

Vol. 20 No. 2

www.mvus.org

February, 2006

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

Meeting at the Old Country Buffet ! near SR 725 and Yankee Rd. in Centerville

February Meeting on Fri 24 Feb. 7:30 PM

MVUS Sunday Net

Our Sunday MVUS net is held every **Sunday at 14:30 GMT** (we stay on GMT year-round, so currently the net is at **9:30 AM** local time). The net frequencies are primarily **144.280 Mc and 28.960 Mc**.

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Upcoming Events!

Hamvention.....19, 20, 21 May, 2006

Microwave Update 2006, 20-22 Oct in Dayton, Ohio (Details Coming Soon)

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De N8ZM

For most of us, this time of year is probably a little depressing, since the skies get dreary, the air is cold, and we can't get out much to work on antennas and visit the good microwave hilltops. This year has been a bit better than most, as the weather reports have been more about rain than snow. At least until this week! (Yeah, I remember the snow we had back in.... now when was that?) The situation appears to have corrected itself in the last few days, as it is in single digits outside as I write this. But hope springs eternal, as it is already past the middle of February, which, means that we only have six more weeks, at most, of planning time for our warm weather projects. (Weren't you were wondering how I was going to work this around to ham radio?).

Each of you have some plans for repairs, modifications, or new installations to the outdoor part of your station, I suspect, and now is the time to be thinking about the what, why, when, and how of your project. I have been wanting, for several years, to raise the height of my tower at least 20 feet to get above the antenna eating trees I have next to it. The trees were there first, so I suppose they have a legitimate grievance against the galvanized intruder, but I have really tried to placate them by not cutting them down. That also placates the wife, who strongly believes that they are an important part of the character of the back yard.

MVUS has a few spring projects as well, including the 1296 beacon, the UHF repeater, and the microwave linear translator. The first two are mainly waiting for the tower climbers to install the antennas, and the third one is moving along nicely thanks to Gerd Schrick, Mike Suhar, John Human, and Steve Coy.

Another project that I hope to get accomplished this spring is sort of a charity project that will enable more microwave activity at Hamvention, and possibly at other times of the year. The tower that we have used for microwave beacons on the roof of HARA Arena is a very old and rusty piece of what I call TV tower, as it was designed to support one TV antenna and rotator. When John Human climbed it last year to install the temporary beacons, he was quick to tell me afterwards that he didn't want to risk climbing it any more. So we hatched the idea of replacing it with 40 -50 feet of Rohn 25. I believe we can come up with that much from various sources, without having to buy new stuff. I have also discussed the plan with the owner of HARA Arena, and he is appreciative, and willing to cooperate with us. He tells me that he doesn't believe that there is anything on the old tower that is still functional. SO, when I have located enough tower sections in good condition, I hope to organize a small work party to do the deed, ideally before the 1st of May.

What's in it for us? Well, safety for one. Two, we'll have access to a nice high location where we can install more permanent beacons, and maybe the linear translator eventually. The really high 1296 beacon is a great opportunity, but we simply won't be able to put anything else on that tall tower, so this provides us with another option. It is my goal to minimize club expenditures for the HARA tower project to just the small amount of hardware needed to attach to the building using the existing mounting points.

See you on the 24th at the Olde Country! De Tom, N8ZM.

February Minutes 2006 MUD Meeting

1. Program – going to be solved by a committee (Red and Gerd are co-chairs/contact person).
2. Gerd will make a list of presentations – Subject, Name/Call, email, phone, contact (Gerd or Red).
3. Printing question – ARRL deadline, etc. (Gerd)
4. Outline of homepage is complete (Steve and Gerd).
5. Payments accepted by cash or check (no credit cards).
6. Registration confirmations by email or letter.
7. Nametags presented at registration sign in.
8. Raffle prize – FT-817 proposed
9. Gerd checks with MUD 05 for profitability.
10. Want to promote raffle at Hamvention.
11. Can pay for raffle tickets when paying for registration.
12. Red to check on getting raffle tickets (probably need 1000 tickets).
13. MUD 2005 donation list located at www.microwaveupdate.org/dontations.html.
14. Conference fee - \$40 in advance, \$45 2 weeks in advance, \$50 at the door. This includes one copy of the conference proceedings. Banquet price is \$35. (These are numbers for 2005.)
15. Still need to work on talks, prizes, and presentations.

This and That 2-06

- **Achtung.** Last month the wrong date was given for Microwave Update: It is on Oct 19 through the 22nd. The place, Holiday Inn Dayton North on Wagner Ford Rd (Exit 57B on I-75)
- **CW.** This is the logo of a new TV network aimed at young people. Quite possible some will google “CW” and find out about Morse code and be curious enough to get interested and become hams. So, help just comes from the most unexpected direction. The ignorance of the TV CEO’s is a blessing for Ham radio!
[Gerd, WB8IFM]
- **Just do it.** “Cut-and-try sometimes is more important than too prolonged theorizing.”
- **Make it BIG.** “Americans seem to work very well, only they obviously insist on making everything as big as possible.” —[German physicist Franz Simon’s impression upon a visit to the US in 1932]
- **1776 Lightning.** Houses burst into flame. Ten soldiers camped by the East River, below Fort Stirling, were killed in a single flash. In New York, a soldier hurrying through the streets was struck deaf, blind, and mute. In another part of town three officers were killed by a single thunderbolt. A later report described how the tips of their swords and coins in their pockets had been melted, their bodies turned as black as if roasted.
[McCullough in “1776”]
- **Quantum Mechanics**...is starkly efficient: it explains what you see but prevents you from seeing the explanation.
[Brian Green]
- **Visiting Grandpa Today.** ...Over the swamp through the traffic jam, to Grandfather’s condo we go, rev the SUV as if gas were free and let the road rage flow...
[Leigh Allan]
- **Computer with On/Off Switch.** Yes Virginia, there is such a thing. Steve, K8UD, showed me his Christmas present: a new Palm Pilot. This is a miniature computer (for the palm of your hand) to help you with your daily schedule to take notes, to calculate and do many other things a computer is good at. But the best thing is, you can turn it on or off with the flip of a switch. No grinding hard drive, all memory is solid state. Now you are talking. Whished my big PC was like that!
[Gerd, WB8IFM]
- **Invention.** By definition invention causes turbulence in the production mainstream.
- **Contest Remark.** That’s life. Some are poor, some are rich. Some live on a mountain, some in a valley.
[Dieter, DL3NQ]
- **The Cellphone.** Oddly enough, the cellphone started as a way for people to speak with each other. Now it’s a camera, computer, music player, close personal friend and more. In the future you can expect it to serve you as a lawn mower, electric toothbrush and, if you are a farmer, an automatic milking mashine!
[Don Flood]
- **HDTV.** It’s not all that much better than your old TV. NTSC is capable of 440x480 pixels = 210k pixels. A DVD can give you 720x480 or 338k pixels. The problem is: can your TV process the signal and show it? Same for High Definition TV. There are two formats: one delivering 922k pixels, the other 2Mega pixels. As you know, even the cheaper digital cameras now have that many pixels or more!

Slotted Cylinder Antennas

(from the Antenna Book by John Kraus, W8JK with Ref. to
A. Alford "Long Slot Antennas" Proc. Natl, Electronics Conf. 1946, pg 143)

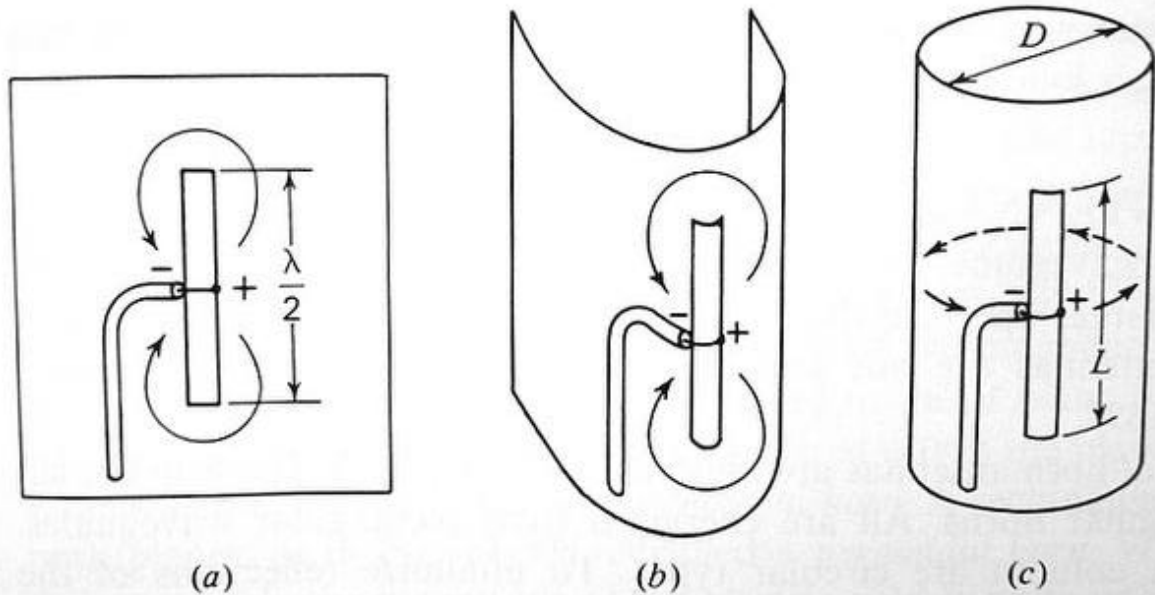
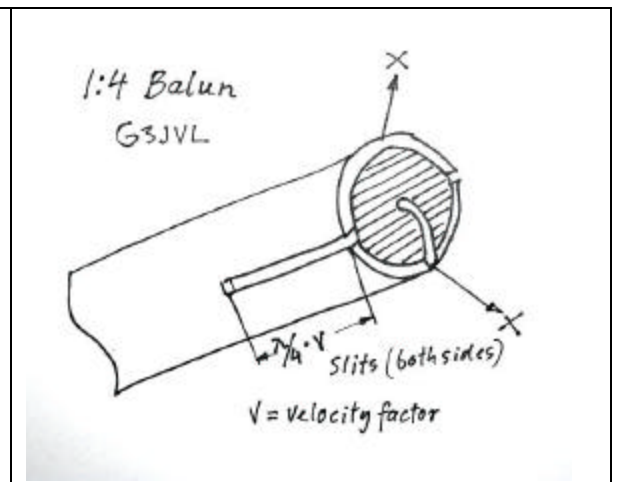


Figure 13-18 Evolution of slotted cylinder from slotted sheet.

A slotted sheet antenna is shown in Fig 13-18a. By bending the sheet into a U-shape as in b and finally into a cylinder as in c, we arrive at a slotted cylinder antenna. The impedance of the path around the circumference of the cylinder may be sufficiently low so that most of the current tends to flow in horizontal loops around the cylinder as suggested. If the diameter D of the cylinder is a sufficiently small fraction of a wavelength: say less than $1/8$, the vertical slotted cylinder radiates a horizontally polarized field with a pattern in the horizontal plane, which is nearly circular. As the diameter of the cylinder is increased, the pattern in the horizontal plane tends to become more unidirectional with a maximum radiation from the side of the cylinder with the slot. For resonance the length of the slot L greater than $\lambda/2$ (explanation)

This slotted cylinder antenna certainly is a good candidate for an omni-directional horizontally polarized antenna. It is the equivalent for horizontal polarization of the well-known types of vertical antennas. This antenna seems to be best suited for the UHF range, i.e. 70cm, 33cm, and 23 cm. It is surprising that it isn't treated in the various ham radio hand books. The following two contributions give examples how to build such an antenna for 23cm. From both articles you get some insight and ideas how to go about it. The slots are 2λ in both but the baluns are of different construction. The $2l$ length should provide horizontal gain at some angles but nulls in others like you find it in long dipoles or long wires. (Ed)



This balun works by taking the voltage on the unbalanced 50 Ohm line and producing two output voltages relative to earth (the cable outer) which are equal to the input voltage but are 180 degrees out of phase with each other. The balanced load is connected between these two outputs and sees the difference between them, which is twice the 50 Ohm voltage. Hence there is a 4:1 step up in impedance. The balun has a comparable bandwidth to the slot, about 10 to 15%. Note that the length of the cuts in the semi-rigid must be an electrical quarter wave long. Since the space between them inside is PTFE, this length is 0.86 times the free space quarter wavelength. If there is a significant gap between the leaves and the PTFE, the velocity factor will be higher. [G3JVL]

Building a Working Alford Slot Antenna

By Robert Templin, W5UE

The process for building a good Alford slot is surprisingly simple. Instead of trying to define the slot length, width, and tubing size and then duplicating these dimensions as accurately as possible, do the following:

1. Select a copper tubing diameter that is commensurate with the desired frequency. The finished product will have a total circumference of 0.416 free-space wavelengths. This determines the operational resonant frequency of the antenna. See pictures.
2. Cut the tube lengthwise on an overhead radial woodsaw using a blade designed for non-ferrous cutting.
 - a. Slot length is determined later by soldering shorting bars across the slot.
 - b. It is usually about 2.15 free-space wavelengths but is not especially critical.
 - c. When cutting make sure tube is securely anchored to a board otherwise it may fly out of the saw table.
 - d. Two small holes drilled at the ends 180 degrees away from the cut and using screws to a board is usually sufficient anchoring.
 - e. Don't take too deep a cut at a time.
3. Slot width determines the SWR. Ordinary copper tubing, once sliced lengthwise, will spring open to a much wider slot width than needed, but you fix this later see below.
4. Heat the copper tubing to red heat progressively along its length with a propane torch until it is annealed dead soft.
5. Cool the tubing in water.
6. Deoxidize the tubing in muriatic acid (outdoors only - bad fumes).
7. Rinse the tubing with water and dry.
8. Drill two feed point holes, one on either side of the slot, across from each other, in the middle of the intended slot length.
9. Attach a 4:1 balun (see **below**) feed to the feed point holes. Run the coax up on the outside back edge, 180 degrees from the slot, where the voltages are zero. UT-141 semi rigid coax is quite useful for this. **Be careful when making the bend at the "bottom" of the loop for the balun.** Semirigid coax will tend to kink and this is not a good thing!!
10. Put shorting bars across the slot two wavelengths apart (top and bottom).
11. Excite the antenna at the desired frequency through an SWR bridge or return loss coupler.
12. Squeeze the slot length closed uniformly along its length until the SWR is minimum. You should be able to get down to less than 2:1 SWR.
13. Add small gimmick capacitor tabs at either side of the feedpoint to further minimize swr.
14. See picture of a 23cM version below, right, which started as a 1.25" copper tube. Note that the tube below the bottom shorting bar is not part of the antenna and may be filled with anything. In this case, a 1" hardwood dowel was inserted to the bottom of the shorting bar and the tube was drilled (4 places, 2 on either side of the slot) and screwed to the dowel. The dowel was then inserted into a 3' section of threaded 1" black water pipe (which had a pipe flange installed on the end) and cut off flush with the bottom of the pipe flange. The pipe flange was bolted to the deck to secure the antenna.

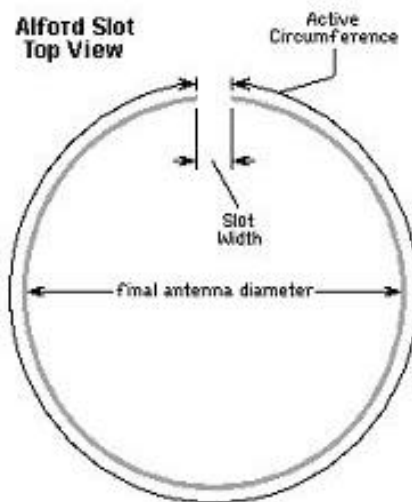
Put the antenna in a weather proof housing, if desired, and readjust for best SWR. Use largest diameter RF-transparent plastic or fiberglass tubing available to minimize detuning effects. Note that the example pictures below has no housing - as long as the vehicle is in motion water has no opportunity to build up inside the

antenna, it functions well without one.

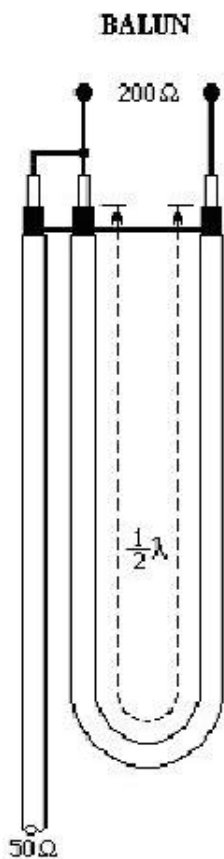
NOTE: The table below shows the "cookbook" values. "Active Circumference" is the tube circumference minus the width of the slot (see top view below, right). As an observation, the finished tube cross-section will often be more egg-shaped than round.

Alford Slot Antenna Details

Freq. (MHz)	Slot Length 2.15 λ (inches)	Active Circum. 0.40λ (inches)	Slot Width 0.016λ (inches)	Final ant. dia. (inches)
902.1	28.25	5.20	0.190	~1.72
1296	20.125	3.910	0.170	~1.3
2304	10.688	2.120	0.090	~0.7



The diameter of a 3456MHz Alford slot antenna is too small to fit the balun inside the tube. If you need an omnidirectional antenna for 3456MHz and above, use slotted waveguide antennas with the big "wings" to make the pattern circular instead of 4-leaf clover-like.

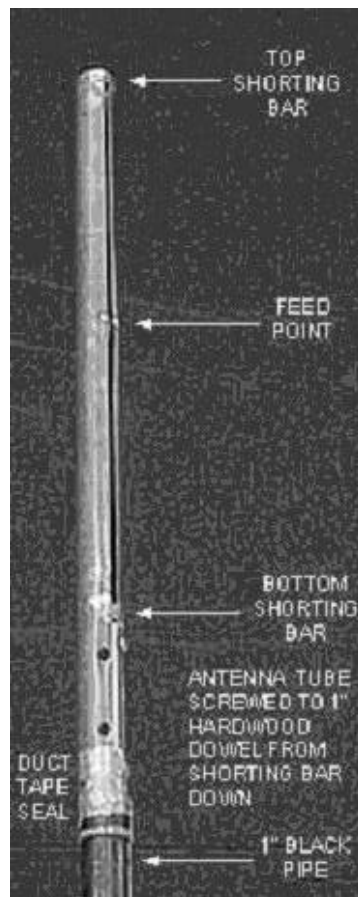


$$\frac{1}{2}\lambda = \frac{15000 \times Fv}{F} \text{ cM}$$

Fv = Velocity factor of coax
 F = Frequency of operation
 λ = wavelength in cM

NOTE:
 Make connections as short as possible.

Fv for UT-141 = 0.694



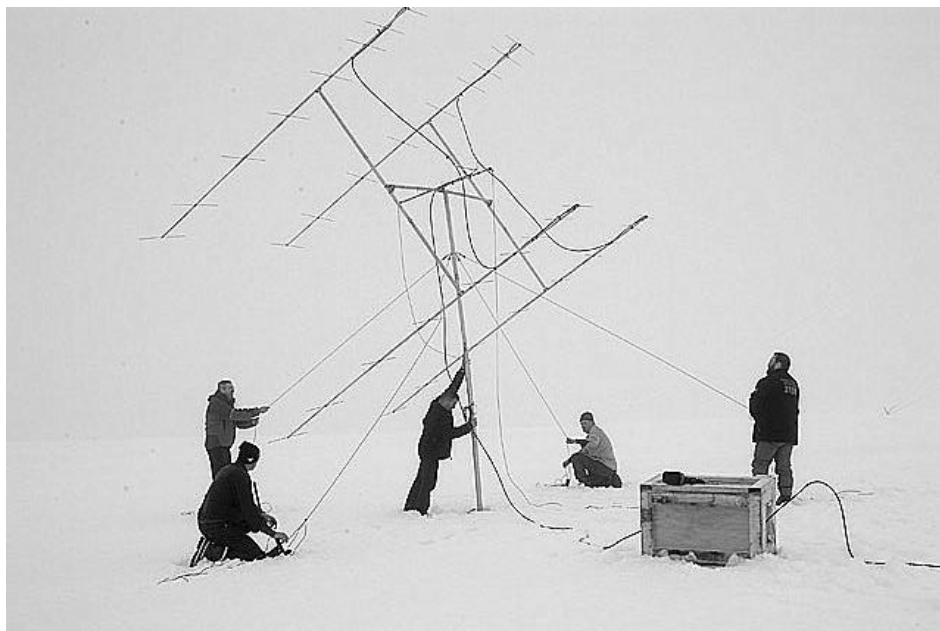
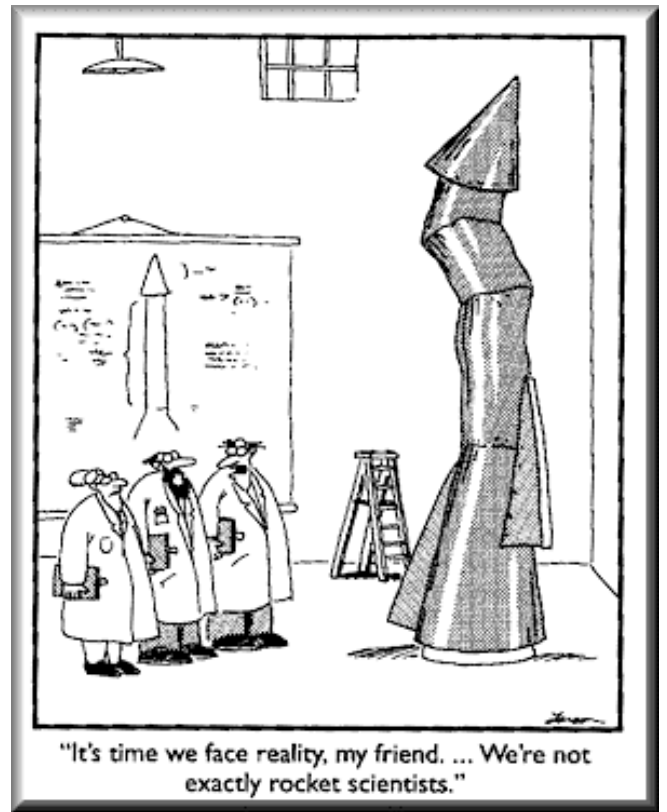
Length of the slot from the bottom of the top shorting bar to the top of the bottom shorting bar = 2.15 λ

23cM Alford Slot used by ND2X/M made by W5OE

4:1 Balun using a λ/2 Detour



Suitsat, the space suit with a transmitter inside, got finally pushed out into its orbit during a spacewalk from the orbiting International Space Station on Feb 4th 2006. Unfortunately something went wrong and the signal on earth was extremely weak, definitely not walky talky strength as planned. O well, there are more suits where this came from. We wish the project well for the next try!



3Y0X Peter I Island Dx-pedition EME Set-Up (2-13-06), QSOs as of 2-16-2006

<u>2m EME</u>	PA2CHR	F6HVK	I2RV	KC7V	W7IUU	KB8RQ	DF2ZC	K2TXB
W5UN	ES6RQ	IK1UWL	W8PAT	DK8ZJ	PA0JMV	RA3AQ	9H1PA
PA3CMC	KE7NR	F9HS	S52LM	YU1CF	SP6GWB	AA7A	EA6VQ	<u>Final</u>
SM7BAE	G4CBW	PE1BTX	W5UN(CW!)	PE1L	W4SW	RK3FG	SM2ILF	<u>118</u>
W7GJ	K7XQ	DF7KF	VK2KU	DL8GP	JH2COZ	HB9Q	SP20FW	<u>Contacts</u>

Microwave Activity Days. Lloyd, Ne8i Reporting. (Lot's of good advice also)

Feb 4th, 2006

Saturday AM produced quite a bit of activity. Besides myself, K8EB, K8MD, K8TQK, K4TO and NQ2O. Representing Michigan, Ohio, Kentucky and New York. Heard some weak signals in the background in various directions on .260. Normal dead band conditions. Several contacts and one-ways through 2304. With the rain/snow, hoped to work some 5.7 and 10GHz scatter, but things did not work out. Not even some enhancement. K8EB stopped by, and we ran some experiments with the new DEMI 8W 10 GHz amp. With under one watt drive, we were getting a good 5+W out. We figure that these should really help get more strong signals on 10 GHz next cumulative. We worked on a bunch of microwave projects.

Monday night. Could not find any activity or check-ins on 432.120. Got a few calls on 2m. Thing is, there are at least 3 active and popular 2M SSB nets running on Monday night.

Might as well get ready for the next MAD, Saturday March 4th. So get your kitchen pass in order, make alternate harmonic activity arrangements. Keep the calendar clear. April; thinking about some rover work. Big thing there will be gasoline prices, then weather.

Next Activity Saturday, 4 March 2004

Saturday March 4, 2006 is the next Microwave Activity Day. Time to check out the microwave equipment. See if it is still working. Check out propagation, try things, or just say hello. So, 902 and up. Saturday morning, starting whenever, till noon, 1PM or lack of activity. Gather on 144.260 and go from there. Then on Monday Evening, March 6, from about 7PM till 11 or so. There are just too many nets going on 144.260 USB Monday, so will try 432.120 USB instead.

Microwave Activity Day was started up by the efforts of W3IY Bill, a couple years back, as a common day and time to get together and check out the microwave equipment. Keep the bands busy. Make sure the equipment still works.

April Microwave Activity Day will be Saturday April 1st, 2006, and Monday Evening April 3rd. First Saturday of the month, and following Monday evening. So get your kitchen pass in order, arrange alternate transport or whatever for the harmonics. Swap Saturdays, make arrangements. Think Spring, and start to get the rovers out and about. Check out new operating sites.

73, Lloyd Ellsworth Ne8i
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Our Middle Microwave Bands By G3PHO

2.3GHz, 3.4GHz and 5.7GHz.....

These are our "middle" microwave bands and a renewed interest is presently being taken in them, especially 2.4GHz as it became a very important part of the recent Phase 3D (A040) satellite program. Terrestrially, there is low activity on these bands but a number of UK amateurs are now actively developing equipment for them. (need to catch up! Ed)