

Vol. 23 No. 7  
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[www.mvus.org](http://www.mvus.org)

**Monthly Meeting Fri 25th**

at the Hometown Buffet near SR 725 and Yankee Rd.  
in Centerville

**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.**

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**Upcoming Events:**

TAPR Digital Conference: September 25/27 in Chicago

US AMSAT Conference: Oct 9-11 in Baltimore

Microwave Update: Oct 23/24 in Dallas TX

Ft. Wayne Hamfest 14/15 November

Beautiful are the things we see  
More beautiful those we understand  
Much the most beautiful those we do not comprehend

-Niels Steensen (Steno) 1638---1686

## De N8ZM

Well, I've finally taken off the extra pounds I gained eating too well at the MVUS picnic last month. NOT! As always, we had a lot of fun, and met some new people as well. Thanks, as always, to Daun and Karen Yeagley for permitting the annual invasion. And I can proudly state that while once again I was unsuccessful in my attempts to burn down the house, the various meats were burned to perfection.

Our tech exploits were a bit different this year, and you have to admit that this group owns entirely too much top-notch test equipment. Thankfully, we have folks who know how to use it, and we also have folks with things to measure and curiosity about how to make those measurements. So we indulged in several science projects, and even some calibration! Between N8UR, W8RKO, N8ASB, and myself, we filled 4, or were it 5, 6-foot tables with test gear. Some of the science projects involved simply crosschecking similar instruments to see how well they agreed with each other (We may all get the wrong value, but we ARE in agreement on it!). Another interesting bit of science had to do with receiver noise, which I will go into elsewhere. Why, we even were able to do some calibration of DC voltmeters to a very high standard of accuracy (microvolts out of 10 Volts!).

Of course, we had the annual railroading of officers, uh, I mean election. The same old codgers are still in charge...K8UD, WB8IFM, and me. I have given up all hope that the membership will ever figure out that they really could do better in their choice of President.

Now, on to other business. Mark your calendars as follows: September 25, October 23, November 27, and December 30. These are the dates for the MVUS meetings in the coming months. Note that the December date is a Wednesday because Christmas had the temerity to usurp our usual 4th Friday. So I made an executive decision to set the date for our Holiday Party on the 30th, unless you guys decide otherwise. I also want to mention that I will miss the September meeting as I will be in Chicago, along with N8UR, N8QOD, ND8I, and possibly other MVUS guys, attending the TAPR Digital Communications Conference. This is a really neat event, even if you aren't into digital modes of hamming, as just being in a room with such a high IQ density (after writing that I'm wondering if there isn't an oxymoron in there somewhere?) gets me buzzed better than 2 quarts of coffee. If you can't get there, at least get a copy of the proceedings to see what you missed.  
73, Tom, N8ZM.

### This and That 9-09

**Digital Speech.** Did you know that the first Bell Labs mathematical paper defining how to transmit speech digitally dates to 1914?  
[Donald E. Kimberlin]

**Transatlantic Cable.** Telegraphers on both sides of the ocean took up a Shakespearean line from "A Midsummer Night's Dream," where Puck says, "I'll put a girdle `round the earth in forty minutes."  
[Donald E. Kimberlin]

**Yankee Lunatic.** In 1854, the main project of a transatlantic telegraph cable was looked upon by ninety-nine men out of every hundred as the wild project of a Yankee lunatic; even on the very eve of its completion, the London *Times* declared it was a visionary and utterly impracticable undertaking.—[D.W. Prowse, Judge, Central District Court of Newfoundland on pg 639 of *History of Newfoundland*, 1895, London]

**Circle of Destruction.** Gas tubes, MOVs, SCRs, SASs, etc. will not protect equipment from a GPR (Ground Potential Rise) by isolating the conducting path. These devices merely offer an additional

path to remote ground through the communication pairs. In fact, they guarantee a connection to the communication path in the reverse direction from which they were intended to operate! This guaranteed connection also guarantees damage to equipment.

[E. Duckworth]

**Power of Lightning.** A lightning strike no thicker than a few inches has the power to illuminate one million 100-Watt bulbs.

[Dehn and Sons]

**Dress Code.** If my wife is around, I'll have to be even more careful about what I select. Pick the wrong belt, and I'm going to get that look, the one that says, "Oh, is this Dress Like Bubbles the Clown Day at your office?"

[D.L. Stewart]

**Today's Blue Jeans.** "When old jeans started to look ratty, we threw them away. Now skilled craftsmen use belt sanders, sand blasters, hammers and pumice stones to make new jeans look ratty and people pay \$300 for the privilege of wearing them."

[D.L. Stewart]

**Brainwashing Starts Early.** Forget tricycles, you will find little Hummers and ATVs for the tikes now. They are moved by lead-acid Gel cells, it would be asking the little ones too much to use their muscles and it prepares them to look for the closest parking at a supermarket when they get to that age! [Gerd, WB8IFM]

**Retro Bikes.** Did see a special display of old fashioned bikes like they had in the 1930s, fat tires, wide comfortable seats, large handle bars and fenders, so you wouldn't get splashed if the road was wet. Years ago I special-ordered such a bike for my XYL's birthday and paid good money for it. The salesman kept asking if I really wanted that. You see, we picked parts from a book, he had never seen! Now you can get these bikes for \$84. I paid several hundreds and that was years ago!

[Gerd, WB8IFM]

**What's in a Name?** Inner tubes for bikes are available in 27", 26", 24", 20", 18", 16", and 12 1/2". That tells me that for a 28", a real old bike size, you use the 27" and stretch it a little! The 26" size dominates. But, apparently, there are a lot of kids bikes still around to tell from the smaller sizes. The Brand name "Slime" was prominent for inner tubes and tire repair kits. Some inner tubes were offered as self-repairing, I guess they had some "slime" right inside and when a hole developed it would automatically plug it with this substance. Great!

[Gerd, WB8IFM]

**Solar Trickle Charger.** A small solar panel that you could place on the hood and capable of delivering 300mA at 15V is offered by Coleman. The claim was you could charge a rundown battery and get the car started (eventually). Not a bad idea. Of course, I am thinking ham radio! It could be a lifesaver. The panel is made by ICP Solar from Montreal, Canada, and assembled in China.

[Gerd, WB8IFM]

**Tough Guys.** Tough guys don't do math. Tough guys fry chicken for a living. \* [Jaime Escalante]

**Calculus.** Calculus was not made to be easy. It already is. \* [Jaime Escalante]

\*From the 1988 Movie "Stand and Deliver"



The banner (red on white) that we display at the Hamvention, at the picnic and other important events we participate in.

This banner is many years old, and was made by Donna Tessneer, the XYL of member Mark (KB8ZR).

## **The Annual MVUS Measuring Session and Picnic** (August 20, 2009)

This year our annual Measurement and Picnic Day was different again from previous years. One comment was we should no longer announce this event as an antenna measurement day. Seems like our members and visitors had built, and measured all the antennas they could think of and in previous years we had fewer and fewer antennas brought to the event and we spent lots of time to measure those in greater detail than ever including taking radiation patterns.

After we sold our 31-year old VW-bus, we were left with our 1999 Ford Taurus wagon, which looks mighty long, but when I checked, the longest piece that would fit in was just a tad over 11-feet (in the old VW bus, we could shove in our 18-foot kayak, although this would stick out the back door). So getting all the antenna stuff inside was out. This vehicle has a roof rack and I thought this ideal for longer items. Well it took a few attempts and my rummaging through the available rope remnants and bungee cords, etc to come up with a decent solution and I believe if I do this more often it might not be so bad. Remember the rover pictures last month. These guys mount the antennas on the roof and never take them down or even adjust them at a stop. Just point the vehicle so they radiate in the proper direction!

As it turned out, I never had to get my mast, etc. down, as there were no antennas to measure. Actually I was the only one with a WW2 dipole to check. I was just curious what the match was and the frequency range!

So what was this event about? Measuring, of course. And the four local members of the club with a considerable collection of expensive test equipment had brought some of their best pieces and were eager to measure. Daun's garage had been prepared for this. You don't want to have valuable test equipment exposed to the elements, and there were showers in the forecast. As it turned out we had the best possible wx with temperatures, which were in the lower to mid 70s and sunshine all day. The way this worked, I presume, the weather gods looked down and said to themselves: where is that tent with the test equipment, there is nothing down there to rain on! So let's forget it.

Our four test equipment guys were Mike (W8KRO), John (N8UR), Tom (N8ZM) and our host Daun (N8ASD). Daun's piece was so heavy it needed two people to carry and when they set it down on the table I was expecting to see the legs bend or worse, but it was OK. Daun's helper, however refused later to bring it back to the basement commenting: let somebody else do it! The other pieces just had to be transported from the cars just outside the garage, which was not too difficult.

There was not all that much to measure and we had lots of time to look at things and socialize. Tom's present interest was a noisemeter and a club project of putting together a noise diode kit. He showed us bits and pieces of the prototype. We did, however, not have a noise diode at hand to measure.

John (N8UR), is our standard man and if you need to know your x-band frequency down to one Hz, he can accommodate you. In fact, he and Mike (W8RKO), have been conducting nationwide FMCs (frequency measuring contests) on HF in the past.

I think we had at least three microwave frequency counters right there! Also, John brought a voltage standard and was ready to check your VOMs, however most forgot to bring theirs (I only saw one). Maybe we can set up just for the VOMs at one of our upcoming meetings, I would really like to see what mine are doing. I have so many VOMs now that I see differences without even trying!

I did bring two smaller 50-Ohm loads, a tuned detector and a "strip line filter" besides that WW2 Dipole. I found this dipole in the original oblong package, labeled on the outside in typical military style (meaning undecipherable). I had no

idea how I wound up with this, but my curiosity was aroused and I opened it up. It was packed in the days before plastic and the packing materials used were "heavy duty" wax paper, rubber, waxed tape and some other goo. As the antenna was for "shipboard" use, so was the packaging, although almost everything in WW2 was packaged very well. The elements were made from 1/2" solid aluminum. I estimated the center frequency from measuring the dipole at 64 cm to be 232 MHz.

Using Daun's network analyzer (Type 8753C, 300kHz to 3GHz), we connected the dipole over a short piece of coax and looked at the return loss. It was not overwhelming, just about 10 dB, but the bandwidth at that was from 208 to 381 MHz. BTW, with the push of a button, Daun could convert the return loss into the beloved SWR (10 dB ~ SWR 2:1).

Connecting my other test objects we kept looking at the return loss. The larger load was labeled by WA5VJB: 75W continuous, 200W intermittent. good to 1000 MHz. We measured the following return losses: 20dB at 360 MHz, 30 dB at 600 MHz, 21 dB at 1.2 GHz and 16 dB at 2.5 GHz. A smaller load that we estimated at a good 10 W capacity measured: more than 20 dB to 2 GHz and down to 13.2 dB at 2.5 GHz. At 800 MHz the return Loss was 26 dB and two tuning screws made us think the load had been optimized for that frequency, which is used for cell phones. The filter detector block had a resonance (return loss 15 dB) at 2.8 GHz. There were three distinctive peaks possibly indicating multiple circuits. (a label mentions 2 "dual cavity").

Attempts to measure a homebrew bias T for 2m were not successful. Each time you measure a device you have to think hard how to do it with the equipment at hand. Often the equipment gives you wonderful numbers that are, however, hard to interpret and may not make much sense for the questions at hand. On the other hand that beloved SWR is not particularly preferred by the professionals. But for a ham it not only means something, it is something he can relate to and if he wants he can use a small light bulb or a glow lamp and move it along an open wire feed line for a half wavelength to "see" the SWR! Unfortunately, few hams still use open feed lines and many new hams never tried this approach.

My last object was the strip line filter for 2m, which was packaged in a 20" box that I inherited but never opened! It had an uncalibrated adjustment knob on the outside and two UHF connectors. Another mystery item! We found no resonance at 2m, so we opened up the box. There was a series resonant circuit inside with a 10" by 5/8-center conductor, which was connected by a small air trimmer to ground. (so strip line was a serious misnomer) At the highest capacity setting (lowest frequency), the resonance turned out to be 154.55 MHz. This circuit was inductively coupled to the feed line, which could conceivably have shifted the resonance up above 148 MHz.

Tom (N9NBS), brought a roll of 87' RG 214 (low loss) cable which measured 2.56 dB loss at 100 MHz, 3.0 dB at 145 MHz, 5.5 dB at 440 MHz and 8.39 dB at 900 MHz. I noticed how careful Daun was inspecting, lining up the coax connectors and how careful he was tightening the screws. Looking at the display, we used a mode where you send a signal into the length of the cable measuring at every fraction of an inch (the markings are in meters and nano seconds), what the return loss is. We noticed a few blips and Daun explained these were impedance bumps caused by a connector or adaptor. These do not amount to much but were clearly noticeable. Just shows you what modern equipment is capable of. See picture below!

Red (W8ULC), had brought a collection of preamps and Tom (N8ZM), was patiently measuring their gain and noise figure. There were no surprises and the numbers tracked closely to the previously recorded ones. But then Red had a special project: the just measured 2m preamp by ARR Company was opened up so that the circuit was exposed, approximately one turn was removed from the coil, then the preamp was measured again, this time at 220 MHz. Voila it worked; here are the measurements: 144 MHz: gain 24 dB, NF 1.14 dB, next 220 MHz: gain 22.5 dB, NF 1.22dB. The "surgery" was successful. Red explained: the 2m preamps are "a lot cheaper" than the 1.5m. Modifying this preamp was a matter of a few minutes!



The picnic, as usual was super. Tom did a good job getting the hamburgers and brats ready, there was a good selection of side dishes and, of course, cookies for desert. As for many years now the highlight was Marilyn's (XYL of Red) birthday. We all sang and had a piece of cake.

Here is a list of the attendees, in the order I marked them down as they arrived, I hope I didn't miss anybody: Daun (N8ASB) and Karen, our hosts; Bruce (ND8I), Steve (K8UD), John (N8UR), Tom (N8ZM), Joe (N8QOD), Ed (WR8A), Jim (KE8BV), Tom (W9NBS), Dave Lundy, Mike (WA8HNS), Red (W8ULC) and Marilyn, Mike (N8QHV) and Karen, and Gerd, (WB8IFM). (17 total)

Dave Lundy took close to 100 pictures and after the picnic we had a slide show! Technology is really something (if it works). I just recently have finally acquired the right cable combinations to show pictures from the laptop on our HDTV screen. Dave will post the pictures on our website and we will select a few and put them in next month's newsletter.

Tom, N8ZM, also has some further details in his column on page 2.

# The ARRL September VHF Contest (Sept 19/20-09)

By Tom, N8ZM

The ARRL September VHF Contest was last weekend (as I write this), and the N8ZM contest team scored well even though the bands, while not dead, didn't really provide any awesome openings for us. We did manage a respectable score, and thanks to N8UR, **were able to try out the FLEX5000 SDR radio on 6 meters.** We gave up a little bit of TX power as it doesn't make as much output power as the JRC JST-245 we have been using, but it made up for it on receive, as **the noise blanking/reduction algorithms were excellent.** We have always been plagued with unbearable and un-findable line noise on 6m. With the JRC, if we cranked in enough noise reduction to get rid of the noise, it garbled the SSB beyond any hope of copying. **The Flex5000, with the PowerSDR software, simply took out the noise and left the voice.** On the panadapter, you could also see the noise reduction quite easily.

Other operating comforts that were **well liked were the panadapter display**, and the click and tune feature. The panadapter's spectrum display would let you observe the other signals on the band for several tens of kHz either side of your frequency. If something new popped up, you simply put the cursor on it and clicked. BANG! You were tuned to that station and could quickly discover if it was someone you wanted to work. **Search and Pounce is VERY easy with this rig.** Fine-tuning is done with the mouse wheel, so it didn't take very long at all for the guys to become very proficient driving the box. It did take up a bit more space on the operating desk, and because we used a separate PC for logging, there were two mice and two keyboards on the desk to cause confusion, but it works out that you only need a mouse for the radio, and a keyboard for the logging program, so the remaining devices could be pushed out of the way. Once set, most controls other than tuning really don't need further adjustment, *and believe me; I'm fond of twiddling with any adjustment I can find.*

## Software Defined Radio – the Future?

For those of you not yet familiar with the SDR (Software Defined Radio) concept, the basic idea is that you digitize the received signal when it comes out of the IF strip, before the detector. In some cases, the digitizing is done literally right at the antenna! The bits are then processed in software running on your PC (and there are versions available or being developed for all three of the popular OS's), and the recovered modulation is played out through the sound card. The IF filtering, detection, noise reduction, audio processing, whatever, is all done in software. The code is "Open Source", which means that you can get to the original code typed by the programmers, and if you want to change it, or add something, you can! This can be good or bad, I suppose, but I have enough faith in the concept of evolution to expect that the bad will not survive for long (even if Windows disproves that theory). In effect, you can have it your way on the same hardware that your friend has 'his way'. Of course, this assumes that you can either write code yourself, or get someone to do it for you. From what I have seen on the ham SDR forums, the talent is out there and available.

Now we all know that hardware is expensive and software is cheap or free, right? SDR is no exception, in that the cost of the SDR radio hardware seems to be about the same as a mid-range priced rig from the usual suspects. And you've probably noticed that those folks are moving in the SDR direction as well, with more DSP built in and upgradeable firmware (fancy term for having the bits stored in some sort of programmable memory). So it isn't likely to be long before the major radio builders get the hint. It might take them a long time to buy into the Open Source concept, though. Likely too many proprietary 'how we do that is a secret' concerns to get past. But for the DIY hams, it is desirable to share what you've developed so that someone else can improve on it, and everyone gets a better radio.

Down the road, one of the cool concepts being developed using SDR is the notion of a cognitive radio, which can figure out what type of modulation is being used and set up automatically to receive it. Another concept is an adaptive transceiver that can look for interference and automatically find an open frequency that is on a band, which will support the distance you want to cover. The radio could figure out from propagation models, solar indices, DX Cluster reports, or any other information source available which band would be the most likely to get your signal through and then find an open frequency for you. Is that cool or what? Well, I do think it really is cool from a technical achievement standpoint, but it would seem to take away some of the old time fun of solving that problem with your own knowledge, intuition, and hunches.

## Lloyd, NE8i, about Texting 8-09

Texting is developing new abbreviations. Based on Internet, Amateur Radio, telegraphy and others. Nice article in the WSJ about it. Seems like many parents, concerned about what their kids are sending, have developed web sites, to list many of the abbreviations to translate them, to catch their kids. Many business people, now using texting, are keeping lists on their desk, by the equipment, so they can figure things out. Some are practical. Some are cute. Both the Merriam - Webster Dictionary and the AP style book, now recognize many of these abbreviations. They are going to be with us for a long time.

Abbreviations I have gotten used to is IMO or IMHO, "in my humble opinion". Thing is, I am used to POS meaning "piece of sh\*t" not "parent over shoulder". LOL does not mean what older folk think, "lots of love".

NetLingo.com is one web site. Another DXTER.com. Textapedia is another source.

Some of the new stuff

WOMBAT -----Waste of money, brains and time.	^5 -----High five
BIL -----Boss is listening	4COL -----For crying out loud
PAW-----Parents are watching	HAND -----Have a nice day
POS -----Parents over shoulder	TOY -----Thinking of you
PCM -----Please call me	FWIW -----For what it is worth
IMS -----I am sorry	SWDYT-----So what do you think?
KUTGW -----Keep up the good work	NRN -----No response necessary
CID -----Consider it done	TTYL -----Talk to you later
IAT -----I am tired	ROFL -----Rolling on the floor laughing
WRUD -----What are you doing	BFF -----Best Friends forever
LOL-----laughing out loud	99 -----Parents are no longer watching

### The "Drought" is over!

By Russel, KB8U, Ann Arbor, MI

There was good tropo on 8/25 & 8/26. I missed the 1<sup>st</sup> day but made it to the rig on the 2<sup>nd</sup>. 2m was a zoo, so I concentrated on 222, 432 and 1296. Worked 9 new band-grids and finally got #100 confirmed on both 222 and 432.

I didn't work any new grids on those bands last year, so my "drought" is over. Best dx was 839 miles on 222 with W7CNK in EM15 Oklahoma City, OK

Other good Dx was

144: K0CIY, EM25, Parkhill, OK

432: K5SW, EM25, Muskogee, OK

1296: W0RT, EM27, Parsons, KS

The bands were also open to the east, worked K1RZ on 144, 432 and 1296. He's in FM19 Damascus, MD Most contacts were on SSB.

Rig is a Kenwood TS2000X and Elecraft XV222 transverter + 80 watt amp. Antennas are long boom M2: 2M8WLHD, 222-7WL, 432-13WLA and 2x23CM35EZ. The antennas are up high, about 1430 feet ASL

## Déjà vu

Lightning hits again

By Gerd, WB8IFM

Lightning hit again the day before Field Day and knocked out a collection of “electronics”. Unfortunately, one was my Yaesu 736 that I was planning to use for Field Day. Fortunately Steve (K8UD), who also owns a 736, immediately offered his, so all could go on as planned with the Field Day. Steve’s 736 also contained a 222 MHz module, so I added a 4 el 222 MHz “cheap yagi” to my load. This antenna is seldom if ever used. I built it once just so we had a source antenna for antenna measurements. As it turned out, we did not make a single 222 contact although we sure tried!

When lightning hit 10 years ago, the 736 also was damaged and I had it fixed by Burghard Electronics. Unfortunately these people are no longer in business. I need to replace a 5A fuse, but I don’t think that this will fix it. The power plug ground lead was welded to the power socket and an area several square inches is blackened inside. Steve has a complete manual though, and is cautiously optimistic that we can revive that thing.

I have studied the lightning literature and conferred with experts for some time now and I am convinced I can implement some changes that might prevent future damages. It is strange, that when you get older you put more effort into making things last. Younger hams build for tomorrow and as the saying goes if your antenna stays up more than a year, it wasn’t big enough!

My big problem is that the 100’ tower is too close to the house. The 10’ solid copper (1 ½” x 3/8”) ground rod is only 4’ from the basement wall with my shack on the other side of that wall. Therefore all the equipment is right on the other side of that wall. So most of my damage has come from the induced current that has come from the “30,000 A” odd lightning impulse going down the tower and into the ground. It was recommended to me to put a metal shield on the wall, in essence covering the entire wall facing the tower/ground with sheet metal on the inside. And, of course, improve the ground system: one rod will NOT do it. It satisfies the regulations, but doesn’t protect you. When studying commercial systems, there is indeed a lot of metal buried in the ground, around the buildings and the antennas.

Since moving the tower is hard to do, I have now decided to move the ground rod and add a few more to the mix **away** from the house. Secondly, I will reposition my station table **away from the “dangerous wall”** (see sketch).

By far the best protection for your station is to disconnect **everything**. This is the recommended procedure. Commercial installations have to stay on the air, but we can stay off the air during a storm. So we have that advantage, and therefore an easier way for protection.

When a thunderstorm approaches, I have the policy to disconnect my antennas. Leaving on a trip, all the power plugs are pulled as well. In normal operation, however, only the “hot wires” are disconnected with **a knife switch**, which turned out to be not adequate. This time I had several pieces of equipment destroyed and there were plugs welded to the outlet! So that tells you that the tower ground is enough above the power line ground to create a devastating differential. This is known as **GPR (ground potential rise)** and assuming a 1-Ohm tower ground resistance (which is according to regulation ok) a 30 kA impulse from the lightning will give you 30kVolts. This is hard on the equipment although the impulse only lasts for a fraction of a millisecond.

The electrical power for the house comes in underground and the “neutral” is connected to our water system: 1) to the deep well pipe that was in use for a number of years and when we got city water that ground was added to the neutral. So, obviously, that is a better ground and I ought to



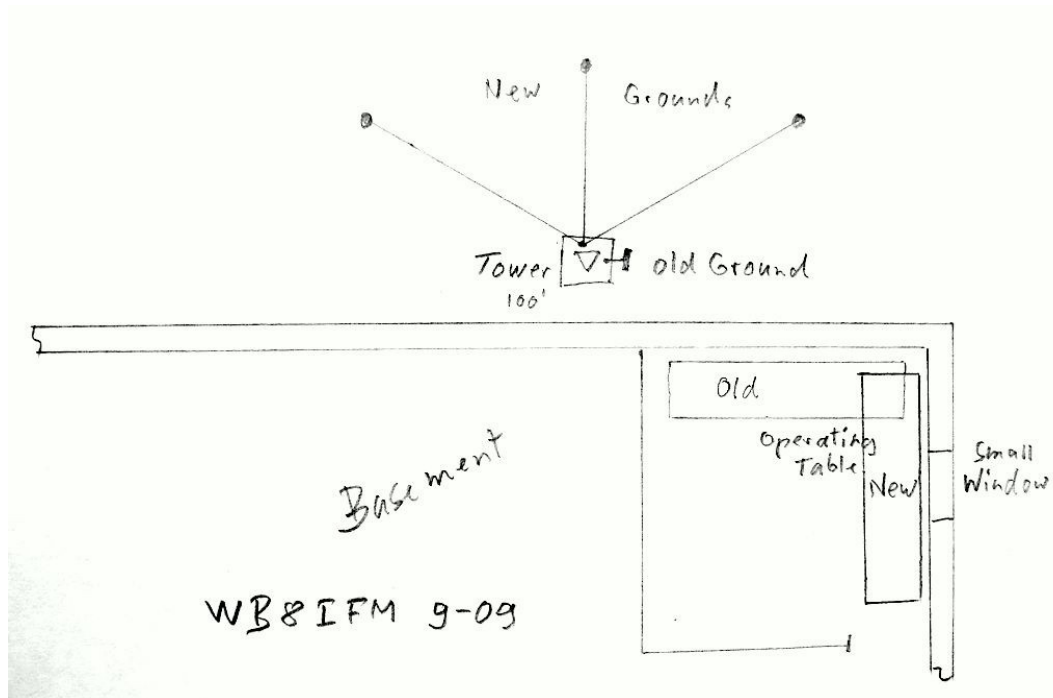
use it for the tower. But regulations say you should not connect anything inside the house. So I am thinking of digging a trench and connect a ground to the 1" water supply running to the 6" main in the street.

How about the materials being used? Usually, you plan for your system to be good and useful for a **long time**. You know what happens to bare copper that is exposed to the weather, and similar deterioration happens inside the ground. The usual solution is to use a sufficiently large size wire like #4. Some sources recommend stainless steel, which is less conductive (by a factor of three), is more expensive, but it will last much longer. Copper strap 2" wide would be an even better choice. Because of the skin effect it has a definite advantage by a factor of 3 over no. 4 solid copper.

A very interesting damage occurred to my **new radio wall clock** that I just had picked up from the Hamvention Flea market for \$10. This clock hung on said wall, through which all the evil EM waves penetrated, and stopped working. It is battery operated and when even two new AA cells could not revive it, I decided to just crack it open and study the construction. Of course, there was the ferrite rod (ca 60mm long and 9.4mm dia) antenna, so probably the input of the Rx got fried! In that same category is the only light bulb that got hit and destroyed. It was a 23W compact fluorescent in the bathroom, and, of course, it was turned off. The only other time that I had several light bulbs go bad from lightning was during a late evening storm (around 9PM) and those bulbs were all turned on, were incandescent and had wiring in the ceiling.

Disconnecting the power should be considered as a routine lightning protection feature. The way I plan to do this (**it has to be easy and convenient**) is to install a 230V (15A) outlet. Then feed my station with a short cord and 220V 15A plug. The plug and cord leads to two square boxes: one with two 230V outlets and one with four 115 V outlets. Everything needs to be attached to those six outlets, if your station needs more power, then you have to upgrade to a bigger plug and you might need heavier wire!

Some hams have used this approach for a long time. Years ago I looked with amazement at Dick Jansen's "disconnect system" in Florida. I was impressed but didn't think we needed that in Ohio. Florida is known for its oranges, but for the hams, it is the "lightning state". The opposite is California; if people hear thunder there they call the TV, radio or newspaper and ask: "What was that noise?"



A good first cut at a solution of my problem:  
Use three ground rods instead of just one; move these rods away from the house; reposition the operating table further away from the tower.