



Radio Amateur News & Views

The Official Journal of the Radio Amateurs of Northern Vermont

December, 2001

Seasons Greetings from RANV

Vol. 11 No. 12

RANV HOLIDAY PARTY

Join with us for the **RANV** Holiday Party on Tuesday, December 11th. With everything which has been going on outside of ham radio, it has been one year we would probably like to forget. What better way to do this than to get together with friends and enjoy company. The major event at this party will be EATING and a whole menu of stuff is planned. This will include: deli platter, veggies, munchies, cheese/crackers, cocktail franks, meatballs, knishes, drinks and all kinds of desserts. Mouths will get a double workout as they will be used to yak it up whenever they are not being stuffed with eats! Bring along all sorts of stories, pictures, videos and conversation pieces! The W1SJ/WB1GQR station will be on the air to broadcast this event live to whomever dares to hear it. The **RANV** Holiday Party is a FAMILY event, so also bring along other family members who generally wouldn't be caught dead at a club meeting or Field Day!

The Party will be at W1SJ/W1DEB's QTH in Essex. If you need directions, please contact W1SJ. Festivities get underway AFTER 5:30 on Tuesday. Come too early and you get to do dishes. Come too late and you miss the eats. Come really late and you can do the dishes – again!

Important! Please let W1SJ know how many in your party are coming so we can have accurate planning of food amounts. At that time, we can also determine who will be bringing whatever to make sure we have enough drinks and dessert. Contact Mitch at w1sj@arrl.net or call 879-6589 days.

10 METER CONTEST

The ARRL 10 Meter Contest takes place next week and you won't want to miss it. Sunspot numbers are still near the peak and conditions are great! In fact the Maximum Usable Frequency has been so high that many contacts between the U.S. and Europe have been taking place on 50 MHz!

The 10 Meter Contest starts Friday night December 14th, at 7PM. During the day, you will easily work tons of stations in Europe, but you have to get up early, since the Europe run is 7-11AM. In the afternoon there are plenty of stateside stations to work with a few South American stations thrown in.

Ted and Fred will be putting the flagship station of the Road Kill Amateur Radio Club, W1PU on the air from Ted's QTH in Burlington. Operators are needed for both phone and cw. Ted says that this is the premier contest training event of the year and several of our crack Field Day ops cut their teeth in the 10 Meter Bash. To join in with the W1PU effort, drop Ted a line at k1hd@arrl.net.

WEEKEND CW CLASS

Looking to upgrade to General but having trouble with the code? Mitch W1SJ will be offering the first ever Weekend CW Course in this area on January 26-27th at the Essex Town Office. This being the first class, it will be free of charge. Act now – subsequent classes will not be free!

Students must enroll in the class by the end of December. Students will be directed to a Web site at which they can download CW practice software and instructions for its use. There has to be some CW practice prior to the class for any chance of success. The class will run 9AM until 6PM on Saturday and Sunday. Since there is a short time to burnout in CW practice, the day will be divided into alternating 30-minute segments of code practice and HF operating techniques. The operating techniques portion will be sort of a "Graduate School" of Ham Radio operating and should be an interesting time when the CW isn't running.

There is a minimum number of students to have the class run. Not enough students means no class. So, if you are interested, be sure to enroll. And, looking ahead, the Weekend Technician and General Classes will be held March 16-17th. Start recruiting those new or upgraded hamsters. Contact Mitch at w1sj@arrl.net for enrollment.

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OUR LAST RANV MEETING

by Grant K1KD, Sec'y

The last RANV meeting was called to order by club president, Paul AA1SU, at 7:10PM, November 11th. Twenty-three hams attended the meeting.

Leading the meeting agenda was the election of officers for 2002. With 24 ballots counted, Paul AA1SU will remain President, and Brian N1BQ will continue as VP/Treasurer. Charlie W1CHG will be club Secretary. All nominees ran unopposed, and will be sworn in to office at the December Party. Next, an announcement was made to remind club hams to check into the NNY/VT swap net which meets on Wednesday nights on 147.285 MHz. Then, Debbie W1DEB took orders for specialized RANV jackets. Finally, Ted K1HD reminded us of the upcoming 10-Meter contest, and invited anyone who would like to operate from club station W1PU, to let him know.

Fred N1ZUK gave the main presentation for the evening on the topic of computers in the shack. For more than two decades, hams have been experimenting with personal computers to enhance their hobby. However, it was the advent of the Internet that has revolutionized how many hams use the computer today. For example, you can access the ARRL web site for tons of ham related information, look up QSL managers, buy and sell equipment, or join a ham newsgroup. You can get a manual for your radio, download firmware if you have a radio that is programmable, or access the thousands of personal web sites of other hams. These are just some of the ways a computer is useful.

Then Fred demonstrated the advantages of using the computer to log contacts. He had a live demo of his radio which was interfaced to a computer. The computer had the "Logger" logging program installed (which can be downloaded for free), and

THE PREZ SEZ

by Paul AA1SU, President

Here we are at the end of a very traumatic year. The tragic loss of Dale Earnhardt in February was very hard for some of us to take. The unthinkable events of September 11th tore at our very souls, and took some of our friends. The plane that crashed just after take off from JFK in November scared us once again. And, the recent layoffs at IBM will have an effect right here in our neighborhoods. These and other events have shown us that the world is ever changing, and sometimes we just can't do anything about it. I realize that these items have little to do with ham radio in Vermont, but as I was trying to summarize the year in my head, these were the things that laid heavily on my heart.

Looking at RANV, I feel that this has been a great year. We have increased membership, and the Weekend Ham Radio class has added to the ranks of amateurs. We have seen advances in technology, and we have been right there learning about it. We had some really great topics this year, didn't we? We covered squiggly antennas, border patrol secrets, had a birthday party, saw some vintage radios, went over emergency preparedness, APRS, power-pole connectors, fox hunting, antenna modeling, and computer uses.

was able to control his radio using the computer software! Other logging programs that are geared towards contest logging were also described.

Finally, Fred demonstrated some of the cool new modes of communication that can be used with the aid of a computer. For example, PSK31, MFSK16, MT63, SSTV, and RTTY are all made simple with the use of a computer. From contest information to QSL routes, ham gear swap pages to logging software – Fred showed us that the computer is a powerful tool to enhance and enrich the hobby.

Even with all of this great stuff, we did miss one meeting on September 11th because of the terrorist attacks. I was hoping to have us tour the Air Traffic Control Tower at the airport that night, but it had been postponed just the week before for tactical reasons. Many of you were sorry to hear this.

As mentioned last month, the 2001 Field Day results are out in December QST, page 99. Read them, if you get a chance. It's pretty dry stuff, but educational. Thanks to all of you that made the RANV effort such a great success. For members that were in other Field Day groups, congratulations to you, also. Together, we really put Vermont on the map. Members that live out of state should E-mail me and tell me your Field Day call sign, score, and story. You get to be mentioned too, we just don't think to ask sometimes.

I'm looking forward to seeing all of you at the Holiday Party on December 11th. I mean it – all of you. Please come, as we'll have plenty of food and great time. We will have a blast!

Contacting RANV

In Person: Meeting, Dec 11th, 5:30 pm,
Holiday Party at
W1SJJ/W1DEB QTH in Essex

By Mail: PO Box 9392,
So. Burlington, VT 05403

By Radio: 145.15 repeater

WW Web: <http://www.ranv.org>

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ANTENNAS – NOT ALWAYS WHAT YOU THINK



by Mitch WISJ

Those who have seen RANV's Field Day know that we deploy a delta loop antenna for 40 meter CW. We started doing this 5 years ago to get an edge on 40 meters, which is a key band on CW.

I have been operating the ARRL Sweepstakes for many years and have usually done very well. Each year I look at what improvements can be made. Last year, I realized that my Achilles heel was 40 meters. It was a band in which I was mediocre at best. Most of the time, I have great hours on 80 or 20 meters and a significant presence on 40 meters is not needed. Last year, and also during the middle years of the sunspot cycle, 80 meters runs out of gas at some point in the wee hours of the morning and a switch to 40 meters is necessary. All too often, when I do this, I get into trouble. It was for this reason I decided to deploy a 40-meter delta loop for the Sweepstakes.

Thursday, before the contest, the loop was erected. The antenna was tested out but the only time I had to do this was afternoon and early evenings – times when the delta loop would not really be much better due to the high angle propagation. I also tested the antenna on other bands and found it was quite good on 20 meters – almost equal to the 3-element yagi. It did not perform well on 10 or 15 meters. Most antenna books will tell you that delta loops will fall off in performance as you move away from the design frequency.

During the contest, I got to compare the loop against the dipole on many signals from different areas. I was disappointed in that the loop only equaled the dipole on long haul contacts (*West Coast*) and didn't even match the dipole for high angle contacts (*Northeast*). Eventually, I just stayed on the dipole.

After the contest, I decided to do more on-the-air analysis of the loop. It clearly wasn't performing the way it was supposed to. I remembered that when we first put one up at Field Day, it had the dipole for lunch. However, there was a difference – the loop was fed in the middle of the base leg, producing *horizontal* polarization. For the last few years, the loop was fed at the corner – producing *vertical* polarization. This was done on the recommendation

of an excellent book entitled, *Practical Wire Antennas* by John Heys. The author says that a loop fed at the bottom would only produce high angle radiation and would be good only for short distances and a loop fed at the corner would produce low angle radiation and be a much better performer. I moved the feed point from the corner (*vertical*) back to the middle (*horizontal*) and then the loop beat the dipole on most paths!

And now the point of this article (*a recurring theme, actually*): NEVER ASSUME ANYTHING! I assumed that the better performance promised by the author would work for us. It was never tested against a reference antenna! And when it was, several years later, it didn't make the cut! Terms like "low angle" and "high angle" of radiation are only relative. To the author of this book, who is from England, high angle radiation is unneeded when working DX. However, in a stateside contest, high and medium angles are crucial on 40 meters. It is likely that I created a perfect antenna to work Hawaii and an awful one to work Ohio, where there are far more contacts to be made. The frequency used is very important. On 10 meters, a low angle antenna is needed to do well stateside whereas for 40 meters, a higher angle is needed. Exactly what are these takeoff angles?

"NEVER ASSUME ANYTHING!"

Good question – they appear to be a well-guarded secret. Some of the DXClusters had a facility which showed the typical angle for F2 propagation. For California, it was something like 25 degrees and Ohio was more like 50 degrees on 40 meters. A two-element 40 meter delta loop at 60 feet has its maximum gain at around 17 degrees, according to EZNEC, and even lower for vertical polarization. That is why the antenna was not performing well on short hops. The reference 40-meter dipole, at 45 feet, radiates primarily between 50 and 80 degrees, making it great for this side of the country.

I tried one more test. For Sweepstakes, I also put up an 80-meter dipole fed with open wire line up 65 feet into the high trees. This antenna is noticeably better than my usual 80-meter di-

pole 45 feet up. I then reset the tuner to 40 meters. This creates an antenna which is a full wavelength long on 40 meters. It is often called a Double Zepp, a name which comes from the fact that this type of antenna was used on Zeppelins in the 30's. When this antenna was compared to the loop and the low dipole, it bested them both on all signals except for those in New England! EZNEC and most antenna books provide the explanation. This full wavelength antenna radiates 45 degrees off of broadside. With the antenna pointing NW to SE, the maximum radiation should be N, E, S and W, with West being the desired direction. Additionally, the elevation plot shows that an antenna 1/2 wavelength high (*65 feet on 40 meters*), squirts a band of energy up at 40-50 degrees – perfect for covering most of the U.S.!

Back at Field Day, the 80-meter dipole was often maligned and not given much consideration. Aha, but remember, in the days before the AB-577 Rocket Launcher Mast, this dipole often hovered around 30 feet in height. Great antenna for working Connecticut, but not much else. That is why the delta loop walked all over it! With the center of the new dipole at 60 feet, this dipole might be the best antenna for the field Day CW station on 40 meters.

The only way to know for sure is to set up the dipole and the loop (*with horizontal polarization*) and compare against a lot of different signals. I also plan to do some modeling and testing of a 2-element 40 meter yagi as well.

My greatest complaint with antenna articles is that a measurement of performance is rarely done. Most QST antenna articles go something like this: *I tied a wire to a rock, threw it into a tree and proceeded to work Europe with 57 signals, thus proving this is a great antenna.* Of course, the article fails to mention that a suitable dipole would work Europe with 59 signals! Based on WX1C's talk at the October RANV meeting, I've been spending more time learning and using EZNEC to model antennas. However, the bottom line is in the signal report. It doesn't matter what any one or any program says, as long as the new antenna brings your signal up an S-unit or more!

THE ANTENNA PROJECT

by Mitch WISJ

I was involved in a major antenna project this Fall. Despite being an old veteran of dealing with antennas, many lessons were still learned. Sharing these details will help some who are considering their own antenna systems. Or, at least it will make for some interesting reading.

My antenna system consists of a 50 foot tower with 10 feet of mast and many antennas packed into a small area. On the mast: HF tribander, vertical (FM) yagis for 146, 222 and 446 MHz, horizontal yagis for 50 and 144 MHz, FM broadcast antenna and a Ringo on top. On the tower: dipoles for 40, 80 and 160 meters. While some antennas were added over the years, most of the system was installed 19 years ago.

Towards the end of last winter, strong winds bent the mast beyond repair. This problem would certainly only get worse, so work was needed before this winter. The typical way to do this would be to slide the mast up out of the rotor, remove the rotor and slide the mast down, removing each antenna as it got within reach. The problem with this method is that incredible strength would be needed to lift up the mast and antennas while I was strapped onto the top of the tower. Many bolts with 19 years of rust would have to be busted open – while on the tower. It was for these reasons that I decided to drop the tower and antennas as a unit and work on the ground. This is possible because the tower is self-supporting (*Rohn HBX-48*). A guyed tower, (*Rohn 25*) could not be lowered in this way – it would collapse.

When the tower was installed, five of us busted our humps and barely got the tower up – and that was with less antennas. I decided that a crane was the easy and safe way to lower and raise the tower. It took a while to locate a crane operator who was affordable. These companies have many thousands of dollars invested in this equipment and need to earn it back. I did not have many hundreds to invest, however.

Finally, on a bright morning in September, the crane arrived, hooked up the tower and we lowered away. The job only took an hour, but considerable damage was done to the mounting base as the tower came down. I started to take the antennas off the

tower when I learned of the news of the day. It was the morning of September 11th. For a long time, I had a really hard time focusing on the tower.

After all antennas were removed and the tower was disassembled into 6 sections, Bob KB1FRW and I took a look at the mounting bolts coming out of the cement. The stress of the tower coming down bent the bolts. The mounting was too far above the cement and the ½” drill rod steel bent easily. The design of this type of mount (*a very old design*) caused the problem. The solution was to heat the bolts, bend them back, and make up mounting brackets to keep the bolts vertical. When working with a tower, always make sure you understand the engineering of the system or have someone knowledgeable check it.

“It is crucial to have a plan..”

With the mount taken care of, it was time to deal with the tower and antennas, both of which showed the ravages of 19 years of New England winters. There is a rule you must always follow when dealing with antennas: **use stainless steel hardware!** How do you know if a new piece of hardware is stainless? Get a big magnet. If the hardware is strongly attracted to the magnet, don't use it – it will rust. If it is only lightly attracted or not attracted to the magnet it is stainless, aluminum, brass or some alloy which is nonferrous. Most major antennas you buy today have stainless hardware, but not all antennas do and not all of the hardware supplied is stainless! If it is not stainless (*or not carefully painted*), it WILL rust. All of my antennas were from the time before stainless steel became popular on antennas, so there was a lot of work to do. For example, the 11 screws, washers and nuts which held the 11 elements on the FM yagi were all rusted solid and all had to be broken off. All of the U-clamps were rusted. On one antenna, the steel mounting bracket rusted profusely. The rust stains ran down the mast and leaked all over the rotor, giving it a nice brown stain. A new mounting bracket was ordered from the manufacturer, who told me that it was now made of aluminum. Besides taking almost a month, they sent a coated

steel bracket – the very thing I wanted to avoid. In this case, and others where there was no stainless steel or aluminum alternative, I spray painted the parts with an acrylic finish called *Krylon*. Two coats were put on before mounting and one coat after. That should keep the rust in check – I hope. While stainless steel bolts were generally available in a couple of select hardware stores, U-Clamps were tough to find. *Lakeshore Hardware* in Colchester has the best assortment of stainless hardware, but they only had a limited number of U-Clamps. I needed around ten 2” and ten 1-3/8 clamps for all the antennas. I shopped around the Web and finally found a place in Iowa which had the required sizes at somewhat reasonable prices.

On close inspection, the tower needed quite a bit of work. The top plate holding the thrust bearing was secured poorly. Extra mounting clamps shored this piece up. A good number of cross braces were bent (*mostly from me climbing on them*). These were all straightened and all the rivets were inspected. All of the cross braces were rusty, again from climbing. The tower was originally galvanized and then it was painted before I bought it. It badly needed another paint job. Before that, I had to wire brush the rust, and treat it with a rust reformer compound. Painting was slow, painstaking work to cover all the nooks and crannies of the tower sections. Finally, the tower bolts (*not stainless*) were brushed to remove the rust and the threads chased with a die so that they would assemble easily. They were painted after assembly.

The rotor was in very good shape and gave me years of trouble free service. The housing was opened up and inspected. Fresh grease was applied to the roller bearings. New screws replaced the rusted ones on the terminal strip and new bolts were used to attach the rotor to the tower. The operation of the rotor was checked several times.

One by one, each of the antennas was checked after it was rebuilt. The 222 MHz antenna was retired due to lack of activity. The Ringo was replaced by a dual band vertical. The Ringo was a terrible antenna for repeater operation. The new vertical, a Taiwanese

continued next page...

The Antenna Project... continued from previous page

knockoff of a Diamond or Comet design was checked for gain and performance. The gain looked good, but the SWR rose to over 2:1 at 147-148 MHz. No tuning needed? Ha! Never assume the antenna you buy actually works. Test it out on the ground first! I ended up taking the antenna apart and cutting some copper inside. All of the antennas otherwise checked out OK, even the HF yagi. It was checked on the ground by standing it to point straight up.

Next came the issue of feedlines. The feedlines were old 20 years ago and now were very old. Because the length of the runs from radio to antennas is close to 100 feet, I chose to use hardline for all the VHF and UHF runs. I installed 75-ohm CATV hardline some years ago for the 446 and 222 MHz antennas. They proved very hard to work with and made the SWR matching tough. I decided to remove these lines and provide 4 runs of 50-ohm heliax hardline for the dual band vertical, the UHF yagi and the two VHF yagis. Three runs were located at Hosstraders and I had some other runs stashed in the garage. The dipoles, HF yagi and 6-meter yagi were fed with old RG-8, which was carefully checked for loss. I found a run of 75-ohm RG-11 for the FM broadcast antenna and fed it with a homemade balun. A balun and 4:1 impedance matcher is made from $\frac{1}{2}$ wavelength (*times the velocity factor*) of coax. Three of the antennas use this type of balun. The key point here is that all feedlines, baluns and antennas were tested on the ground first. This was a good thing – one of the hardline runs was bad and required repair!

Finally, it was time to assemble everything. The tower was assembled, the rotor was mounted and the mast inserted into the rotor. The new mast was slightly beefier and a smaller piece of mast was inserted inside this mast to strengthen it. The antennas were mounted and the feedlines were run and dressed on the tower. Black tie-wraps were used to attach the cables to the tower or mast. Stainless steel hose clamps were used to secure the hardline to the tower. Black tape was only used to weatherproof cable connections. Purists will faint at this thought, but I've found that 2 wraps of good black tape has worked very well for me over the years.

In early November, the crane returned and the tower went back up without incident. However, 5 hours into the Sweepstakes the connector to the HF yagi failed. I used a torch to get the connector hot enough to solder the shell. This is not a good idea, as it chemically weakened the insulator and it arced over with high power and failed. From now on, no short cuts – I use the iron properly!

It takes a long time to do an antenna project from start to finish. It is crucial to have a plan of what jobs will be done when and when necessary hardware has to be ordered and purchased. I initially operated without such a plan and it took what seemed like an endless 2 months to complete. Keeping exact details written down is key to the planning. Realizing that you forgot a connection at the top of the tower after the crane leaves is a very bad thing! Finally, think safety at all times! Having a great antenna system is useless unless you are around to enjoy it.

CONTESTING CORNER

by Paul AAISU

This weekend gets off to a great start with the *ARRL 10-Meter Contest*. This is a great contest for all likes and abilities. There are numerous categories and power levels to get involved with. It is a 48-hour contest starting at 7PM Friday, December 14th. The band usually shuts down at night, but not always. For those of you that have your Tech Plus or higher license, this one is a lot of fun. Strangely, the *National Contest Journal* has called it the hardest contest in the world. Exchange is signal report and state. DX stations will send you signal report and sequential serial number. Tech Plus stations sign "/T" on CW. This gives the other station more points. For full details, see page 104 of November *QST*. Please remember to put **RANV** on your summary sheet!

The next two weekends have some blasé contests with likely little interest to our readers. However, once the holidays are over, there is the ever-popular *ARRL RTTY Roundup*. It starts on Saturday, January 5th, at 1PM and ends at 7PM on Sunday. You can operate no more than 24 of the 30 hours. The exchange is the same as for the 10-Meter contest, and RTTY is an extremely popular DX mode. You can add to your DXCC count, as well as your WAS count in both of these contests. Suggested frequencies and complete rules are on page 112 of December *QST*. This is a very popular mode, and as we found out at the last meeting, there are several sources available on the Internet to get you started. So cozy up to that rig, and give it a try.

I always try to post contest results here to recognize **RANV** member efforts. Sometimes, it's just me. For instance, the results of the *2001 CQWW 160-Meter Contest* is out. Now, it is hard for any of us to work the phone part of this contest, because we are all so heavily involved with the Milton Hamfest. And, it looks like no one in Vermont participated at all. However, I know that some of us make an effort for the CW portion. But, once again, I don't see any Vermonters listed. Wait a minute; it looks like I took top honors for low power in Rhode Island. Rhode Island? Hold the phone! I was never in Rhode Island. Phooey, I guess it pays to check log status on the Internet when available.

Once again, I wish to thank everyone for a job well done at in June. It takes a lot of effort to do Field Day, but we did it, and we did very well. Next month, its *Vermont QSO Party* time!

SWAP NET

There is a new 2 Meter FM net on the local airwaves. On Wednesday evenings at 7:30 PM the *W2UXC Northern New York/Vermont Swap Net* has been attracting more than a dozen check-ins. The frequency is 147.285 MHz, the tone is 123.0 Hz, and the Net Control is Arn N1ARN. Arn is inviting all **RANV** members to get on for this net and participate. While you are on there, you can listen for items being posted, or post some equipment of your own. You can also post items that you are looking for. After any radio items are mentioned, it becomes a rag chew net where friends can catch up on the latest goings on. So, if you have some free time on Wednesday evenings, please check into this net. The repeater has great coverage, and can be heard around many parts of Vermont.

**RANV GALA
HOLIDAY PARTY**

**Tuesday, December 11th
5:30-10pm
at W1SJ**

RANV

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<http://www.RANV.org>