April Meeting: Friday, the **24th**, at 7:30 PM at the Perkins Restaurant at SR 73 and I-75.
Meeting topic: Hamvention plus the usual discussions on topics of general interest. There is no meeting in May. CU at the Hamvention. More on page 2.

Contents

Upcoming Events:

Meteor Scatter Contest 2, 3 May, see Mar 98 newsletter

Hamvention in Dayton **15, 16, 17 May**

Central States Conference , Kansas City, MO. July 23-26 see back page

Microwave Update in Longmont, Co Sept 24-27 No contact info at this time.

Mid-Atlantic VHF Conf. Oct 3, Horsham PA

AMSAT Symposium Oct 9, Vicksburg, MS

Correction: March Issue, center of pg 8, insert "d" for the dimension and in the denominator

Two meter SSB is alive and well...

in this area, and several locals have gotten back on the band to try out the propagation. Orv, WA8WJW, is running some serious power and a nice, high antenna setup. Bruce, KA8EDE, is running about 200 mW, which means he has an afterburner in place, to use his words. He has worked several stations from his location south of Xenia, so the 90 ft. tower is helping him a lot. He has lamented several times that he doesn't hear anyone else when he listens in the evening, so if you are active, give him a call, because his QRP signal will take some work to dig out, but you will be amazed at how strong his signal can be. I've worked him twice from my alleged subterranean QTH, and he was very loud on the second try. The first try was made difficult by the topsoil 'ttenuator installed in the hard-line connectors. At VHF, cleanliness is next to loudness, to borrow a phrase.

Hanvention will be here in less than a month, and I have received the exhibitors badges for those who I signed up when we reserved the booth space. I will send or deliver them to the guys who I volunteered for booth duty. There are still several opportunities for YOU to sit a spell in the MVUS booth and simply take a short break while helping the society. We get the space to provide a place for VHF, UHF, and microwave enthusiasts to meet and chat, and to attract new members. It isn't hard work, and if you team up with a buddy you'll have a little freedom to wander off to the necessary room as needed. Also, Gerd usually likes to have a little help with setup and teardown, so get with him soon if you'd like to help with that task. A few years ago, Sam, WB8ZDF, brought some of his collection of classic VHF gear to show off. It sparked a lot of memories for the people who saw it. I think this year might be a good time to show off your own creations, whether they are antennas, amplifiers, preamps, gadgets, or ??? The sight of unusual or homebrew equipment is always an attraction, and a working demo of equipment would be especially cool. If you have any ideas or proposals, call me and we'll talk about how to make it happen.

The meeting this month will, once again, be at the Perkins Restaurant at I75 and SR73 in Springboro. That site seems top work out quite nicely for us, although sometimes we must share the space for the first hour. I think the staff makes a good effort to take care of us, although I know that there have been one or two occasions where folks couldn't get served. I have mentioned those to the staff and they seem to be working to fix the problem.

As it turns out, both Gerd and I will be unable to attend the meeting on the 24th due to unavoidable travel. In my case, it is the result of changing employers and the need to attend some training classes. After almost thirty years in the automotive components manufacturing industry, I have been offered an opportunity to work in the world of electronic instruments as a technical consultant. The offer was too good to pass up, especially as I don't have to move out of the Dayton area. I'll be traveling more regularly, but should still be able to make most of the MVUS meetings. The company? Hewlett-Packard. Yeah, it's for real. More later.

Don't forget to sign up for the VHF Dinner on Friday night of Hamvention (May 15) by contacting Tom. WA8WZG. There will be prizes and a noise figure measurement setup. Last year it was terrific; don't miss it this time!

See you at the Hamvention booth! **de N8ZM.**

Hamvention Schedule

Friday Night : VHF Weak Signal Group **Banquet & Noise Figure Measurements**, prizes too!
Holiday Inn, Wagoner Ford Rd. From 6:30 to 11PM. Contact Tom, WA8WZG

Saturday Morning: **VHF- Forum**, Merle, W9LCE & Red, W8ULC Moderators.

The Midwest VHF / UHF Society, Inc. Booth **718**
VHF & Up_ers Meeting Place throughout the Hamvention,
Clyde, KB8HV, Red, W8ULC, Tom, N8ZM & Gerd, WB8IFM and more

Fleamarket # 1701 / 1702: Daun, N8ASB & Randy

Have a Good Time!

This and That 4-98

Cologne or Koln, Germany is a striving metropolis, often called the "Rome of the North." It does have Italian influence. More than1300 trains stop at the main railroad station and with more than 40 museums it is comparable to Paris or New York. Otto invented the "gasoline motor" there, in Germany still called the "Otto motor". Confused by the many look alike downtown houses, Napoleon gave orders to give the houses numbers. Of course the famous cologne (scent water) 4711 originated there; the number being the house number where it was produced.

Walking Mouse. Many of the receivers on a military base are **extremely** sensitive and are therefore more likely to be interfered with even by a correctly functioning rig. At Kelly AFB in San Antonio we had some receivers that could "hear the static caused by a mouse walking through the grass five miles away." [WB5RUE]

Are we Alone? The best argument yet: If it's just us, isn't this an awful big waste of space?
[Movie Contact / after book by Carl Sagan]

Talking while Driving is just as dangerous with or without hands-free operation. When we were kids riding the streetcars our favorite place to be would be right next to the driver to watch the "road disappear" up front. The driver was **standing** and there was a sign that **strictly forbade** to talk to the driver. So this is not a new found wisdom.

Half-time. Not too long ago scientists started to theorize what kept the sun radiating all that life supporting light and heat. A brief calculation assuming the best burning coal only a period of less than a few hundred years was arrived at. So in the 30s , aware of Einstein's e=mc , an atomic conversion from hydrogen to helium was suggested. A recent calculation considering and estimating the present amounts of hydrogen and helium, the process has been going on for the past 4.5 billion years. And it is estimated that the sun will go on for another $4.5 billion years.

If you build it, they will come. More and more short-wave transceivers now include the 6m and 2m bands. And since the traditional short-wave transceiver is built for SSB and CW, these additional bands offer them as well. So there is a marked increase and interest in activity on those VHF bands. [N8ZM]

Stay in Touch. A three man team of endurance drivers circumnavigating the world stayed in touch with the home base using an in-vehicle Inmarsat satellite phone. There are still large areas of the world that are only connected by satellite. Inmarsat provides spotbeams for the four ocean regions. [Microwave & RF, 2-98]

Silicon Germanium Marriage. Temec company (from the Telefunken Group) has combined silicon with germanium in the fabrication of high frequency chips used for cordless and mobile communication. The speed of this combination is faster than silicon and simpler , less expensive than GaAs. Furthermore, the new devices have low noise and low battery drain. [Microwave & RF, 2-98]

Computer Inroads. As of a year ago 43% of the people of the Miami Valley (Dayton area) owned a personal computer and 30% had access to the internet. This is getting like "sports" and tends to keep people at home and off the road. This makes the great outdoors more enjoyable for the rest.

Anniversary. It was 30 years ago, on April 9 1968 that the first rocket was launched from Kourou in French Guyana for what was to become **the** launch site for the European Space Agency (ESA).

Sun Sensors on P3d

You can argue about what constitutes the most important part of a communication satellite. But there is a consensus, if there is no power, the bird is dead! We all know from OSCAR-13 that the illumination of the solar panels often took precedence leading to poor antenna alignment and the dreaded "spin fading". It was either that or there would be loss of power and a discharge of the battery.

As OSCAR-10 was launched, the first received telemetry indicated that there was a very low solar illumination; obviously something had not functioned right at deployment. The attitude was so far off that it was out of range of the +- 45degree sun sensor. So one could only guess at the real attitude ... no corrective action (magnetorquing) was attempted. Fortunately, the situation improved all by itself and cautious magnetorqing began, and eventually Oscar-10 was stabilized and brought into full sunlight.

This time the satellite is studded with a slew of 16 sun sensors total. Of those two are aligned with the solar cells and called the "stable mode" sun sensors. Two more, also looking towards the sun, are sensing illumination and rotation. And the rest of twelve more, called the "omni sensors," are looking all around. Three each look up and down for the most undesirable location of the sun and the other six are spaced at 60 degree looking out to the sides. (see fig.1.)

Outputs of the photo diodes are fed to the analog processing board where a multitude of op amps do the adding, subtracting and comparing before passing the voltages to the IHU.

A lot of thoughts and a lot of work by a number of people had gone into the design and construction of the sensors. My assignment then was a final checkout, including calibration and selection of the proper feedback resistors and an attempt to broaden the pattern for the omni sensors. We really wanted the "total coverage" and NO drop-outs.

The two "stable mode" sensors actually were small pinhole cameras with one cm square photo sensors. The distances (focal lengths) to the sensors were chosen to create a +- 45 and +- 20 degree coverage. This compares to a wide angle and a normal camera lens (for 35 mm photography the corresponding lenses would have 22 resp. 60mm lenses). The sensor has a transparent resistive layer on the surface and has individual electrodes on all four sides. Below the "P" surface is N-type silicon and a common (metallic)cathode on the bottom surface. (see fig 2.)

A point of light (the tiny image of the sun) falls somewhere on the one cm square surface and creates at that point an electrical potential to the cathode. By measuring the four currents from the electrodes to the cathode the position of the sun is calculated. Also calculated are the sums and differences of the two current pairs. This provides an indication (data valid) when the sun moves off the sensor. (fig. 3 and 4)

All the measurements at the P3d are more or less manual and done with love, dedication and finesse. To ease the stable mod sun sensor measurement we had a fixture mounted on a telescope equatorial mount which follows any heavenly target including the sun. In essence, the axis of an equatorial mount is aligned parallel to the earth and rotated with a motor drive counterclockwise at the same rate as the earth rotates clockwise. Now all we had to do, was setting the sun sensor at the desired angles (usually data were taken in 5 degree increments) and read the various currents or voltages. A plotting program for the Mac did the rest.

The twelve omni sensors use a photo diode which is housed in a TO-5 can. The preliminary measurements of these sensors were made using an "indoor range" akin a mini antenna range. The sensor was mounted inside a blackened box with only a hole on one side to expose it to a incandescent light source a few feet away. The sensor could be rotated and readings were taken in 5 degree increments. The actual sensor in a TO-5 can is below a window but recessed.

This prevents sun rays beyond about 75degrees from the normal to enter the sensor's area. We wanted to increase this range at least to 90 degrees and possibly beyond. Since we have plenty of sunlight (light to burn!) we tried a little Teflon dome over the sensor. (fig.5) This dome nicely catches the light from the sides, and we got acceptable readings even beyond 90 degrees. (fig. 6)

The GS9b and GI7b Russion Surplus Coaxial Triode for UH+ Frequencies

By Merle Rummel

From the '97 Microwave Update Conference, Barry Malowanchuck, VE4MA

GS9b @ 2304 MHz :

1250V @ 300mA (375W) 60 W out (16%) and @ 400mA (500W) 90 W out (18%)
this exceeds the dissipation rating of the tube

The **GS9b** is rated for full values to 2000 MHz (15cm) Fil. 12.6 V @ 1 ...1.2 A
Plate: 2500V max and 330mA max @ 300W max Plate dissipation, air-cooled
Capacitances (pF): in 7.2 ...9.6; out < .04 thr 2.5 ... 3.5

The **GI7b** is rated for full values at a max frequ. of 3333 MHz (9cm) Fil. 12.6 V @ 1.8 ... 2.05 A
Plate 2500V max 600mA max @ 350W max plate dissipation, air-cooled
Capacitances(pF): in 10 ... 12.2 out .055 ... .095 thr 4 ... 5.2

Using the GS9b with 2500V on the plate and 300mA would be 750 W input and at a 18% efficiency deliver 135W output, this exceeds the plate dissipation of 300 W for air cooling.
One can either tweak the tube for higher efficiency or use water cooling.

We could usually tweak our UHF TV Transmitters (800MHz , Klystron) to 34-35% efficiency for broadband operation. We could probably do that for narrow band operation at 2304 MHz. We certainly could do that at 1296, and probably achieve up to 40% efficiency, which would be 262.5 W - 300 W out for the GS9b or 525 - 600 W out for the GI7b.

The air radiator can be removed from the tube for the purpose of water cooling which Barry suggests. That way even with the lower efficiencies higher power can be generated. Included are some data from spec sheets received from Barry. Also below find some input/output data gleaned from Karls (DJ9HO) amplifiers:

Frequ.	Type - Input/output (Watts)	Tube
2m	RLV2-15/350	GI-7bT
70cm	RLV70-10/400	GI-7b *
70cm	RLV70-20/400	GI-46b
70 cm	RLV70-60/600	GI-31b

Barry Malovanchuk, VE4MA
will be speaking on the 23cm amplifier using these tubes, at the UHF/Microwave Forum at the Dayton Hamvention on Saturday morning, May 16th.

***** Basic Schematic of Karl's Amplifiers

Lightning does strike twice ...and more

The taller the structure the more (direct) hits it gets. Most of what we know about lightning has been gathered by instruments installed on top of the Empire State Building and on Mount San Salvatore in Switzerland. The Empire State gets hit on average 23 times per year. In a region with moderate thunderstorm activity like New York or Pennsylvania the average hits per year are as follows:

Structure	Hits
300’	one
600’	3
800’	5
1000’	10
1200’	20

A 50’ structure will get hit once every 4 to 6 years. Even an acre of flat land will get hit once in 100 years!
Martin A. Uman / Understanding Lightning (1971)

Rumblings from the Sun

Remember when Ed, WR8A and Bruce, KA8EDE a few years ago were demonstrating their set-ups, “listening” to the sun at infra-red wavelengths. It sounded pretty distinct and not at all like random noise.

As it turns out, scientists have been observing and “listening” to the sun for a number of years. Two systems are in place to accomplish this. First there is SOHO (the Solar and Heliospheric Observatory), a satellite spiked with a dozen telescopes and a number of other instruments, and second there is GONG (a Global Oscillation Network Group), a network of 6 telescopes that record “low frequency waves” of the turbulent gasflow on the sun. 200 megabits of data are thus recorded every day. It is: “Like trying to determine the interior structure of a piano by listening to it fall down the stairs” says Phil Scherrer from Stanford.

The sun is and has always been an object of major importance to us earthlings: “ When the sun coughs, the earth gets sick!” The more we understand, what is going on, the better we can adjust our ways of living here on earth. [Bill Dietrich, Seattle Times]

32nd Annual Conference July 24-26, 1998 Adam's Mark Hote Kansas City, Missouri

This year the 32nd Annual Central States VHF Society Conference will be held in Kansas City, Missouri, from July 23 through July 26. The conference will be held at the Adam's Mark Hotel, located near the intersection of I-70 and I-435 across from the Truman Sports Complex. We have reserved a block of rooms for the conference at the special rate of $82 + tax per night. These rates are for single, double, triple and quadruple occupancy during the conference date.

Tom Bishop, KØTLM, is in charge of the technical program and the proceedings. If you are interested in presenting a talk, please contact Tom as soon as possible. He can be contacted at 4936 N. Kansas Avenue, Kansas City, MO, or by phone at 816-452-6953, or at k0tlm@juno.com. Please consider preparing a submission for the proceedings, which will again be published by the ARRL. The deadline for submission of finished papers is May 15th, so get busy!

Antenna gain measurements are scheduled in a reserved area of the hotel's parking lot for Friday morning and noise figure measurements will be held Friday evening along with the flea market.

Charles Hensley, KAØOGU is in charge of the family program. There will be baby-sitting available as well as a youth and teen banquet. The Adam's Mark has a full range of guest amenities, including indoor and outdoor pools, whirlpool, sauna, and health club.

Central States VHF Society members are requested to submit nominations for the Chambers and Wilson Awards. Nominations for both may be sent to Kent Britain, WA5VJB. The Chambers Award honors those who have made outstanding technical contributions to the VHF/UHF/Microwave art. The Wilson Award is for other kinds of contributions to the amateur world above 50 MHz, including service to the society.

The ham prizes are being handled by Jon Jones, NØJK. Please let him know if you can help him out with prizes or have suggestions.

Further information and registration forms will be mailed in late May. In the meantime you can keep up-to-date by periodically checking the society's home page at http://www.csvhfs.org.

We are looking forward to a great conference here in Kansas City this year.

73, Denise Hagedorn, AJØE 2318 N.E. 37th Street Kansas City, MO 64116 Tel: 816-452-2957 hagedorn@wiltel.net, President; Tom Bishop, KØTLM, Vice President; Dave Meier, N4MW, Treasurer; Larry Hazelwood, W5NZS, Secretary

Special Conference Air Fares

Kansas City International Airport (MCI) is the main commercial airport in Kansas City.
Southwest Airlines is offering a discount on most of its already low fares, for travel to and from the 32nd Annual Central States VHF Society Conference. Call (or have your professional travel agent call) the Southwest Airlines Group and Meeting Desk at 1-800-433-5368, Monday - Friday, 8:00 a.m. - 5:00 p.m. and Saturday 8:30 a.m. - 5:30 p.m. no later than July 15, 1998 and refer to identifier code S6848 to take advantage of this offer. Call right away as fares are subject to terms and availability. (Travel in or out of Dallas Love Field is subject to the requirements of the Wright Amendment).

(I just called and for a RT from Columbus,OH to Kansas City, leaving in the morning of July 23 and coming back the afternoon of July 26, was quoted the following: $ 150 for 65 and older and $160 for under 65. They said this is a 10% dicount to their normal pricing. They fly only from selected cities, like in Ohio: only from Columbus and Cleveland. WB8IFM)