

ANOMALOUS PROPAGATION

Newsletter: **The Midwest VHF / UHF Society**

Editors:

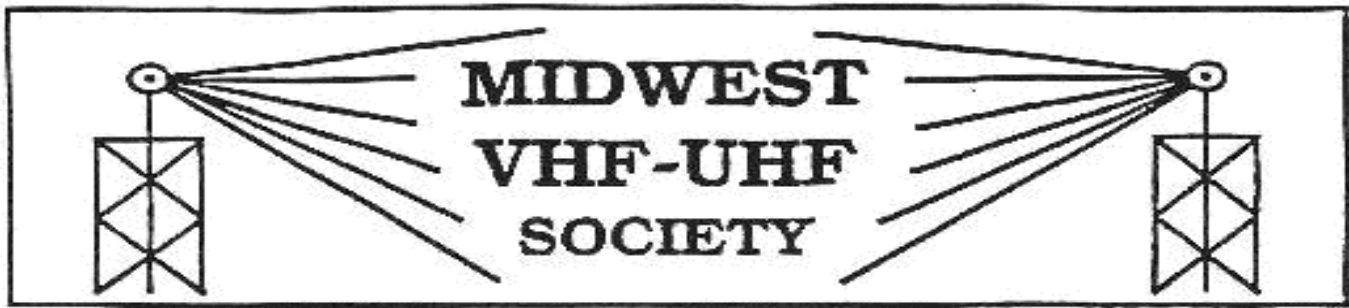
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Annual Society membership is \$ 10.00. Please
make checks payable to Gerd Schrick



Vol. 22 No. 6

www.mvus.org

August 2008

MVUS Sunday Net at 14:30 UT (currently 10:30 AM local time, EDT).
The net frequencies are primarily **144.280 Mc and 28.960 Mc.**

August Measurements (Antennas & Equipment) and Picnic
Sat 23 August **10AM to 5PM**, Picnic at 1:30PM

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Upcoming Events

Picnic and Measurements.....August 23rd Starting at 10 AM
At Sacket-Wright Park ,just outside (south) of Bellbrook

2008 Microwave Update: Bloomington, MN on Oct 17 and 18
The Preliminary List of Presentations is on Page 7

Tom's page "De N8ZM" is unavailable. Tom is at the IEEE ECM Symposium in Detroit
Contact Tom about measurement needs at : Tom_Holmes@agilent.com or 866-650-9518

Instead we bring you "Interesting Weekend", a report by Lloyd, Ne8i, the ultimate rover,
in his unusual "telegram style" describing the cumulative contest
for the weekend of August 16/17-2008

Interesting Weekend. Never know what will happen. Lots of stations on. Many experiences. Aug 16/17 08. Cumulative report.

EN81hv Sterling State Park, Monroe Mi. Saturday. Really beautiful summer day. Sunny, low humidity. W8ISS, AA2LY and myself showed. Worked VE3ZV on 10G and 24G. Good strong signals. Several of the VE3 rovers; VE3SMA, VE3FHM, VE3NPB, VE3TFU. Add WA8RJF and WW8M. Conditions on the Lake Erie propagation was pretty good early on. Started dying about 10AM and gone by 11AM. Dead band for the rest of the day. Sunrise works. My guess, before sunrise too. Stayed there till 7PM. Not much activity in the afternoon. Ran some contacts and experiments on 3.4G 5.7G as well as 10G and 24G. Inland, conditions from the Lake to WW8M, 50 miles, were not there, and did not help. Conditions inland, were pure dead-band. Talking to the crew up in EN74, they had really good similar conditions early in the morning on Lake Michigan, but, by 11AM, they were gone. James, W8ISS, with all the weak distant signals to work with, experimented with feeding his "new" satellite 18" dish. Standard, found on the curb surplus outlet. The Vivaldi PWB feed (Kent WA5VJB) worked really good. Actually, his highlight, was finding that he could hear WA8RJF 130 miles away across Lake Erie directly just using the Vivaldi. With my dish, Tony WA8RJF at the time was about an s8. VE3TFU Steve brought along a 10 GHz beacon, set it up on the beach with a small horn. 10368.325 ±. Working really good. Got to play around with it for a while. Nice to have a spare station available, to just turn it on and listen to the beacon. Watch conditions change on Lake Erie. Again, it was close enough 40 odd miles across Lake Erie, that a Vivaldi antenna produced an s9 signal.

In Roving, you never know quite what to expect. My pickup is in repair, and a local friend kindly loaned me his pick up. Well, it is an older vehicle. 1990. Lots of miles, use, history, rusted out this and that, etc. Every time you close the door, you hear some more rust fall and hit the pavement. Set up all the stuff in the bed. Frame for the 7el M2 2M Yagi, extra battery collection. Equipment. Around here, this weekend was the "Dream Cruise", on Woodward Ave, lots of old cars, rods and stuff. Been going on all week. Needed to go into town, and do some shopping. Friday PM, drove rover there for a couple miles. Complete with antennas, cracked windshield, rust, no muffler. Got lots of finger pointing and such. All these gleaming cars, pride and joys, labor's of love, then me. People just did not know what to make of it. The muffler recently died, so I had to take it really easy, try not to make too much noise, and where I might travel had to be very carefully planed, and was, well, very limited. Few places I could go. Cruise was a place a no muffler, well, sort of fit in. Saturday 6 PM Came time to leave Sterling. Would not start. Pull the hood latch. Handle came off in my hand. Fun time opening the hood. After poking around for an hour, got it started. Half mile later the red brake light came on, and found I had no brakes. Fun. Quick call, Don WW8M would help repair. Just had to get it to his place, 70 miles away. Fun drive, 70 miles, no brakes. Lucky, no accidents. Oh, did I mention, no muffler. More fun than I was planning on. Spent all night repairing the brakes and muffler. Got home at 4AM. So, I missed the Sunday morning conditions, but at least I had working transportation for Sunday afternoon. I have not had this much ride fun since college days.

Sunday afternoon. Again, really nice summer weather, sunny, low humidity. Made some calls, some plans, skeds and went to GP Hill, EN82em. Pulled into this hilltop park. Found a charity benefit party going on. Sponsored by one of the local FM broadcast stations. Took a while to drive through that. Big crowd. Fortunately, it did not affect the hilltop, 1/4 mile away. However, the music was very loud.

Watching summer storm clouds form, from a hill top, can be entertaining, informative and such, while waiting for other things to happen. Add background music. WW8M Don had been watching local TV 7, digital 3, which is a weather channel, with weather radar. Using only this he noted the various red blobs around the area on the radar display, so we tried each of them out for rain scatter. It was the forecast popcorn rain showers. Now, this tool is something that a rover with a simple TV receiver, digital adapter monitor display could easily use. Thing is, cell phones, high speed links and 144.260, were not all that useable and or reliable this year. We found lots of places where none of the available high tech alternatives worked very well. What was learned, is one can do rain scatter and such without access to the internet, or computers. They are good tools, useful, but not critical. One of the best places to exchange information found, what was going on and such, was right on 10 GHz. Well, we managed to find one red blob north of Clare, center of the lower peninsula, which supported rain scatter. Produced 40 over signals. Great. Made a rain scatter contact. Signals went up and down, but we played around with the cell for a while. After a few cell calls, managed to get K2YAZ on. He was strong. N4PZ, managed to work WW8M, very weak. The storm cell, was not in a good place and all, but they tried and made it. Tried to get others. What WW8M, K2YAZ and I wound up doing, was operate about 5 KHz apart, calling CQ. Take breaks. Thing was, it was easy to quickly tune for the other 2 stations, move the antenna and find the peaks of that cell. Watch the cell, as it changed, track it. Where the hot spots were. Also look for other cells. Fun stuff from the hilltop. Watched one cell form over Windsor Ontario. With this one was finally able to work WA8RJF on rain scatter. Another over London Ontario worked as well. Also, tried 24 GHz rain scatter with WW8M and K2YAZ. Not successful. Rover technique I used here, was first, the usual put the dish on the horizon. Then scan the horizon. Once the signal was found, then use some elevation, fairly easy with my set up, and look for peaks. 2 to 4 degrees above horizon was about all. These were small, close popcorn type rain cells, Maybe 100, 150 miles away, so contacts more than about 250 miles were not going to happen. Like I said, some cells worked. Others did not. Then, for how long? All fun variables to take the challenge with, and make microwave contacts. Beautiful sunset from the hill. Rain scatter still going on, past sunset. Stayed around till the park police reminded me the park was closed, and I needed to leave. They were pretty good about it.

Score? I don't know. Figure it out one of these days. Had lots of fun. Lots of microwave contacts and activity. Sending in my log? Planning to. Heard lots of reports of this station or that, something not working as hoped or planed and that sort of thing. Many interesting stories. Oh dear. Let everyone tell their stories. Cross fingers, and offer what help I can. Next time. Lessons learned, many. Big next thing this year, is the next Microwave Activity Day is Saturday September 6th. This year, that is NOT Labor day weekend. The weekend after, so, we might have smaller crowds and such at rover sites. So I am going to suggest that will be a good day to try things out. Maybe stretch them a bit into the afternoon, looking for any popcorn etc rain storms to check out. Try to get things working good before September VHF and September Cumulative. Shortly, I will send out a September cumulative plans list. Then Saturday October 4th MAD, another microwave opportunity. Fall weather should be good, and it should be a good opportunity to try some more Lake Effect propagation. Thing is, activity, we make it happen. If you can find someone and you both are willing. Go for it. Make it happen. Any time or day is good. Hey everybody, thanks for all your wonderful efforts, time and all to make things enjoyable. "Always fun on the Microwaves" -WA8RJF 73, Lloyd Ne8i

This and That 8-08

Lightning kills hundreds of people in the United States alone.... lightning should not be taken lightly or ignored, but neither should it be overrated: falling down stairs kills sixteen times more people than lightning does. [Peter Viemeister, The Lightning Book].

The Universe. The universe consists mostly of hydrogen and ignorance. [Mentioned by John Dobson]

Your Status. If you don't worry, you are dead! [John Dobson]

Degree. If you think you know it all, you deserve a degree in disinterest. [John Dobson]

Where is the Beef? Americans eat about 10 billion cows, chickens, pigs, and other animals every year [The Week; 2-8-08]

Invention of the Telephone 1876. "This was a rather startling thing, after all: to be able to talk into one thing, and then hundreds of feet away, you hear something at the receiver. Scientists had believed that this was basically impossible - that the amount of energy that you get from the voice, that you put into this device, would not be sufficient to carry to the other end, and then get reproduced so you could hear it again. [Barney Finn, Smithsonian Institution]

Garbage. A survey of landfills found the mayor culprits to be construction and demolition debris and paper. The debris occupies 20% or more of the space and the paper more than half. Paper is made up by newspapers, magazines, packaging paper, computer print outs and phone books. Paper is slow in biodegrading and the ink often contains poisonous metals and there is a lot more here than from batteries, light bulbs and lead solder seamed cans. [Leland Teschler]

Mendelson. The liquidation outlet claims to be "the first place to look for every last thing" and sells items including clothes, mannequins, games, European accessories, computers, microphones and radar detectors. [Harriet Kamakil]

Ethanol Fuel. Putting ethanol in gas tanks is a waste. My solution is to drink the ethanol and walk [Tom Cater]

Harvesting the Spectrum. "This article describes a dynamic spectrum access (DSA) radio software that determines locally unused spectrum and then harvests the spectrum for 'cooperative' use in the presence of other wireless users." [Salvador D'Itri and Mark McHenry]

Text Messaging. Just read through a list of 20 popular text message terms and there were very few I could decipher, not being "into it". Here are some examples: the (to us) familiar UR = your, JK = just kidding, 2Mi = too much information, W/E = whatever and ROFL = roll on the floor laughing. [Gerd, WB8IFM]

Solving their Heating Problem and more. Not a single chunk of coal is burned for electricity in Iceland. Instead, they power their booming economy with renewable geothermal and hydropower. [Laurie David]

Bad Boy in the Old Days. If you were sent to your room for acting up (sometimes no supper), all you could do was read or sleep. Now, for those of you today it's a different situation. You all have television, computers, cell phones and more. That's real punishment. [Mark Marderosian]

Advantage of the Old Days. The main advantage in those "good old days" was we had to use our imagination in everything we did. The youth of today have so much of everything, their minds become dormant. [Mark Marderosian]

If it wasn't hard, everyone would do it. It's the hard that makes it great. [Tom Hanks]

Upcoming Satellite Launches

By Gerd, WB8IFM

“The luster is off from Amateur Radio.” That is how Peter, DB2OS (AMSAT DL Pres.) started his discourse recently at the AMSA-UK symposium when he explained future launches of our amateur satellites.

There is a new generation of rocket engineers and managers who grew up with the Internet and easy worldwide communication, and who carry a cell phone with them 24/7. For these people “amateur radio” with its use of short waves, talk about band conditions and other exotic terms is not of much use. Rocket science has further more evolved so that launches are routine and rarely something goes wrong. There are exceptions: A business venture rocket outfit “Falcon” just launched their first three rockets and all three were a failures. Several small NASA payloads got lost. As it is now, we have to compete with the commercial sector and that costs money. The exact amount is confidential but Peter provides an estimate: figuring \$20k per kilogram, it would be in the multi million dollar range.

There are now three “high elliptical orbit” satellites in the pipeline: P3F (eagle) which eliminates the apogee motor, P3Lite which will be carried by a geosynchronous commercial satellite thus eliminating the motor, the power supply and the station keeping hardware (quite a bargain) and P3Express, a traditional P3 satellite patterned after P3B and P3C which became Oscar 10 and 13! The first two projects are ours the third is the German project. All three satellites are well on their way to completion, largely put together by volunteers.

Hams never have been able to finance the actual launches, we were just lucky to get in on the ground floor and snag a number of free launches. Karl, DJ4ZC and Werner, DJ5KQ (SK) suggested at one time an improvement for rocket launch that impressed and helped the Ariane people (European space agency) and led to years of fruitful cooperation. But those days are gone and we have to think of new ways of getting our “birds” into orbit.

Both Rick, W2GPS (AMSAT NA Pres), and Peter are now working hard to secure funds for launches and both are confident that they will succeed. The point is made, that hams never had and gave the

necessary amount for a launch. However, I would like to argue, that if you add up all the money that is put into repeaters on the ground, you may indeed come up with a sufficient amount for a launch. Also I like to point out that we have now for the first time a presidential candidate that gets most of his money from small but many contributors. Applied to our situation: when you divide a couple of million dollars by the number of hams, assuming 200k in the US, you are talking only \$10 per ham*. This is the dirty little secret of how big business makes money from a lot of little people!

From the start of P3Express, the satellite was meant as a test bed for a Mars mission and this might be the savior for the launch of P3E in 2009 and P5A (Mars) in 2011. AMSAT-DL has applied for support from the government run DLR (German Aerospace Research Center) and will most likely receive 20 million Euros (about \$30 million) to cover the building of P5A and the two launches. This, of course, will require some pretty advanced knowledge and technical skill of our lab personnel; which in turn should restore some of ham radio’s reputation.

As the money will not become available before the year 2009, donations are needed now to keep the lab going and to carry it over into next year. As you may know the lab at the University of Marburg had to be vacated and it is now at a new location. We have a quite favorable lease but it still is 15k Euros per year.

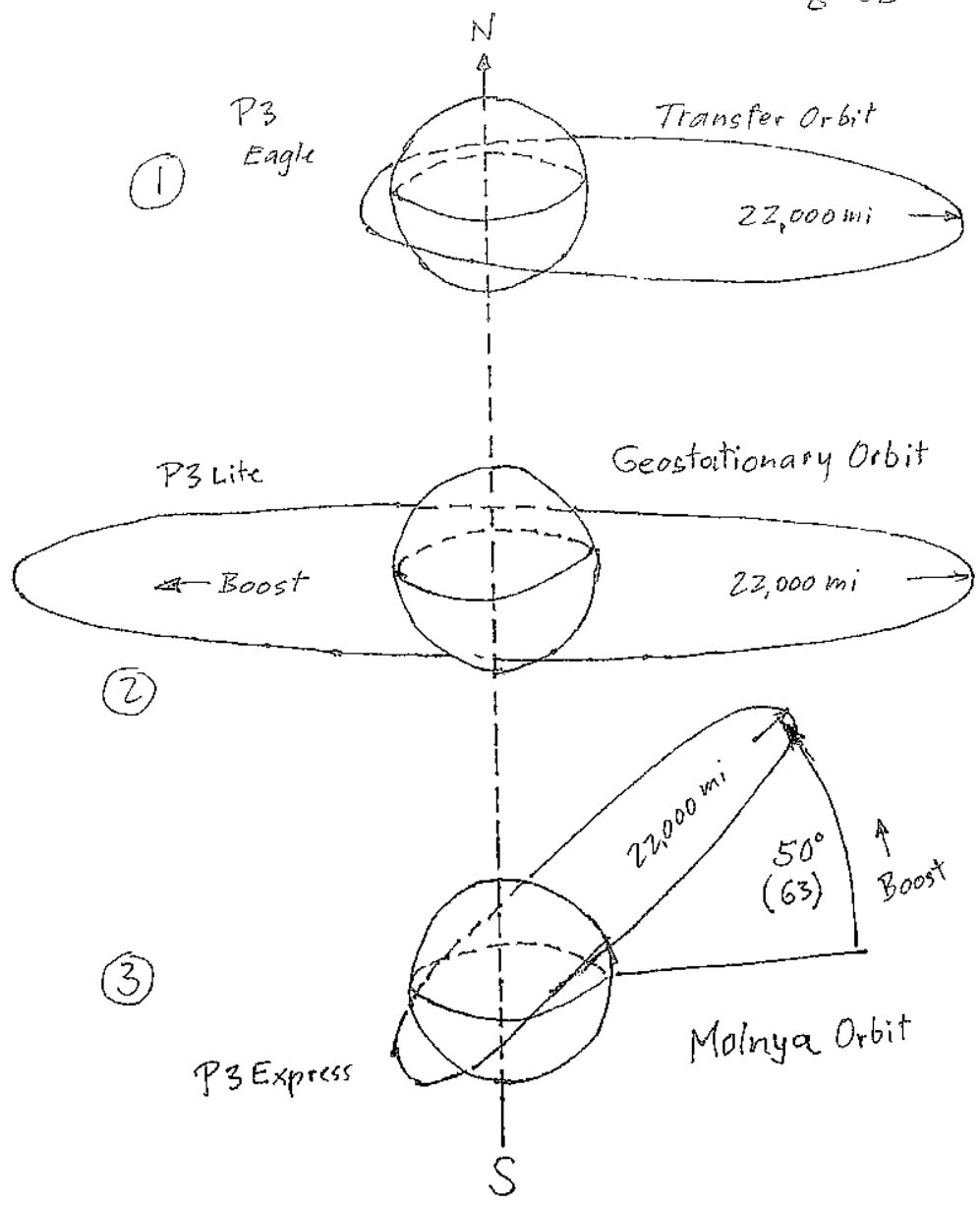
You can show your support by buying a few pixels (via the Internet) from a picture of the P3E spacecraft that will be distributed and also be carried into space. Most contributors just post their call, but the sky is the limit (hi).

I have not heard from Rick**, how the US effort is making headway but I will get in touch and report next month how it is going!

*Looking up the FCC database total number of hams (all classes) as of 10 Aug 2008 was close to 660k, so that makes it just a buck and a half per ham!

** Rick, W2GPS, has a very good write-up on the “Eagle Project” in the 2008 May/June AMSAT Journal.

8-08



MUD 2008 Presentations as of this time 8-08

5LUA - 24 GHz EME Comes of Age

W1GHZ - Pipe Cap Filters and Rover Transverters

2PED - New 24 GHz Power Amplifier Modules

N2CEI - New Transverter & PA Designs

A5VJB - Waveguide Basics and 1296 MHz Yagis

K6HIJ - SBMS 3456 Transverter & NEC Modeling

A1MBA - 78 GHz Amplifier Project

N5AC - USB Programmable uW LO Design

A1ZMS - New 241 GHz Record > 100km

KØAWU - Use of Softrock a.SDR-1000 Rigs for Microwaves

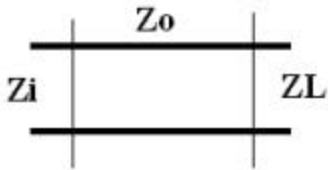
Impedance Transformation with Quarter-Wave Lines By Martin, LA8OKA

$$Z_i = \frac{Z_0^2}{Z_L}$$

The input impedance of a line an odd multiple of $\lambda/4$ long is

where Z_i is the input impedance and Z_L is the load impedance. If Z_L is a pure resistance, Z_i will also be a pure resistance. Rearranging this equation gives $Z_0 = \sqrt{Z_i Z_L}$

$$Z_i = \frac{Z_0^2}{Z_L} \quad Z_0 = \sqrt{Z_i Z_L}$$



This means that if we have two values of impedance that we wish to “match,” we can do so if we connect them together by a $\lambda/4$ transmission line having a characteristic impedance equal to the square root of their product. A $\lambda/4$ line is, in effect, a transformer, and in fact is often referred to as a *quarter-wave transformer*. It is frequently used as such in antenna work when it is desired, for example, to transform the impedance of an antenna to a new value that will match a given transmission line.

Website: arcticpeak.com/antennapages/quarter-wave_transformer.htm

GP Hill, EN82em. New Hudson Michigan. By Lloyd, Ne8i Lyon Township Community Park Another Good Rover Site

How to get there: Take I-96 Exit 155A. South to Grand River, 2nd light hard right. 6 way intersection. West about a half mile up the hill. Right turn into the Park. No fees. Limited hours. Left at the park rules sign, pass the Fire Department, cell tower, water tower. There are 3 parking lots. Head to the western parking lot.

Unpaved. Highest elevation. Aprox 1000 ft ASL on the East side of the Fort Wayne Moraine. Best, easy to access, rover site north of Detroit. Good paths to the S, SE and E. Over most of Lake Erie, and into parts of Ohio. To the W, NW and N, is the peak of the Fort Wayne Moraine, 150 to 200 feet higher. Blocks those paths.

This park was built on an old land fill. GP is short for **Garbage Pit**. On a hot summer day, it's a little smelly. Lots of places already have a Mount Trashmore, so, this got a different, distinctive name: **GP Hill**. The trees are still small enough, not to be a problem.

The Fort Wayne Moraine runs from Michigan's thumb down to Fort Wayne Indiana. There are 3 main ridges. The most western is typically the highest. Moraines define the region between 2 glaciers. Typical maximum elevation is in the 1100 to 1200 ft ASL range. Blocks much of the VHF UHF propagation between Detroit and Chicago. The highest point, is in Lapeer County, near Thomas, M24 and Davison Lake Rd. 1264 ft ASL. In Hillsdale County there are many areas above 1200 ft ASL. Plus man made ski hills. Pine Knob, Mt Brighton etc. Lakes Erie, Huron and Michigan are typically 574 ft ASL range. Next Month some pictures. [Ed]

Boltek Lightning Detector by John Ackermann N8UR

I've always been interested in lightning and thunder – I'm one of those people who automatically begin counting “one thousand one... one thousand two...” whenever there's a flash of light. However, given all the stuff running in my basement that requires uninterrupted operation, a nearby storm makes me kind of nervous.

For a long time, I had been thinking it would be neat to have a lightning detector, but the units were very expensive and I wasn't sure how well they really worked. So I never looked seriously into getting one. But this past June I was in Cincinnati during a very severe storm, and the local TV station had just obtained a new radar system that integrated a lightning display. I was hooked and started investigating getting a lightning detector.

There are a number of vendors, but many of the units are either standalone warning systems for golf courses and other outdoor activities, and don't provide azimuth or distance information other than a warning when strikes were close. Others were very expensive (over \$1000). However, Boltek (www.boltek.com) seemed to have a couple of reasonably priced units. They have two models of interest to amateur meteorologists: The LD-250, which is a standalone unit that talks to the computer via an RS-232 serial connection, and the StormTracker, which is a PCI card

that mounts inside the computer.

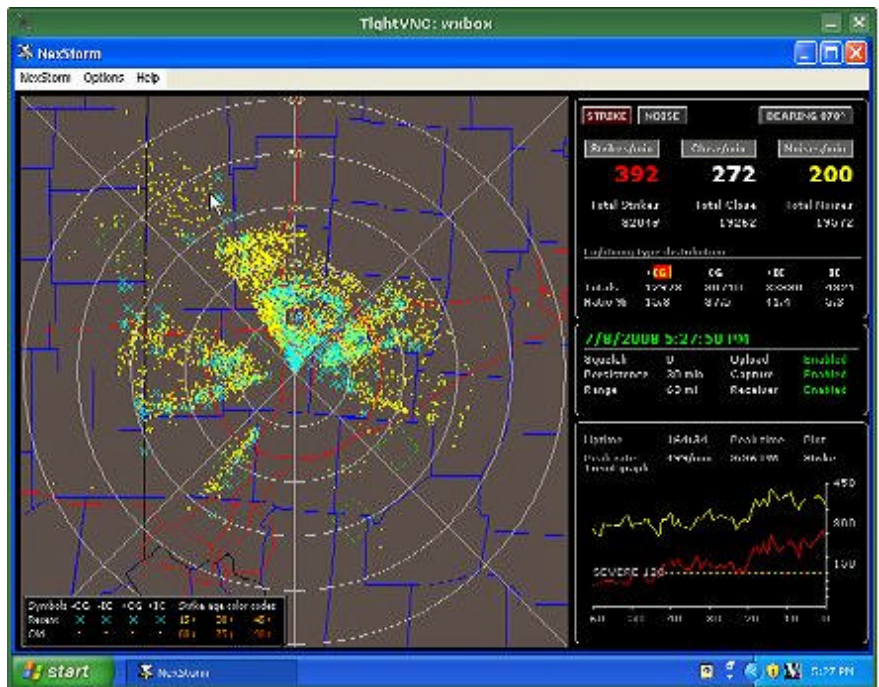
Since I was hoping for something that could operate under Linux as well as Windows, I initially looked at the LD-250. However, according to web reports I found, it's not quite as accurate at determining range and azimuth as the PCI card version, and it also doesn't provide some interesting information that the other unit can – namely, whether a strike is in-cloud, or cloud-to-ground, and what its polarity is.

I think the limitation in the LD-250 is the power of its built-in processor; after all, analyzing a static burst is an exercise in digital signal processing, and the more CPU power you can throw at it, the more you can do. The StormTracker can take advantage of the PC's horsepower to do more sophisticated analysis.

So, I ended up getting the StormTracker card. Since the software that Boltek provides is quite basic, I also bought a third-party application from Astrogenic (www.astrogenic.com) called NexStorm. It interfaces with the Boltek card and provides a nice interface that looks a lot like a radar display. It can use a number of maps for background display; I ordered a custom vector map from Astrogenic that has the advantage of allowing scaling.



Antenna and Scenshot



Note that the display shows a number of statistics; I haven't figured out just what to do with all of them yet! The blue Xs on the screen are recent strikes; the yellow dots are older strikes and will age off the screen.

One interesting feature that I'm still learning how to use is the program's ability to use the strike information to plot individual storms, showing their track and whether they are strengthening or weakening. That feature isn't turned on in the display shown here.

The lightning detector is basically an AM receiver, though I haven't determined just what frequency range it uses. The antenna is a small black box, about 2x3 inches square, and the feedline is 8 conductor Cat 5 network cable. There are some electronics inside

the antenna, as it gets quite warm when power is applied. As best I can tell, the antenna is some sort of DF configuration, probably with ferrite rods. With N8ASB's help, we built a “radome” mount out of PVC pipe components and mounted it on my roof:

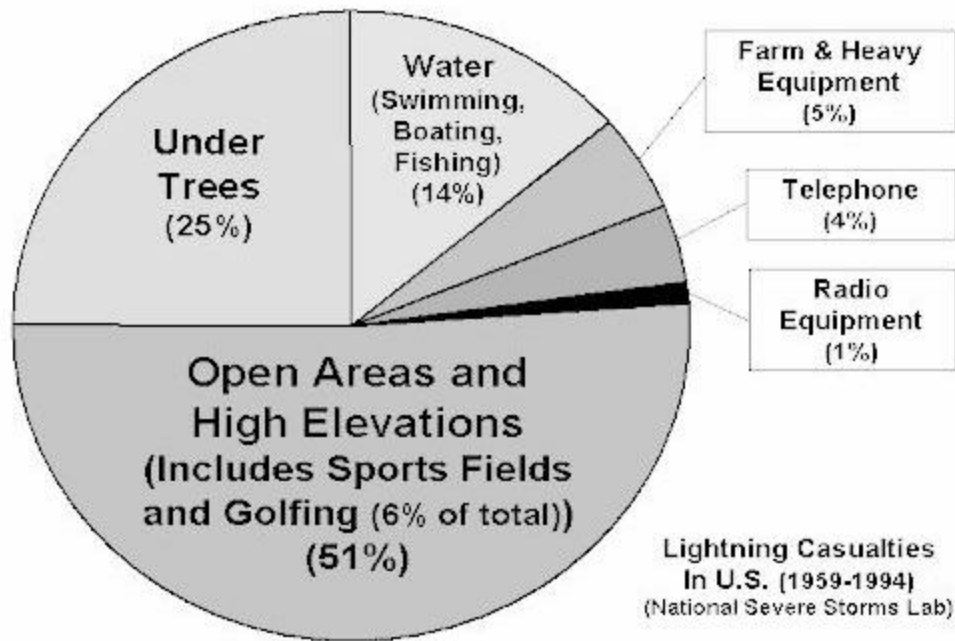
Since everything I do seems to end up on the web, I've set up a web page that shows a current view of the lightning detector screen. You can see it by going to <http://www.febo.com/wx>. The page is automatically updated every 60 seconds, so you don't need to keep banging the “refresh” button to keep current. There is supposed to be a Java applet available that allows web viewers to scale the map and do other cool things. I hope to get that configured Real Soon Now; when I do, it will be at the same URL.

A lightning stroke can generate from **100 to 1,000 million volts!**

Lightning Safety Awareness - An Educational Problem

While many people think they are aware of the dangers of lightning, the vast majority is not. Lightning can strike as much as 10 miles away from the rain area of a thunderstorm; that's about the distance that you are able to hear the thunder from the storm. While virtually all people take some protective actions during the most dangerous part of thunderstorms, many leave themselves vulnerable to being struck by lightning as thunderstorms approach, depart, or are nearby. Although some victims are struck directly by the lightning discharge, many victims are struck as the current moves in and along the ground.

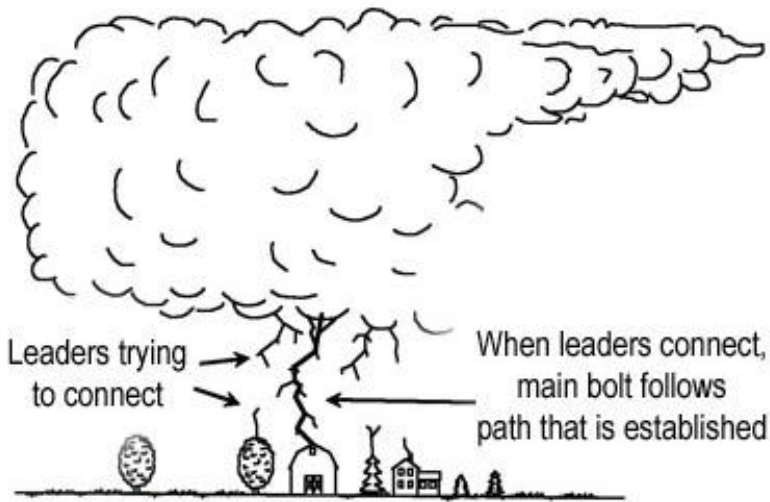
Where are people when lightning incidents occur? The chart below gives a breakdown.



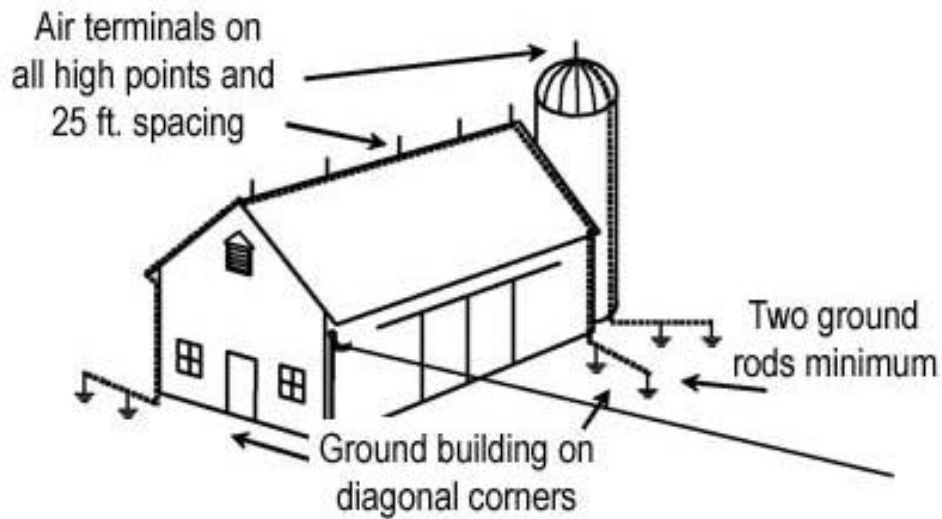
Gender of Victims : 84% Male, 16% Female

Months of Most Incidents: July 30%, August 22%, and June 21%

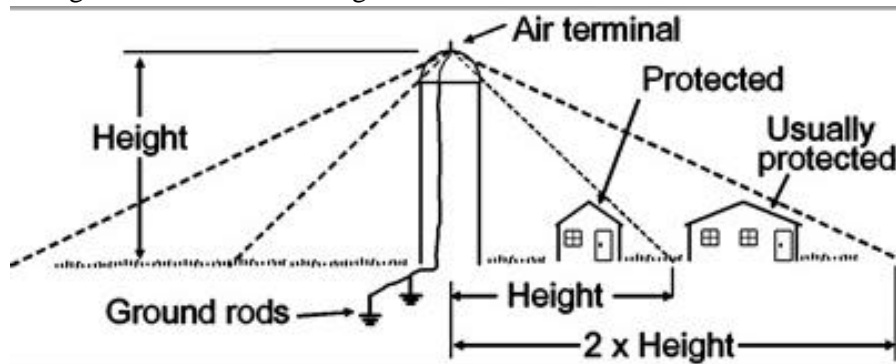
| Lighting Fatality Statistics - Top 10 States: 1959-2001 | Lightning Deaths and Injuries: Top 10 States: 1959-2001 |
|--|--|
| 1. Florida: 404 | 1. Florida: 1979 |
| 2. Texas: 189 | 2. Michigan: 800 |
| 3. North Carolina: 176 | 3. North Carolina: 771 |
| 4. Ohio: 134 | 4. Pennsylvania: 731 |
| 5. New York: 132 | 5. New York: 699 |
| 6. Louisiana: 130 | 6. Ohio: 642 |
| 7. Tennessee: 130 | 7. Texas: 637 |
| 8. Maryland: 122 | 8. Colorado: 546 |
| 9. Pennsylvania: 120 | 9. Georgia: 544 |
| 10. Colorado: 117 | 10. Tennessee: 519 |



Tall objects with a lightning protection system provide a zone of protection to some adjacent buildings and objects.



Attach air terminals to the roof ridge and other high points and connect them to grounding electrodes on opposite corners of the building with a main connecting wire.



. Tall objects with a lightning protection system provide a zone of protection to some adjacent buildings and objects

From Lightning Protection for Homes and Farm Buildings *By: Jon Althouse*

