

Vol. 20 No. 9

www.mvus.org

Nov / Dec, 2006

November Meeting on Fri 24th at the Old Country Buffet !
near SR 725 and Yankee Rd. in Centerville

December Meeting on Fri 29th at the same place.

Club Memorial Call W8KSE 10 & 3.4 GHZ Beacon, presently in Repair.

MVUS Sunday Net at 14:30 GMT (currently at 9:30 AM local time, EDT). The net frequencies are
primarily **144.280 Mc and 28.960 Mc.**

Contents

De N8ZM.....	3
More Numbers from MUD-06.....	3
This and That.....	4
Audio Support for MUD-06.....	5
Rememoring Microwave Update by Freddy,ON6UG.....	5
Last Banquet Pictures by Steve, K8UD.....	6
Far Side of the Sun.....	7
Report from Italy.....	8
Solar Cells and Light Bulbs.....	8
Lightning Story.....	9
NYC Rover?	9
Update VOA EME Project.....	10

Upcoming Events Nov 18/19 Fort Wayne Hamfest

Happy Thanksgiving and a Happy Holiday Season
from the Editors of "Anomalous Propagation"
Steve, K8UD & Gerd, WB8IFM

De N8ZM

Now that almost all of the excitement of MUD 2006 has subsided, the replacement condition appears to be writer's block. Sitting here in a hotel room (again!), and contemplating things to write about is going pretty slowly. But as MVUS President-for-life, I must press on!

I mentioned last month that we had purchased some of Kent Britain's PC bigwheel antennas for the 1296 beacon project, as well as a set for 902 should we ever have the capability to add that to the mix. Part of the challenge with these is to find a way to properly stack and feed them to get the pattern down on the horizon. I'd like to organize a small group of you to help with the concept investigation and construction of this. I can provide test equipment and some measurement expertise, but would really appreciate some help in the design and fab end. We need to get this going since our window of opportunity to get this installed on the TV tower is once again fast approaching, and may not be available for very long as our benefactor is nearing retirement. I hope to work on this mostly over the Thanksgiving weekend, so don't wait until the November meeting to contact me if you are interested. Go to the phones and call now for this once in a lifetime offer!

When you get to read this, the annual ARRL Frequency Measuring Test will be history for 2006, but those of us who mess around with this are planning to try to implement our own FMT from this area. This puts us on the other end of the problem, so to speak, as now it will be our job to generate a precisely known frequency with enough power to be heard over the eastern half of the US and Canada at a minimum. We have started working with the ARRL to see about them possibly sanctioning our efforts. We might even try to run the test several times a year as practice for the League's annual event. Watch this space for more to come.

Gerd reminded me that this is the last Anom Prop for this calendar year, so I do have to cover December as well. That said, I wish each of you a very happy and well fed Thanksgiving, and a very merry holiday season, whichever form of it you choose to celebrate.

Don't forget that we'll have our November meeting on the day after Thanksgiving, the 25th, and our December holiday party on the Friday after Christmas, the 29th. Both will be at the usual place, unless someone comes up with a better offer.

So to each of you, may the rest of 2006 be terrific, and my best wishes for an outstanding 2007.

de Tom, N8ZM.

More Numbers from Microwave-Update 2006 in Dayton

Preregistration: 92, at the Door: 18; for a total of 110 Extra Proceedings sold: 36

Banquet Contract for 120. Actually in attendance an estimated 110. **Hotel:** 181 guest nights

Presentations from 8:15 AM to 5:00 PM with frequent short breaks and a 1 ½ hour break for lunch
10 presentations on Friday, 9 on Saturday (although we kept going to almost 5:30 one presentation had to be scratched for lack of time)

Proceedings Contains 19 papers, one presentation (paper not in the proceedings) was added: Digital Radio by Bdale Garbee, KB0G, and one paper: Microwave Translator by Gerd Schrick, WB8IFM (in the proceedings) was dropped. 11 extra papers (no presentations) are also included for a total of 286 pages.
All papers (20) presented but one ! Eleven extra papers (no presentations). Total of 286 pages.

Prizes, plenty to go around more than once

Pictures: presentations, vendor's room by Gerd, WB8IFM, banquet pictures by Steve, K8UD

This and That (11-06)

- **Surplus Tour.** Although short on microwave parts it was nevertheless interesting (see Freddy's ON6UG report) Steve, K8UD, who owns Consolidated Electronics reported 4 groups that stopped by. He even sold \$ 100 worth in parts.
- **First Weekend ARRL EME at WW8M.** Given no Internet connection, no telephone, no advance notice, no skeds, no nets, no clusters etc. How many EME QSOs? **One QSO** in 12 hours of operating time. Strictly Columbus method! Find it, land on it, work it, log it. [Lloyd Ellsworth Ne8i]
- **Far Side of the Sun.** You can now view a picture of the sun front and back on the Internet. Scientists from Stanford have been perfecting the readout and display of data from the SOHO satellite, which carries a Michelson Doppler Imager. Read the fascinating report about it.
- **Retiring.** I am going to sit down and do nothing for two weeks to learn how to be bored. [Bob Barker]
- **Bargain.** Critics say the US penny has become obsolete... But wait, as a Montgomery County water customer you receive an astounding value. More than three gallons of high quality drinking water are delivered right through your faucet directly to you for just one penny! [Water Department]
- **Crud.** The Internet is slowly filling up with crud, which means you have to be highly critical of what you read. On a one page write up about the "diode" I found the following; "when the voltage is higher on the positive lead, the cathode (about .65 volts higher), then the voltage will flow. And: ...the bridge circuit can produce pure D.C. from your wall outlet..." This statement is then modified:" Some additional parts are needed such as a transformer and capacitors." [WB8IFM]
- **Timepiece.** My son gave me a Bloomingdale quartz watch for the new millennium and it has been keeping time ever since the year 2000. Soon it will be 6 years since then and not only has the battery never been renewed but it also has kept very good time. At this point (Nov 06) the time is only 1 minute slow. This translates into $3 \times 10^{\text{Exp}-7}$, pretty good for a crystal! [WB8IFM]
- **Happiness.** Some people cause happiness wherever they go; others, whenever they go. [Oscar Wilde]



Audio Support for Microwave Update 2006

by Mike Schulsinger, N8QHV

The Dayton Holiday Inn North could supply one wired microphone and a built-in amplifier/speaker system. This system is also used for the annual Hamvention VHF dinner. However, we were planning to also use a "hands-free" wireless microphone, for the presenter's convenience, so we began planning along those lines.

Here is what we needed:

- A wired microphone. (supplied by the Holiday Inn)

- A wireless microphone including the receiver

- A microphone mixer.

- Various audio interconnect cables.

As it happened, I didn't have to go far. There were several TAPR members on the MUD committee, that knew about a TAPR flyaway kit that contained a high quality mixer board, a diversity wireless microphone system and the extra cabling necessary to hook everything together irregardless of the local setup. Our TAPR folks arranged for the loan of the kit to MUD 2006.

The audio kit arrived in time and it took less than an hour to set up everything. The wireless kit and the hotel mike worked just fine with the TAPR mixer. One feedback problem did pop up due to speakers placed throughout the ceiling of the meeting room. This was solved by turning down the microphone not in use.

PS. We also supplied our own projector and wound up to be charged extra by the hotel only for the 10x10 foot screen, which cost us \$100.

Microwave Update Remembered.

Thursday's Activity etc. by Freddy, ON6UG

I joined the surplus tour on Thursday with members of the Northern Lights Group and Ed Krome K9EK. Unfortunately I forgot some of the calls. From the tour that went very well I mainly remember the warehouse of Mendelson in Dayton and Fair Radio in Lima.

Microwave gear was hard to find but the old equipment brought back memories of my early days.

The WS-19 set we saw at Fair Radio was the equipment that introduced me into amateur radio some 46 years ago. The "microwaves" then for me were what the B-set could do at that time: some 200 MHz.....

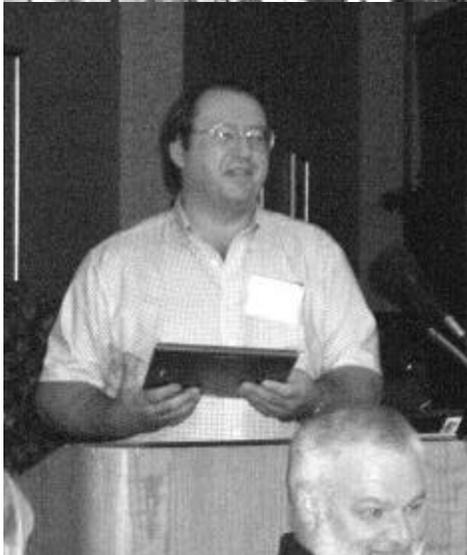
I found the "Update Flea Market" on Friday evening to be outstanding.

Microwave Update was an opportunity to meet new and old friends and hams with similar interests.

I must also thank the hams that have been with me during the update and took me around for the surplus tour and the lunch breaks.

I hope everybody enjoyed it as much as I did. I certainly look forward to next years Conference.

73 Freddy, ON6UG



Last of the Microwave Update -06 Banquet pictures

Left: Jeff Kruth, WA3ZKR, accepting the first Earl Price Award

Right: Tom Holmes, N8ZM, Conference Chair and to the far right Mike Schulzinger, N8QHV, whose idea it was to host MUD in Dayton and who did an awfull lot to make it work!



NEWS RELEASE New technique provides the first full view of the far side of the sun

March 13, 2006

Contact: Mark Shwartz, News Service: (650) 723-9296, mshwartz@stanford.edu

Comment: Phil Scherrer, Department of Physics: (650) 723-1504,

pscherrer@solar.stanford.edu

Editor Note: Videos and high-resolution images of the far side of the sun are available at

<http://sohowww.nascom.nasa.gov/>.

Relevant Web URLs: [Stanford Solar Center](#) [Solar and Heliospheric Observatory \(SOHO\)](#)

The hidden face of the sun is fully visible for the first time, thanks to a new technique developed at Stanford University.

Only half of the sun—the near side—is directly observable. The far side always faces away from Earth and is therefore out of view. But the new technology allows anyone with a computer to download images of the entire solar surface—an important advance with practical applications, say researchers, because potentially damaging solar storms that form on the far side now can be detected days, or even weeks, before they wreak havoc on Earth.

“Sunspots, solar flares and other active regions on the surface of the sun emit radiation that can interfere with orbiting satellites, telecommunications and power transmission,” says Philip Scherrer, research professor in the Department of Physics. “This new method allows more reliable warning of magnetic storms brewing on the far side that could rotate with the sun and threaten the Earth.”

It takes about 27 days for the sun to rotate on its axis, so an active region that forms on the far side can remain hidden for up to 13 days and surprise Earth-bound observers when it finally rotates into view. That’s what happened in October 2003, when active regions from the back side suddenly appeared on the eastern edge of the sun, spewing X-rays, ultraviolet radiation and high-energy particles into space. “We were not able to make a public prediction about the intensity of that activity, because at the time we could only image about a quarter to a third of the far side,” Scherrer says. “The new method allows us to see the entire far side, including the poles.”

SOHO mission

Scherrer and his Stanford colleagues study the sun using data from the Solar and Heliospheric Observatory (SOHO), a research satellite launched in 1995 by NASA and the European Space Agency. On board SOHO is the Michelson Doppler Imager (MDI), an electronic instrument that creates images of the sun’s interior by measuring the velocity of sound waves produced by hot, bubbling gases that well up to the surface—a technique called acoustic helioseismology.

“Helioseismology works on the same principle as medical ultrasound, which can create an image of a fetus inside a pregnant woman,” Scherrer explains. “In this case, we’re looking through a star with sound waves.”

Positioned about 1 million miles above Earth, the SOHO satellite always faces the visible side of the sun. In 2000 and 2001, scientists Charles Lindsey and Doug Braun—now at NorthWest Research Associates Inc.—developed two techniques that resulted in the first pictures of the sun’s back side. However, both techniques had limitations. One method only produced images near the center of the far side, while the other was restricted to views at the edges. To get a complete image, researchers would have to combine both methods, but that proved to be a major technical challenge.

The problem was finally overcome last summer when a new computer algorithm was

developed by the Stanford SOHO/MDI team in collaboration with Kenneth Oslund, an undergraduate at the California Institute of Technology. Their work resulted in the MDI Farside Graphics Viewer, which displays the first full images of the far side of the sun. The viewer is available online at http://soi.stanford.edu/press/farside_Feb2006/web/.

Solar max

“This new method is a vast improvement,” Scherrer says. “It should be especially important during the next solar maximum, which should begin in 2011, when solar activity will be at its peak.”

He points out that during the last “solar max,” which lasted from 2000 to 2003, solar storms temporarily knocked out power in the northern parts of Sweden and Canada and destroyed a satellite that was used to verify credit card payments at numerous gas stations in the United States. Air transportation also can be disrupted when solar radiation interferes with the operation of Global Positioning System satellites, or when aircraft that take shortcuts over the North Pole have to take longer routes to prevent passengers and crew from being exposed to intense X-ray radiation.

“Our goal is to give pilots and air traffic controllers a day or two notice of a possible solar event,” Scherrer says, adding that missions to Mars and other planets also can be affected when solar storms interfere with satellite communications to Earth. Last week, researchers at the National Center for Atmospheric Research in Colorado released new computer models predicting that the next solar cycle will be 30 to 50 percent stronger than last time.

In 2008, SOHO is scheduled to be replaced by NASA’s Solar Dynamics Observatory (SDO), a more advanced satellite designed to provide new data about the magnetic forces inside the sun that drive the 11-year solar cycle. Stanford, the University of Colorado and the Lockheed Martin Corp. will lead the SDO research effort.

“With cell phones and other devices, we’ve gotten more and more dependent on the space environment, so there are real economic reasons for missions like SOHO and SDO,” Scherrer says.

-30-

BY Mark Shwartz

Report from Italy ---9-22-06

Hi Gerd,

thanks for the qso and the nice e-mail. I have no way to check, but I wouldn't be surprised if we had met sometime back in the fifties, when you still were in DL.

I work on all bands except 40 meters, as I do not have a proper antenna for it. With the coming of the long winter nights, I'll be back on 160 too.

I have been active on satellites since OSCAR 6, and I'm looking forward to the next one. I am equipped for up/downlink on 1.3, 2.3, 5.7 and 10 GHz. I have narrow band equipment on 5.7 (about 15W out) and 10 (about 5W out), with a couple of 1-meter dishes.

Microwave operations from home are severely restricted by natural obstacles a short distance away, so I have to do mountain-hopping, especially during contests (wx permitting). Luckily, I have a good location a few km away. My record on 10 GHz. is 816 km, from here to Barcelona, Spain. During the summer season, I regularly work Sicily on 5.7 and 10 (about 600 km). I also try to do some rain-scatter work, and have worked a few distant stations in that mode.

My current project is a 24 GHz transceiver, which may be ready for low power operations in a month or so. Come next year, I am planning to bring the output power to 1 watt. I do not expect to work too many stations at all on 24, so I'll stay with low power.

Let's keep in touch. I'll call you when I hear you on 20 mtrs. Please do the same. BTW, I've been on EME on 432 MHz for many years, and still enjoy the mode.

Best regards to you both, 73 de **Peter, I5CTE**

Solar Cells and Light Bulbs – the Infrared (IR) Problem

By Gerd, WB8IFM

The wavelength of Infrared is longer, beyond the wavelength of our visible red, which is roughly 800 nm. A good old incandescent light bulb puts out a lot of IR, which we sense as heat and very little light, only about 2 to 4 %. By forcing more current through the filament we can heat it up to a higher temperature and obtain more light output. That, however, shortens the lifespan of the bulb considerably. Doing the opposite, we get a very dim light, but save electricity and the bulb might last a long time!

As far as the silicon solar cell is concerned, it also has a preference for Infrared. This is what limits its efficiency to about 20%. The reason, of course is that our sun at its temperature puts out mostly visible light and not IR although it doesn't feel like that if you are in the sun. That, of course, is the effect of the total radiation whether visible or not. All is being caught and converted to heat by our skin and clothing.

Lightning Story

By Gerd, WB8IFM

I had a qso with DL1SE and learned some interesting facts about lightning. When Juergen, a now retired physicist, built his house, he picked a nice location on top of a hill. (Wished we all could do that.)

However, in building the house and antenna, he had to overcome two obstacles. First, local regulation required that he got a permit from all his neighbors, a sheer impossibility. So he decided to make the antenna part of the building by putting it smack in the middle of the house and making it retractable. The second surprise was when they started digging, they found solid rock beneath. Well, he went ahead with the house pouring a concrete foundation with room in the center for a 100-foot pneumatic mast. His antennas, a huge 11-el HF beam and a bunch of VHF / UHF antennas, now nestle right above the roofline but can be extended by the push of a button. In many years his neighbors have gotten used to the sight of his antenna, and Juergen now leaves the tower extended most of the time only withdrawing it when a storm approaches.

Impossible to find a decent ground because of the rocky subsurface, he decided to do without any grounding of the station whatever. Only one other time I remember a qso with a Spanish ham, which described a “groundless” situation. This fellow had his station in one of the upper floors of a high rise with the antenna on the roof. I forgot whether the building had a protection system, but for him the grounding seemed impractical and he ran his station entirely without ground. When I asked him about experiences with lightning he told me a hair-raising story of a ball lightning. Seems like a lightning ball, coming down from the antenna separated from his equipment and traveled through the room and out the window, fortunately missing the operator!

Now Juergen reports to have been very lucky that no severe lightning damage has occurred over the years. One of his neighbors, whose lot is clearly at a lower elevation, but above normal soil, was not so lucky. In spite of an excellent lightning protection and ground system, he has frequently had lightning damage to his electronics and has had fights with the insurance companies over compensation. Seems like his soil was conducting well and an underground water vein was also playing a role. While in Juergens case, the solid rock although forming the highest point around, acted as a virtual depression saving his house and antenna from being hit.

As far as damage is concerned, the usual protection system will protect the house, but not the electronics in the house. The strong electric field that is associated with the lightning current, counting in the thousands of amperes, is hard to predict. Even completely unplugged equipment can be effected.

It seems with the progress in sensor and sophisticated mapping techniques, using aircraft, maps of ground conductivity could be made that would indicate spots that might attract lightning. On those spots high conducting towers could be installed that would catch and ward of lightning in that area. This might be another real estate criteria when building new houses or moving in an existing one!



Rover in NYC in 1924?

Now, seriously, the NYC police department is experimenting with a mobile phone!

Credit Rich Howard

Update on the VOA EME Project (23' Dish)

By Dave, G4HUP/ND8P, Jim, N8ECI, and Mike, KA8ABR

Since the presentation was given at the recent Microwave Update concerning the EME project at the VOA site, several fronts have been advanced towards making the station operational.

Dave, G4HUP/ND8P built a radiometer based on a design by G4NNS, and this device is used as a noise indicator to help keep the dish aimed at the Moon. The radiometer is a receiver that is basically a TRF design operating on the 144 Mc band with a bandwidth of 2 Mc. Signals from the transverter are fed to both the IC-251 IF radio and the noise indicator. During receive periods, the noise indicator will see moon noise while the IF rig is demodulating signals, so the noise can be used to adjust the aiming of the dish to keep it pointed at the Moon.

Dave could use moon noise to improve our calibration curve and eliminate pointing errors that had plagued us. Since we needed data at high elevation Dave drove out to the station at odd hours to collect the data, even in the middle of the night.

All of the 10 GHz equipment was moved into the enclosed area behind the dish and mounted onto a shelf that can turn with the rotating feed tube. The temporary mounting in use earlier led to inconsistent results due to strain on RG-405 lines and their SMA connectors. Since the shelf will move with the feedhorn, polarization can be changed on the fly when using linear.

To improve performance, a two-stage preamplifier was purchased from Down East Microwave during the

Microwave Update. This amplifier is now in line downstream of the single-stage DB6NT preamplifier, boosting the overall gain to about 40 db before it enters the transverter. Also, a waveguide switch was added to the back of the feed to allow going over to transmit mode when desired.

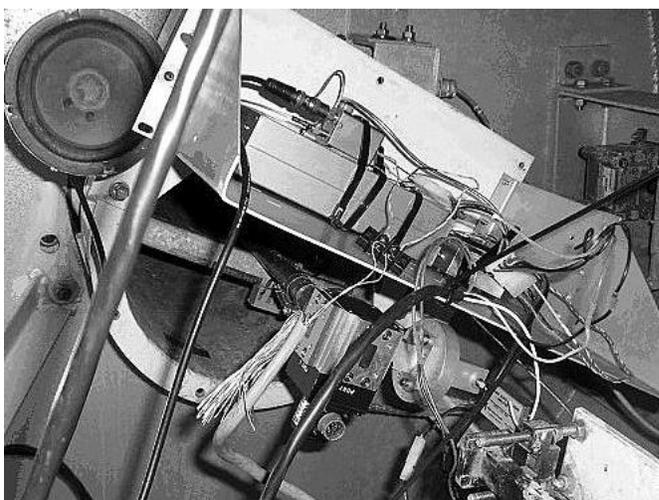
Dave and Jim also built up an intermediate amplifier that we needed to raise the 10 mW output of the transverter to the 2 W needed to drive the final to 8 W. Both amplifiers were tested at the shack of WA3ZKR in Morehead, Kentucky, on a recent trip there to see the 68 ft radio telescope dish and facilities installed at the university.

On Monday, November 13th, actually the same day that Dave returned to England, W5LUA provided a test signal for us to copy off of the Moon. AI was found after a little searching, and calls plus O's were copied for about 15 minutes. The signals were about 15 db out of the noise, as determined by the spectral display program "Spectran" by I2PHD. Dave, G8HUP/ND8P, and Mike, KA8ABR, were on hand to listen for AI, but Jim, was not able to make it to the VOA for the historic event.

Soon, the transmit chain will be completed and installed. The sequencer and waveguide switch will be wired up and tested. Finally, the station should be capable of two-way EME contacts. Other issues that still must be resolved include the pointing errors that may be a combination of mechanical alignment and the inadequate resolution of the look angles computed by the tracking program.



Front panel of noise indicator based on G4NNS design. Meter face still shows labeling from original use. Knobs control step attenuators stripped from an old spectrum analyzer



View of rear compartment showing 10 GHz equipment mounted on tray. Round waveguide from feedhorn (3/4 inch copper pipe) terminates into waveguide switch under tray. We still need to construct a proper transition from circular to round waveguide.