MIDWEST VHF-UHF SOCIETY

Vol. 14 No. 3 **www.ceitron.com/mvus/mvus.html** **March 2000**

Club Memorial Call W8KSE

March Meeting. Friday, the 24h, at 7:30 PM at the Perkins Restaurant at SR 73 and I 75.
Meeting Topic: TBD

Contents

Upcoming Events.

Great Lakes ARRL Convention / Cincinnati……25/26 March

Dayton Hamvention / ARRL Natl. Conv.…..…19/20/21 May

Central States Conference…….……July 20/22 / Winnipeg

Microwave Update…….…….Sep. 28/30 / Philadelphia

De N8ZM

3-00

At the last meeting, the vote was overwhelmingly in favor of donating $500 to AMSAT for the P3D launch effort. If anyone wishes to sign the letter, get with me before Hamvention. More good news: it was announced last week that P3D has been listed to fly this summer on Ariane 507. It won't be long now, guys, so start getting your gear together! There is a great article by MVUS member Ed Krome at www.downeastmicrowave.com/edkrome.htm that outlines what is needed for a good P3D ground station. The transponder band plan can be found at: www.amsat-dl.org/p3dqrg.html. I'm getting psyched!

Gerd tells me that I have to cut it a bit short this month to make space for some other info. He also asked me to get it to him about 4 days earlier than usual (that's usual meaning when he needs it, not when I usually deliver). I suspect that it is all a strategy to make sure he gets it on time. Or, he might be trying to get this out before our tech session on the 18th. Whatever his motive, he knows how to give me the appropriate kick in the backside! If there is one person who should get the credit for the continuing existence of MVUS, it is our editor, treasurer, secretary, and business manager: Gerd. I can stand up and lead the meetings without a plan, forget important facts, tell really bad jokes, and write this rambling exercise in free association each month, somehow passing myself off as a leader. Someone else could do what I do much better, I'm sure. But when it comes to making the wheels actually turn, Gerd is the guy at the crank. If you get a chance, give him a little help with the load he's carrying. I'm sure he'll appreciate it.

Just in case this does get out before the 18th, I expect to be able to check for receiver sensitivity, intermod performance, and make some impedance measurements. If you have any oscillators to put on frequency, or filters to tune, we'll do that as well. Anytime after 10:00 AM is fine. Pizza and pop is on MVUS.

Red, W8ULC, recently asked about the effect of preamp placement on system noise figure. While I think his question has been answered, I have been getting educated on the subject recently, and will do a short dissertation on the subject at the next meeting. Hope you can make it.

de N8ZM, Tom.

Hamvention Dinner

The VHF Weak Signal Group that meets Monday nights at 0200 UT on 3.843 MHz, would like to invite everyone that is coming to the Dayton Hamvention to our Annual Banquet on Friday night May19th from 6:30 PM until 11:00 PM at the Holiday Inn North, Wagoner Ford Rd in Dayton. WE have reserved a room, that will seat 125, There will be a cash bar and plenty of seating to allow you to mix and mingle with other VHFers from all over the country and the world. Guest speaker will be Doug Smith, KF6DX, from the ARRL staff and editor of QEX magazine. Over 50 prizes with two grand prizes worth over $300 dollars each will be drawn starting at 9:00 PM The cost of a ticket to attend this function which includes the 2 entree banquet dinner, is only $33.00 per person, and they are limited to 125. You may order your tickets by sending $33.00 plus an SASE to Tom Whitted, WA8WZG, 4641 Port Clinton East Rd., Port Clinton, Ohio 43452. Website info is www.wa8wzg.com . This is one of the largest gathering of VHF weak signal enthusiasts in the US, so get your tickets early and join us for an enjoyable evening at the Dayton Hamvention! Thanks and 73's **Tom Whitted, WA8WZG**

This and That 3-00

- **I've Got a Dream.** There are now 95 million e-mail users in the US. Some of them have become addicts checking and sending their mail around the clock. Says one: While I am sleeping a little icon pops up in my head that chimes, "You have dreams!" I click on the icon and the dream begins.

  [Omar L. Gallaga]

- **A long Wait for the Telescope.** After the "ingredients" were available to invent and build an optical telescope it still took more than 300 years to do so. Here is the time-table: 1278 glass mirror, 1290 spectacles and finally around 1600 first telescope appears in Holland.

- **Tracking the Sun and the Moon.** There is an instrument now available costing about $ 100.- that can gravitationally track the sun and the moon. Roger Baker from Austin, TX developed it. One of my favorite truisms of science asserts that yesterday's discovery is to-day's calibration and tomorrow's noise. [Shawn Carlson, Scientific American.]

- **Lithium-Polymer-Battery.** The search for a better (lighter) battery that could propel a car goes on. In December of 97 3M and Hydro Quebec unveiled a Lithium polymer battery which can store 150 Watt hours per kg. This compares to 75 Wh/kg of a Nickel-Metal-Hydrate battery and only 35 Wh/kg of a lead-acid battery. Translated into cruising range (at the same battery weight) this means, the General Motors EV1 vehicle would get 450 km versus 250 km with the Nickel-Metal-Hydrate and only 130 km with the lead acid battery. [Stromthemen, 3-98]

- **Ultra Timely Clock.** European scientists are attempting to build a clock in the next few years that will err by no more than one second in three million years! Present most precise clocks deviate by one second in 300,000 years. A very accurate wristwatch advances or lags by one second in 10 years (?). [Dec 99 – Yahoo News]

- **In the Fast Lane.** The transponder technique that gets you through the tool booths on a toll road w/o stopping now lets you buy a hamburger and fries at the Mc Donald drive through w/o paying. The transponder registers your identity and the amount due appears on your next monthly statement from the toll road company together with the toll costs!

- **Array 2K.** A new kind of radio telescope will take shape over the next few years at a northern New Jersey location. The name refers not to the New Year but rather to the instrument's more than 2000 square feet of collecting area. This is equivalent to a single dish antenna over 50 feet in diameter, at about a tenth the cost. This is achieved by combining sixteen standard satellite TV antennas into a single, powerful radio telescope. As ambitious as this is, the SETI Institute in California is planning a set up involving 500 such dishes for an area of one Hectare (10,000m^2). [SETI]

- **Make Mistakes**, you learn from them. Just keep making them, but don't make the same ones, make new ones. [Susan Sarandon]

- **Room and Board.** *"How long are you going to be in jail?"* "Two weeks!" *"What is the charge?"* "No charge, everything is free!"

- **Early TV.** A 1949 survey indicated that families with little education lost interest in TV programs sooner than the better educated. [Scientific American]

RTTY HAS A NEW PARTNER - PSK31

By Ed Kulesa, K2VEE

On the HF bands there is a relatively new mode of transmission taking hold known as PSK31. It's creator Peter Martinez, G3PLX, put considerable thought into trying to find a better mode of transmitting digital information, with less bandwidth, while maintaining the popularity and utility of RTTY. The result, as noted in a May 1999 QST article, actually became a blend of the variable encoding length, rhythms, and natural operator synchronism found in CW, with the popular 'unlinked' flow of conversation found in RTTY.

In order to reduce the bandwidth, he selected BPSK (Biphase Shift Keying) modulation and invented a variable length encoding technique that used a double zero as a word delineator. With the advent of the DSP processing that can be performed by today's computers, he was able to add the smoothing matched filters which reduced the spurious modulation harmonics. Thus he ended up with what effectively looks like double sideband suppressed carrier modulation with two tones 15Hz either side of a suppressed carrier - and a method of transmission that has both AM and PSK components.

Since the AM component varied mainly at the modulation rate of 31.25Hz, one could run the AM through a detector and drive a PLL with this resulting frequency so as to obtain a steady 31.25hz clock reference. Now with a dependable reference, the detection of the BSPK portion is achieved by delaying the PSK signal and comparing the phases of the two components to gives us the 0 …1 binary output. See Figure.

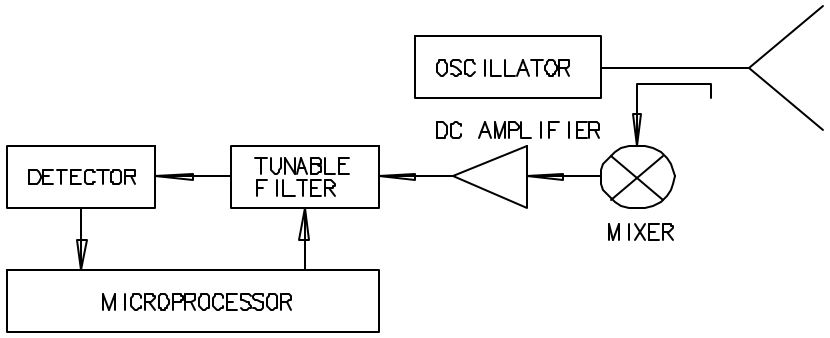
The acceptance of this new mode by the ham-community was in large part due to the ease with which individuals could get started with PSK31. Anyone with a computer, an audio card using the basic chipset used in the "SoundBlaster" series of cards, and a stable receiver could get underway in short order. I would suggest that anyone interested in starting on PSK31 should download a new program called "DIGIPAN" obtained at http://members.home.com/hteller/digipan . This program is much simpler to use and less tedious to tune than the <psk31sbw> program suggested in the QST article. It presents a 3 khz wide 'waterfall' display of the spectrum at the current receiver frequency (sideband) and allows a simple point and click method of tuning in signals. It's a real pleasure to use. Since the bandwith of the PSK 31 signal is only 100 Hz, quite a number of stations fit into the displayed bandwidth.

Wiring connections between the computer and Xceiver are simple audio cable connections. You need to connect the "headphone" output of thr Xceiver to the input of the soundcard and the output of the soundcard to the "microphone" input of the Xceiver. However, as simple as the connections are, there are three things to note:

a) The computer audio output to the Xceiver microphone jack should be attenuated by nearly a factor of 100 as suggested in the reference web sites below. A 100 kΩ / 1 kΩ series resistor connection should do fine.
b) It cannot be over emphasized that the modulation levels must be kept low at the microphone input else additional unwanted sidebands will show in the transmission.
c) Having a few RF chokes or a line filtering toroid on hand to add if you think any RF is getting back into the audio lines, would be prudent.

PSK31 is a rather neat way of achieving a narrow band signal and its utility has proven itself over the months of use primarily on the 20m band. With new users coming on board each day, a 3khz portion of the band can comfortable hold 10-20 users who would have normally taken up 400+ Hz of RTTY space apiece. A wonderful space saver on the crowded HF bands… See figure for exact recommended frequencies. But what about our VHF bands - especially 2m and 6m? Wouldn't this mode help out in a small area above the SSB portion of these bands or interspersed with the packet section of the 2m band? In emergency operations, when 6m and 2m really show their local utility, adding a new mode of handling messages could add to general utility of VHF bands for radio amatuers. Give it some thought - but do have some fun and try PSK31 - especially when it's so easy to get started.

CW radar can be very simple and inexpensive



Simple low-cost CW radar devices use homodyne principle; since transmitter is on all the time, it serves as the local oscillator to convert received spectrum down to zero frequency. Doppler frequencies of interest are in the audio range.

Practical details of inexpensive CW radars

- Commonly use microwave ISM frequencies
  - X-band, 10.525 GHz [Amateur band 10.0 - 10.5 GHz]
  - K-band, 24.150 GHz [Amateur band 24.0 - 24.25 GHz!]
- Typical transmitter uses Gunn diode oscillator in cavity, power 10 - 100 milliwatts
- Typical receiver uses Schottky diode mixer
- Antennas are horns or horn-backed dielectric lens
- Microwave door opener costs about $50
- Radar speed guns cost $200 - $2,000

Real Dedication

By Gregg, K9KL

Gregg reports on how he got ready for the January contest in Wisconsin!

I wasn't COMPLETLY iced up like last year,and I got the chance to work on my antennas on the Thursday night before the contest,the night we had a lunar eclipse, astronomy BTW is another of my hobbies and that is one where being in the boonies is a VERY good thing, no city lights to harm observing. I went outside after putting more clothes on and didn't think it was too bad, it was only 12 below and everyone knows that is warm for us northerners.

So I put on my belt and harness and started climbing the 80 footer, well when I got above the barn (40 feet) the wind hit me like a ton of frozen cow chips, man was it COLD. I went up anyway and did my thing and wasn't to cold except my thumb which was holding on to the tool I needed, I was very thankful for my thick beard.I was done in about 20 minutes and came in the house to warm up and asked my wife to put the WX channel on, the wind chill was minus 52, no wonder I was a bit chilled! Then my wife was a bit upset because she didn't know I was up there!!!!

Fun stuff this ham radio is. People sometimes ask me if I'm nuts to climb my tower in winter, I tell them no, but it doesn't hurt either to be a little goofy. My one neighbor who lives about a half mile away always goes back in his house if he sees me up on one of my towers. HI HI.

Anyway the test was a blast and was really good to get in on it. I was sick in Sept, was at a NASCAR race in June and frozen up last Jan. 6m was a riot when the AU came in. 2m and 222 were just going nuts, with 6m nearly unmanageable but that was the band I had the most fun on.

Speaking of 6m does anyone have an idea of what I could use to get rid of channel 2 garbage, I have channel 2's tower in my line of sight about 7- 8 miles away and if I point that way I get lots of crud, any ideas. I never had that when I had only a 7 element beam for 6m but now that I have 11 elements I hear that junk, do I need a band-pass or what? I didn't get my microwave stuff up yet but for June for sure.

My totals are as follows:	6m	172 qsos	64 grids
	2m	118 qsos	42 grids
	222	27 qsos	16 grids
	432	42 qsos	18 grids
	1296	14 qsos	8 grids

Something like 71 k. I didn't hear a thing from 10:30L till about 4:00L on Sunday am/pm and the condx really lacked on Sunday. I can ALWAYS work WA8WZG on 1296 but not then. Sure was fun working W0ZQ and WA0BWE on 1.2 GHz, also worked to Detroit on 1.2 but on Saturday evening. It seems as if all my stuff works now, I do need to adjust my 4* 23cm-35 so all point in the same direction for 1296, they are off a little and I could tell as I spun the rotor.

BTW I tore up two rotors here before Thanksgiving and got 2 new BIG BOY (pro-sis-tel) rotors and really like them, but I will tell you in a year if they are tough, it hasn't been windy yet. Anyway thanks for reading my ambleing and hope for some good AU, I see most nights here but don't hear anything on the radio.

73 es good dx, Gregg K9KL

Microwave DX: New Records - New Friends

by Tom Haddon, K5VH
President, Roadrunners Microwave Group

I¹m relatively new to serious micowave DX¹ing and, although I have been QRV on 1296 for many years, I took the plunge last year and bought a Down East Microwave transverter kit for 13 cm - 2304 MHz. In the process of building this unit, I ran across Brian NQ9Q/5 here locally in the Austin, Texas area and managed to get it working with his help. I didn¹t have any test equipment usable up there, but it turned out not to be much of a problem to get the unit functional with a VOM. Still, it was nice to know that I was actually putting out a signal - a mighty 1.1 Watts ! Anyway, I was on the air, but hardly anyone to talk to besides Brian only eight miles down the road (at least he is in a different grid).

So, we started a club and began actively recruiting members last summer. In the meantime, I got hold of Al Ward W5LUA up in the Dallas area, and we managed a few contacts on 2304.1 MHz in July; also worked Greg AA5C there. They are both in the EM13 grid and I am in the eastern part of EM00 - total distance of about 200 miles. Not bad, I thought. Then, one weekend when signals were really strong, Al called Joel Harrison W5ZN up in the Little Rock, AR area and we managed a two-way. Man, was I fired up then! 500+ miles to EM35! So now I was hooked. The club we formed was doing very well, and we got over twenty members right away. Found a couple of old hands at microwave stuff like Bob Templin W8ZSX, who turned out to be an RPI classmate (less a few years) of our VP Bill Tynan W3XO/5. We got several members in the Houston and San Antonio areas also. All wanted to get on the higher bands, and I wanted to have company there and some help at the same time, so its working out well.

Here in Texas, we often get tropo across the Gulf of Mexico to Florida and Cuba, etc. I am pretty active on 2m/70 cm SSB and had seen it many times. I even had several contacts with Florida on 1296 (10 watts to a 6 ft dish). Most of the time it happens in the Spring (April - June) or Fall (Sept - Nov). I thought maybe I could work across the Gulf sometime on 13 cm. So, I asked around. One of our members, John Godwin K5IUA (EL29) mentioned that he understood that Rolf KB4DFO was on 2304 and maybe one or two others in central Florida. So we determined to be ready - John had Rolf¹s phone number and also another guy there - Chuck K0VXM.

In January 2K I felt really cooped up; the weather was OK, if anything unusually warm. But I have severe allergies from the cedar trees which polinate this time of year, so I wasn¹t going outside at all. Since I work out of my house anyway, I spent a lot of time on the radio. Six and two meters SSB mostly - or on the internet. Late in the morning of January 11th, I worked several Florida stations like Sam KF4YOX in EL96 and Bob WD4MGB in EL87; I had worked both several times before, so this was nothing new.

However, both John K5IUA and I were talking about getting some of the Florida guys up on microwave frequencies. That evening, lots of Florida stations were active on VHF and UHF across the Gulf. As a signal check, I confirmed my 2304 operation with W3XO/5 in Kerrville, 60 mile west of me. I worked Perry N0KBH in EL87 on 432 with very strong signals, and I knew that K5IUA was trying to contact someone in Florida for 13 cm. So, I started monitoring 2304.1. At 0230Z (8:30 pm CST) I heard someone calling CQ on CW! Unbelievably, it turned out to be Buddy WB4OMG of EL87. Although his 2m and 70 cm station was down, he had heard the band was possibly open. I came back to him, giving him a 599 report - we switched to SSB; very readable.

Later, when I talked with Buddy directly at the Orlando Hamcation, he told me he just about fell on the floor! Both of us were quite suprised to make this contact. As the evening progressed, we were able to maintain contact, with armchair copy. Signals sometimes went to 30/40 over S9. Not bad for 1.1 watts to a 34 in dish! Going back to 2m, I heard Rolf KB4DFO, in Ocala EL89 and gave him a call. I had worked Rolf before on 1296 years ago, and had heard that he was QRV on 13 cm. Indeed, he had that capability - with 20 watts to a pair of loop yagis. We switched to 13 cm and, after a little searching, we found each other and completed a contact at 0506Z. Rolf was 59, and I got a 57 report. Neither of us were thinking of a record at this point - we were just happy to complete the QSO! Later, after discussions with Al Ward W5LUA, we verified that this indeed was a new North American record at 965 miles - bettering the previous contact between Al and Tom Whitted WA8WZG by ten miles. We were lucky! See the NTMS web page at http://www.ntms.org/ for the official details.

In February, I had a chance to take a small vacation, so I elected to go to the Orlando Hamcation and meet some of these Florida hams I had contacts with over the years. Rolf KB4DFO offered to put me up at his place in Ocala, and we could go easily to Orlando from there.

It was a pleasure to meet Rolf. It turns out that he is a microwaver from Germany originally, and has been in Florida for about twenty-five years. We congratulated each other on the contact and vowed to complete on 5760 MHz this year. Hope this happens!

At Orlando I got to have eyeball QSO¹s with many of my previous UHF and microwave contacts including Buddy Morgan WB4OMG, Chuck Hoover K0VXM, and others. We had a great time and got to see the latest stuff from Down East Microwave¹s booth. I look forward to talking across the Gulf with my new friends - hopefully on all the bands through 10 GHz!

EME Dxpedition to Greenland, OX2K

Hans, K0HB@arrl.org

In the past we know of only 2! contacts made with Greenland on EME. Now we and the EME community have a chance of making a lot of "first time connections" to a "world most wanted" on 6M, 2M, 70cm and 1296 MHz - and HF.

In the period from 29th of May to 6th of June a group of 25 OZ hams will activate Greenland under the call OX2K. On 6M we will use a 4-el Yagi and a 4CX1500 amp. On 2M we will use 4 long yagis, LNAs from SSB Electronics and a 4CX1500 amp. On 70cm there will be 4 yagis also, two 3CX800A7s and LNAs from SSB Electronics. On 1296 we will use a huge dish. However, we have to share the dish with other services, so we cannot take skeds for this band for the moment, but we will send e-mail to pilots in the ham community and post on the clusters, when we are QRV on the dish.

We have made an EME Internet site, where all information about skeds, QSL, donation and so on can be found: http://www.qsl.net/ox2k. you can also send e-mail from the site, to ask questions or to arrange skeds. We will have 2 stations operating HF on all bands with yagi antennas and amps as well. Operation will be 24h a day, split operation around the IOTA frequencies.

The OX2K-team looks forward to log you [NLRS]

Why Metal shines in Light

"A piece of metal has electrons free to move through the entire solid. This is why metals can conduct electricity. It is also why they are shiny. These unattached electrons oscillate together with a large amplitude in response to the electrical field of an incoming light wave. They themselves then radiate electromagnetically, just like a current in an antenna. This radiation from the oscillating electrons is the reflected light. In this situation, little of the incoming radiant energy is absorbed, it is just reradiated, that is, reflected."

From "Black Body" by Michael Fowler

Interesting Website

There is an interesting Website that deals on a Question and Answer basis with the problem of "How Stuff Works!"

Here is a list of the new questions added to the question archive at
http://www.howstuffworks.com/question-archive.htm

- What does the weight mean in "20 pound bond paper"?
- Is it better to leave my computer on all the time, or should I turn it off when I'm not using it?
- What do the big signs shaped like red, blue and yellow diamonds posted on many buildings mean?
- What does Digital Spread Spectrum mean in cordless phones?
- What gives Harley-Davidson Motorcycles their unique sound?