

Radio Amateur News & Views

The Official Journal of the Radio Amateurs of Northern Vermont

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Vol. 10 No. 11

AMATEUR RADIO IN SPACE The November 14th RANV Meeting

We have an exciting meeting planned for you this month! Very soon, amateur radio will be on the verge of more communications from space. Mike N1JEZ will present a two-part program on upcoming events, some of which will happen right during the meeting!

Part 1 will be a quick overview of Amateur Radio aboard the International Space Station (*ARISS*). There has been much recent activity getting the Space Station manned and outfitted. They should activate the amateur station onboard right around the meeting time. Currently you can hear them quite easily on the TSUP channel (*their communications channel*) at 143.625 MHz.

Part 2 will be about Phase 3D. This will be a comprehensive overview of the satellite. This will include: frequencies (15 meters through light); imaging, analog and digital; the design of the spacecraft; the propulsion systems and proposed orbit. There will be handouts of the presentation as well as various in-depth articles on the orbital mechanics involved in attaining the final orbit. If all goes well, we may be able to hear the launch, which is planned for 8:07-9:03pm on the meeting night, November 14th. It will be re-broadcast on various HF frequencies, including from the Ham Radio Club in Kourou, French Guiana on 14.315 MHz

The meeting takes place at 7pm, November 14th, at the O'Brien Civic Center, 113 Patchen Road, South Burlington. Pre-meeting warm-up and face feeding will start at 6pm at Zach's on Williston Road.

RANV HOLIDAY PARTY

Make sure you can join us on Tuesday, December 12 for the RANV Holiday Party at the QTH of W1SJ and W1DEB. There are 4 things we are celebrating:

1. RANV's 10 anniversary
2. Our BIG Field Day WIN
3. W1SJ/W1DEB marriage
4. Festive Holiday stuff!

The amount and variety of food from last year will be increased, so bring an appetite. We will also have the usual socializing, on-the-air shenanigans, videos of activities and more. Have a suggestion to have more party fun? Please let Mitch know and we'll add it to the list.

The Party will start at 5:30 and will last until everyone leaves or the band close down. If you need directions, contact W1SJ.

ELECTIONS

Pursuit to the By-Laws of the *Radio Amateurs of Northern Vermont*, enclosed in this month's newsletter is your ballot for election of officers. Families receiving one newsletter will receive the correct number of ballots.

Nominations for officers come from the membership, or (*much of the time*) people are asked to run. We have found one candidate for each office. However, any club member in good standing, who agrees, can be written in.

Paul AA1SU has agreed to continue doing his excellent job as president. For VP/Treasurer, Brian N1BQ, organizer of the *Tuna Tin 2* meeting last month has agreed to run. And for Secretary, Grant K1KD, who has operated at Field Day, has agreed to write the meeting minutes for the coming year.

Please show your support for our officers by voting. Either bring your ballot to the meeting, vote by E-mail, or immediately mail your ballot.

We guarantee no election signs, no junk election mail and the new officers will be chosen by the end of the meeting (*not like some other election we know*). And remember our motto, *vote early and vote often!*

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OUR LAST RANV MEETING

by *Howie, K2MME*

Boy, people were there in droves! It looked like somebody was giving something away for free. Paul announced that November is election month and a candidate for Secretary is needed. A November snack provider was found and the meeting quickly turned to the topic of the evening.

Brian N1BQ made a brief introduction to the task at hand. We were going to build the *Tuna Tin 2* QRP transmitter. Most felt that it should be crystallized at 7122 kHz. No doubt, this was to be an evening different from the ordinary. There were a lot of people – unofficially 24. It seemed like everybody came with a purpose. Arriving members entered with bulging bags. It looked like we had a corner on Burlington's soldering irons and hand tools. There were tables staked out by little bands of intrepid kit builders huddled over their tuna fish cans (*although cat food cans were better suited for the deed*). Some were still sporting labels. Brian gave some useful bits of information, distributed the goodies and the gang was off to the races. Some arrived with some of the mechanical work done, with switches and connectors in place. There was the hum of little transmitter makers in action. Little puffs of smoke rose from the camps like smoke signals portending the true mission of the kits. All 16 kits were accounted for and others expressed interest.

It's obvious from the intensity of the activity that this was a very well received function. Brian was holding a follow-up clinic at his house on Saturday to give folks a chance to both finish and try out the transmitter. Once there is a body of working units, we will set up a net on 7122 kHz. Brian made Mouser Electronics catalogs and QRP Homebrewer journal available. It was neat to see the haze from the rosin core flux in the air and the aroma will linger.

Thanks Brian, it was lots of fun.

THE PREZ SEZ

by *Paul AA1SU, president*

I am so happy to report that we won the 2A category of Field Day for the second year in a row. Congratulations to everyone in the club who participated in this great event! We could not have done it without the help of everyone involved. From Richard & Karen with the great food to Brian for bringing his FT-1000MP, we all participated wherever we could. I want to thank phone operators W1SJ, K1HD, KC1WH and N1ZUK and CW Operators WA1LIR (*now K1LI*), AA1SU, K2MME and AB1T. The Novice operator, Jeff N1YWB, gets a special thank you for holding onto his General Class CSCE from the Milton Hamfest VE Test Session, so that he could run the station. Thanks to the VHF operators, N1SRC & AA1SK, who also helped out at every turn in the operation. Additional thanks to the staff W1DEC for passing our Traffic, N1ZRA for his muscle, K2KBT for moral support, and WN1HJW with Karen for being there when we needed them. The following visitors helped make us proud of our operation by gracing us with their presence: W1DEB, N1BQ, N1COB, WA1LIE, KB1EPT, W1RC, & KA1RF.

It is only 7 months to Field Day 2001. We want to make it a threepeat with your help again.

The last meeting was an incredible success. Brian's idea to build an HF transmitter that we all could actually build at a meeting was a stroke of genius! The meeting was completely packed, with 24 hams in attendance. I hear that 5 of the 16 were actually completed that night, followed by several more in the coming days. Please feel free to send Brian and me your feedback whenever you want to. This is something that we will repeat in the coming year.

On another front, the ARRL announced earlier this year, a club

competition for \$1000. The idea was to encourage club activity around the country. I plan to enter us in this competition; the deadline is New Year's Eve. The good news is, that without even trying too hard, we have accomplished several of the items that they score points for. This is because we are so doggone active anyway. I am so proud of all of you that set aside your time once a month to come out and participate in a hobby that I know, competes for your time in other areas. I am also proud of those that can't make it to the meetings, but that support the club through your membership, and by reading about the club's activities in this newsletter. Together, we all help to keep ham radio alive in the Champlain Valley. If the League does this again next year, I plan to appoint a committee to push myself and the other officers, to do more of the items that are on the points list. Trying to do this myself was not as easy as I thought.

So, keep hanging in there, troops. All of the previous meetings under my Presidency have been met with such positive responses. But with everyone's help, the best is yet to come.

Contacting RANV

In Person: Meeting, Nov. 14th, 7pm
O'Brien Civic Center
113 Patchen Rd, SBurlington
By Mail: PO Box 9392, South
Burlington, VT 05407
By Radio: 145.15 repeater
By E-mail: w1sj@arrl.net
WW Web: <http://www.ranv.together.com>

Principals:
President Paul AA1SU 860-1134
VP/Tres: Richard WN1HJW 372-4595
Secretary: Fred N1ZUK 878-4209
Editor: Mitch W1SJ 879-6589

Please send submissions for newsletter to the editor, W1SJ.

WEEKEND CLASS: 8 NEW HAMSTERS, 2 UPGRADES

by Mitch WISJ

The new and improved version of the Weekend Class debuted this October and once again, it generated all sorts of new hams. In response to the FCC restructuring of amateur radio on April 15th, the class was changed to allow students to earn their Technician license on Saturday and General on Sunday. Eight new ham operators have come on board. Of those, Keith KB1FVB is already a General. The other seven are hard at work on their CW and plan to have the General privileges by early next year.

The group is primarily boaters and many plan to do offshore sailing one day. Most of the people in the group work as computer analysts. Perhaps this is why the quiz scores all weekend were extremely high (around 96%). Perhaps they did their homework!

Sara is married to Brian N1BQ and has already spent much time on the air these past two weeks. Keith also has been heard on the air. Kevin lives in southern New Hampshire, but is in Malletts Bay most weekends on his boat. Wendy and Bill were often overheard talking about the details of their boat, and I'm sure that conversation will turn to the installation of radios and antennae.

Sunday, we were joined by Rachel (*daughter of Tom K1VG*) and Sam N1PDL. Rachel is now working on her 5wpm code and Sam finished off his General at the exam session.

The next Weekend Class will be March 18-19 in Essex. Here are the graduates of the class:

| | | |
|--------|-----------------|-------------|
| KB1FUT | Kevin Stupak | Hinsdale NH |
| KB1FUU | Wendy Boettcher | Charlotte |
| KB1FUV | Mike Banks | Charlotte |
| KB1FUJ | Steve Neidig | St. Albans |
| KB1FUZ | Sara Riley | Underhill |
| KB1FVA | Dave Wojcik | Colchester |
| KB1FVB | Keith Kennedy | Warren |
| KB1FKE | Rachel Repstad | St. Albans |
| N1PDL | Sam Conant | Colchester |

**NEXT VE SESSION:
Friday, December 15th, 6pm
Essex Town Office**

THE FALL FOX HUNT

By Paul AAISU

The Fox Hunt of Friday, October 13th was the last of the year, but my first ever as the Fox. I have been hunting the Fox for 3 years. Being new at this, I wanted to pick a spot that was not too hard to find but still have some fun listening to the hunters circle around me. I decided on the parking lot of the Round Church in Richmond. The parking lot is actually a half circle that left me quite visible from the road. That was to change as the night went on.

I started with the roll call at 6:05 PM and logged 7 check-ins. I brought along a bevy of ham radio books to read. I made my motives clear. I not only wanted to educate the hunters, but since I seldom have time to read, it gave me a chance to catch up. I started with "Frequently Asked Questions About Antenna Systems and Baluns" by Jim Thompson W4THU of Radio Works fame. After a while, I asked for a signal check. Good thing - apparently, my signal was a little too weak. I had decided to run low power on my mobile rig to make it a little easier. I theorized that the signal would bounce off of the surrounding hills less, thus giving a truer reading.

At 6:42 PM, Bill N1IRO with Oliver KB1FLG strolled into the lot and tagged me with relative ease. More hunters found their way to me as I switched to reading the ARRL HF Digital Handbook. Soon however, I was noticing that the parking lot was filling up with normal people, some with flashlights. They slowly made their way to the church, and I seemed to go unnoticed. Eventually, the lot and surrounding streets were full of cars. This gave me a lot more camouflage, plus something to talk about. It was the only clue that I gave out all night. One hunter told me that he saw a sign pointing to a concert inside the church. This explained all of the arrivals. Eventually, I was found by all of the hunters, which made me feel good. Looking back, I should have run a little more power to start with from that location. When the last ham found me, I called for everyone to meet at Friendly's in Williston as soon as possible. I had earlier mentioned 9 PM as the cut off time for the hunt, so not everyone was listening at this time. However, eventually we all convened and continued having a good time talking about ham radio, the hunt, or whatever. Here are the results.

| Time | Call | Started From |
|------|----------------|---------------|
| 6:42 | N1IRO & KB1FLG | Montpelier |
| 6:46 | W1SJ & W1DEB | Essex |
| 7:20 | N1NTT | Milton |
| 7:26 | N1LXI | So Burlington |
| 7:31 | N1ZUK | Colchester |
| 7:46 | N1SRC | Underhill |
| 7:52 | N1YWB & Sean | Williston |

ADVENTURES IN WORD-PROCESSING: CREATING THE UNIQUE QSL CARD

By *Eric NISRC*

I got hold of a QRZ Hamcall disk which has a collection of hundreds of QSL cards and looked them over. I also checked out the web sites, looking for QSL Card designs. There are some fairly nice cards, but many of them are based on some very common themes. At the same time, I have discovered how to refill the ink cartridges in my printer, which drastically cuts printing cost. I resolved to make my own QSL cards.

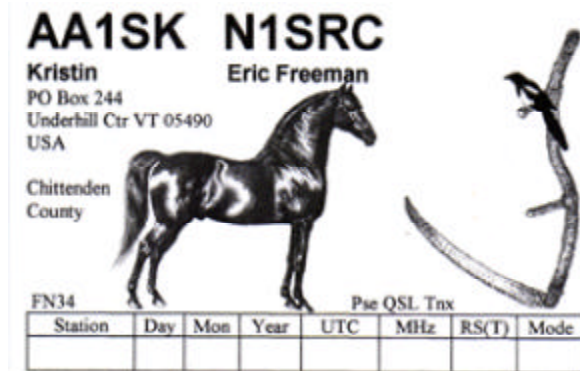
First, I measured a bunch of them and observed that the bureaus like the size to be about 3.5 by 5 inches. The larger sizes don't fit well in envelopes and the bureau finds them much easier to sort if they are uniform. AA1SK turned up some nice card stock. I was too cheap to spring for the shiny photo card stock.

Most modern word processors support tables. I used Wordpro, because it came with my machine. I created a 2x2-cell table with 3.5x5 cell size and specified landscape printing. I had to adjust the position slightly using page margins because the printer can't print on the outer tenth inch at the sides of the page or the first half-inch of the page.

I then found some images to use for my graphic. I used the PhotoStudio SE software that came with my scanner to scan in the images and then edit 3 of them to have the correct size. This took some experimentation and a lot of fiddling. Once I had the bitmap, I set it up as a watermark graphic placed within the cell. I found that each cell in the table is seen as a separate page by the software. A watermark serves as a background graphic, so you can arrange words right over it if you want. Regular, or "in line" graphics don't

work because they have a normally rectangular border and no text is allowed in the border. This prevents using a lot of the space I needed.

I stuck to black and white since the colored inks are water-soluble and I wanted something that would not run.



I used a table inside the table to create the boxes for the report. The call sign and other data are just plain text, in various type sizes. Then I selected the contents of the first cell in my big table and copied it to the other 3 and printed some samples on plain paper. Then I used the card stock and made up a bunch of sheets. I took the sheets to a copy center at work where there was a large paper cutter that can make very straight cuts and carefully cut the cards out. Many schools and copy centers have these. You can also take paper to a commercial place and have them put it on card stock. I found that 3 sheets was about the limit to make good even cuts. Now I have a small stack of QSL cards ready to go and I can guarantee that nobody else has the same one.

I did a second one for my father using some graphics he sent up and that one took only about a half hour, after all the practice I had had. I found that I could not export the file to other formats such as Word or HTML without damage. The same methods should work.

NEW 145 GHZ RECORD

On Nov. 6th at 00:58 UTC, Brian WA1ZMS and Geep WA4RTS had a QSO on 145 GHz over a path of 34 kilometers (21 miles). Note that is *gigahertz*, not megahertz! Signals were weak but copyable using CW. Transmitter power on each end was around 5 milliwatts. ICOM R-7000 receivers were used as the IF radios. This QSO took place in the Lynchburg, Virginia area. WA1ZMS was on the Blue Ridge Parkway at Grid Square FM07fm and WA4RTS was in Lynchburg, Grid Square FM07ji. No receive margin was to be had on the WA4RTS end, so this is the limit of what can be done for now with the exception of weather conditions. Weather at the time of the QSO was 45 degrees at 58% relative humidity.

Brian is a RANV member and is originally from Rutland. He is also the holder of the 75 GHZ record at 110 kilometers (69 miles).

RANV WEB

All sorts of interesting information can be obtained at the RANV Web Site, <http://www.ranv.together.com>. Recent club and area news appears right below the logo. Here you will find results of contests, fox hunts and classes. Just below this is the club activities for the next month

Click on **Callsign Lookup** and look up any callsign in the U.S. Go to **Vermont Repeaters** and check out all of the repeaters in Vermont and nearby areas. Go to **Ham Radio Exams** and see our exam sessions or sessions in New England. The **Picture Library** has all our smiling faces from many activities. Try **Library of Links** to go to the ARRL, FCC, Form 605, Vermont clubs, and all sorts of interesting information.

In our mission to be *Vermont's Ham Radio Headquarters*, what else should we have at the Web site? Please let us know by E-mailing w1sj@arrl.net.

FIELD DAY 2000

RANV DOES IT AGAIN!

I just couldn't seem to work the logistics to join 2 million other nuts in Manhattan to celebrate the Yankees three-peat in the World Series. However, that very day, I received word from Fred N1ZUK that the Field Day scores were out and RANV managed to snare a *two-peat* in the *dog-eat-dog* Field Day 2A category. In this era of weird propagation and free agency of top flight Field Day operators, it is, indeed, a tough thing to accomplish. The last time it was done was by the W5NN *Team Cramp* group in Texas in 1995-96, who disbanded after their 2nd win. Before that, it was none other than K1VT, *Silicon Junction Radio Club* in 1986-87, who included several of today's W1NVT players.

Unfortunately, the closest thing we'll get towards receiving a ticker tape parade will be perhaps a crumpled up newspaper or back issue of QST thrown at us. However, a celebration is planned at the RANV Holiday Party. We don't get to do this all the time! And, shortly after that, we plan for the three-peat!

As with last year's results, there appears to be some contest reporting glitches. A group out of Arizona scored a thousand points higher, but on closer inspection, they were using the 5-point multiplier, which means that they go into the 2A-battery category. Across all categories, we were 35th in the nation – not bad considering that all were running more transmitters than we did. Propagation-wise, it was a tougher year than last year's record setting pace. I guess when 10 and 6 meters aren't open all night, the scores will tend to drop and conditions will seem poor.

Here is a listing of the Field Day groups in Vermont and nearby. Since it is impossible to compare scores across categories, the place, total number in category and overall percentile is shown to show how each did in their respective category.

| CLUB | CALL | CAT | QSO | PTS | # TOT | PCT |
|-----------------|--------|-------|------|-------|---------|------|
| RANV | W1NVT | 2A | 3363 | 10202 | 1 427 | .999 |
| Nature Boys | W1ECH | 1Abat | 826 | 8435 | 3 63 | .968 |
| Twin State (NH) | W1FN | 4A | 3009 | 9708 | 6 134 | .962 |
| Udder Club | W1MOO | 5A | 3548 | 10876 | 5 77 | .948 |
| SOVARC | WT1B | 3A | 1562 | 4340 | 68 293 | .771 |
| GMWS | WG1Q | 2A | 1160 | 3806 | 104 427 | .759 |
| Non club | W1EQO | 1Bbat | 143 | 1170 | 21 43 | .534 |
| Lincoln Gap RC | K1GAP | 1Abat | 125 | 1350 | 34 63 | .476 |
| BARC | W1KOO | 3A | 372 | 1830 | 190 293 | .354 |
| Tesaro (NH) | W1IM | 2Abat | 287 | 1052 | 54 75 | .293 |
| CVARC (NNY) | W2UXC | 3A | 133 | 1034 | 260 293 | .116 |
| BARF | KB1BRN | 2Abat | 143 | 586 | 70 75 | .080 |

CONTEST CORNER

by Paul AAISU

Contest season is upon us! All of the smaller contests that you have been enjoying earlier this year will help in the coming months. But first of all, congratulations to all of you that put in a fine effort for the ARRL International DX Phone Contest. The following RANV members racked up some nice scores on Low Power: AA1SU, K1KD, and K2MME. On High Power WB1GQR (W1SJ op), KK1L, and N1PEA all made us proud. The conditions for this contest, by the way, were the best that I have ever worked. Even Mitch, a 25-year contester, said to me on the repeater later, "It doesn't get any better than this!" Keep up the good work guys!

The weekend after the monthly meeting is the ARRL November SSB Sweepstakes. This happens to be Mitch's favorite contest, and is the best stateside contest of the year. The exchange is a consecutive Serial Number, Precedence, Call Sign, Check, and Section. Almost sounds like a Traffic Pre-amble, doesn't it? Well, it is meant to be. The Precedence is "A" for Low Power, or "B" for High Power; there are others, as well. The Check is the last 2 digits of the year that you were first licensed. The section is Vermont (VT) for us, but remember that several states have multiple sections in them. You should be at least a little familiar with them before starting. Again, good contesting software is handy to have.

I need all of you that enter, to put RANV on your Summary Sheet where it says Club Affiliation. RANV is entering as a Local Club, and we are hoping to win this year! The complete rules are on page 102 of the October QST. So, anybody that can get on, please do. Then, E-mail me, so that I can tell the ARRL of your eligibility.

On the weekend after Thanksgiving, is the CQ WW CW Contest. This is a favorite of the YCCC, and they are looking to win the Unlimited Club category again. The exchange is RST and CQ Zone, which for us is "05". So, you guys in YCCC (*and you know who you are*), be sure to get on for all the points that you can.

On December 1, is the ARRL 160-Meter Contest. I know many of you do not have 160 capabilities, so I won't dwell on it. It starts at 5 PM Friday, and ends at 11 AM Sunday. The complete rules are on page 98 of the November QST.

For those of you new to HF contesting, try out the ARRL 10-Meter Contest starting on Friday, December 8 at 7 PM. It runs for 48 hours and has several categories. So many in fact, that many who enter, win a certificate for their efforts. The conditions around the world right now are red hot! Ten Meters was really hopping during the recent CQ WW SSB Contest. It is possible to get your Millennium DXCC on 10 Meters with 100 watts and a dipole. Then again, the band could be closed. But, be sure to get on and give it a try. You won't know until you try. I not only encourage the new hams to get on, but the experienced ones as well. This will also be a RANV Club effort, so be sure that reflects on your Summary Sheet. Contest rules are on page 97 of the November QST.

Next month, who was Stew Perry W1BB?

REPEATER NEWS

By Mitch WISJ

Finally, we took the long-awaited trip up the mountain to fix the repeater last Tuesday. Joining me on this wonderful trek in the woods were Tom N1GZZ, Neal N1ZRA and Chris KB1EMB. This was Chris' first trip up. He came up just to help move some supplies up the hill and told me he enjoyed it thoroughly. As I saw him move up the almost-vertical Spillway trail at a fast pace, I knew that he really got into this type of hiking. Frankly, I prefer to stay home and talk on the radio!

We had three specific goals. The first was to replace the fiberglass collinear antenna with an aluminum phased dipole array. The fiberglass antenna has been taking a beating from falling ice and has failed too often. Second, was to replace parts in the transmitter to clean up garbage generated in the receiver which has made copy of mobile stations very difficult. Third was to locate and fix the confounded teapot whistle, which comes and goes and drives everyone nuts.

The trip up was uneventful, but tiring (*for me*). Tom handled the 10-foot by 3-foot antenna by himself with ease. The rest of us brought up mounting brackets, tools, spare repeater parts, sealing tape, wattmeters, HT's and other implements of destruction. There was a dusting of snow at the base and about 2 inches at the top. Forty-degree temperatures and very light winds made for a pleasant day (*or as pleasant as it gets up there*).

The first problem was that the tower was coated in rime ice. Rime ice is fog which freezes to surfaces, making a jagged, glacier looking appearance on everything it touches. Fortunately, the warm temperatures started melting the ice. Unfortunately, the method of ice removal is gravity, which sends very heavy pieces of ice and snow raining down on anyone within 50 feet of the

tower. It is much like being shelled with artillery – you hear the whistling of something traveling towards you at high speed and you hit the deck. This is not easy if you are standing on the tower. And in between the ice falling, droplets of ice are melting, making it feel like a rainstorm. It's no wonder that Tom and Neal looked as battered as the antenna after over an hour on the tower.

The old antenna removal and new antenna mounting went smoothly. Some engineering had to be done to get the antenna into the right spot, but it all went together.

Meanwhile, I was down in the shack conducting repeater surgery. I first looked at the controller, hoping to find the teapot noise. Eventually, I found an IC in the audio path which was half out of the socket and quite loose. This just might be cause!

“reports from all directions indicated improved signal strength”

I resealed it and others in that circuit. Time will tell if the noise goes away or comes back. Next, I replaced the transmitter exciter board (*for the 3rd time this year*). This is the original board which came out of the repeater and was repaired. I put the repeater back on, using the duoband link antenna to test it out. It worked, but was still noisy.

Finally, Neal made the connection to the new antenna. Right away, the remaining noise went away and reports from all directions indicated improved signal strength. We did not expect the antenna to improve the signal, as it was designed to maintain our existing coverage. Even toward the back of the antenna, through the tower, Paul AA1SU was reporting good signal strengths up Route 100 in Troy. There was a general feeling of satisfaction. And it was still light out!

In these adventures, Murphy is never far away. After putting everything back together, I found that the audio to the UHF link transmitter was very, very low. I had first thought that I damaged something in the controller, but realized that the same audio feeds both VHF and UHF transmitters. It was clear that something was amiss on the UHF side. Of course, the manual for the UHF radio was left in the car. Then Tony WA2LRE mentioned that the UHF audio had been low like that for weeks. He did mention it to me previously and the information propagated through all the cobwebs in my head and right out the other ear. Good. Now we have something to look forward to for the next trip. The UHF problems will not affect anything on the main repeater.

Based on the reports we have heard, the repeater is working tremendously. We can only hope it will stay that way, returning Hot 515 to the great repeater that it is. Although we didn't hear any paging interference when we were there, it is still bothering the repeater and we will have to work with the other users to identify that and clean it up.

With all the fussing with the UHF audio, we didn't leave until after 6. Wasn't it dark then? You bet it was! Tom had a helmet light, which helped somewhat, and there was a little moonlight. But it was a sloppy, muddy, slip-n'-slide trip down the hill for the next hour.

Thank you to climbers N1GZZ N1ZRA and KB1EMB for their hard work. Also, please acknowledge climbers of past trips: N1SRC, N1ZUK, AA1SU, W1KR, N1JEZ and KD1DP (*hope I didn't miss anyone*). Thank you to Brian WA1ZMS for engineering help and Tony WA2LRE for help with procuring and mounting the antenna.

That should cover everything. I'm going to bed!

**NEXT MEETING:
“Amateur Radio in Space”
with N1JEZ
Tuesday, November 14th, 7pm
O’Brien Civic Center**

<http://www.RANV.together.com>

RANV
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