS before he headed home. John, a fairly recent member was here for the first time. He was active on VHF a long time ago and in fact met several old pals at the picnic. He lives in New Holland, OH and has a small business there. His present interest is in 1296 EME and he is tinkering with tube cavity amplifiers. John made a sizable contribution to MVUS which will be set aside for experimenting with such amplifiers. At present we are acquiring a number of Russian GI7bs, most of which are already spoken for. ( Ed Krome, K9EK, btw. is experimenting with this tube on 13 cm). Joe Burke, WA8OGS, and XYL made a rare appearance. He is busy with bringing up the children and also preparing for a job change, going into teaching.

My xyl, Traudl, tells me the women and children all had a good time ... so let me conclude with : a good time was had by all, see you again at the x-mas party our second annual family affair if not sooner.

Some preliminary “spot data”. Complete curves have been recorded and will be presented next month.

**2m** (Source: Flexi Y. 6 el, 83” 9.1 dBd)

	144	145	146	147	148 MHz
Ref. 8el, 144” 11.1 dBd	-33	-33	-35	-39	-41 dBm
Flexi Y 6 el 83” 9.1 dBd	-1.6	-1.7	.2	3.4	3.6 dB
Flexi vs Flexi	0	-.1	-.2	-.3	-1.8 dB
N8ASB 14 el, 15’ 2”	-.3	-.4	-.7	-.2	+2.1 dB
Best Gain at 148 MHz 11.2 dBd					

**70 cm** (Source: Flexi Y. 13 el, 88” 13.2 dBd)

	430	435	440	445	450 MHz
Ref. Flexi Y 13 el, 88” 13.1 dBd	-43	-43	-43.5	-44.6	-46.8 dBm
N8ASB 19el, 12’ 10”	+2.7	+2.5	+2.3	-3.2	-16 dB
Best Gain @ 430 MHz 15.8 dBd					
KE8FD 24 el, 17’ 1”	+3.5	+2.3	-2.7	-15.7 dB	
Best Gain @ 430 MHz 16.6 dBd					
KB8HV 22el, 14’ 2” (Rutland) +2.4		+2.1	+1.4	-1.8	-2.8 dB
Best Gain @ 430 MHz 15.6 dBd					
WB9IFM 11 el, 4’ 2”	-2.2	-2.2	-2	-1.5	-.6 dB
Best Gain @450 MHz 12.5 dBd					

**23 cm** (Source Loop w. Reflector)

	1200	1250	1300	1350 MHz
Ref. Dual Coffee Can 9.7 Dbi	-61	-56	-56.7	-60.3 dBm
WA8OGS, Dual Band Dual Can				-1.0 dB
“ Single Band “ “				-.8 dB
“ Single Can				-1.5 dB
KA8EDE 25 el, 5’ 8” Yagi	+8.5	+6.3	+7	-30 dB
Best Gain @ 1200 MHz 17.3 dBi				
KA8EDE 57 el, 15’ 5” Loop Yagi	-4	8.9	+11.5	+7.4 dB
Best Gain @ 1300 MHz 21.2 dBi				
W8ULC 22 el, 5’ 3.5” Yagi	+8	+7.9	+8.3	-20 dB
Best Gain @ 1300 MHz 18 dBi				
WA9OUU Circular Dish Feed	-1	+7	0	+2.4 dB Vertical
	+4.4	-1.1	0	-1.1 dB Horizontal

