Mt. AIRY V.H.F. RADIO CLUB, INC.

CHEESE BITS

W3CCX
CLUB MEMORIAL CALL

ARRL Affiliated Club

Volume LXIV | January 2021 | Number 1

PREZ SEZ:

Happy New Year! Let me say that again...HAPPY NEW YEAR and Goodbye to 2020 with so many disappointments, rules and regulations, and personal loss for many families and friends during the Pandemic. Thanks to all those on the front lines: Countless numbers of first responders, healthcare workers, doctors, and scientists dedicated to helping those in need at such an uncertain time. There is much hope for the New Year with the new vaccines & other treatment options being developed by the large pharmaceutical companies. Yes, 2021 should prove to be a good year for all, allowing us to get back to the more normal lifestyle we usually enjoy!

It was certainly different last year with online meetings instead of in-person meetings. We have had many great presentations by guest speakers and members. Talking about guest speakers, how about Bob Heil's presentation on Human Speech Articulation for the December meeting! His surprise ending performance of "Here Comes Santa Claus" on a 3 manual organ adjacent to his shack was the greatest! When we could not operate from Camelback in June, the Pack Rats pulled together with 56 members operating their home and rover stations producing a super score of 2,086,553 points! That's the Pack Rat Spirit! Our efforts will not be unrewarded!

Thanks to Doc, W3GAD our VP and Program Chairman, we have some good meetings planned for this year:

January- Crying Towel – Our January Contest "post mortem" with members tales of woe!
February- Home Brew Night- Bring your favorite home brew project to share with members.
March- Presentation by Al, K2UYH – EME Made Simple.
April- ARRL Night and Pack Rats Awards with ARRL officials in attendance virtually!
May- Agenda presently open.
June- June Contest wrap-up & election of officers.

In case you missed this Bill, W0RSJ and Jim, KC3BVL are working on **club QSL cards** for the W3CCX club call as well as for individual members. The last time we did this was for our 50th anniversary in 2006. Proofs will be available for all to see shortly, including the nostalgic 'Rat logo in outline or the more recent full color 'Rat logo.

Mike, N2DEQ our contest chairman has updated the traditional contest package items and they are on our website under the **"Contest Info" tab**. Remember to sign in to the website so you can access the "Contest Info" tab. I'm sure you have been following Mike's contest reminders.

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PACKRAT BEACONS - W3CCX/B
Located at FN21be except 2304 which is at FN20dh
50.080 144.300 222.062 432.290 903.072 903.3 1296.264 2304.3 3456.200 5760.3 10,368.3 MHz (red = temporarily off the air see https://www.packratvhf.com/index.php/on-air for details)

MONDAY / TUESDAY NIGHT NETS
VHF/UHF Monday:

TIME	FREQUENCY	NET CONTROL
7:00 PM	224.58R MHz	WR3P FN20kb Ralph
7:30 PM	50.150 MHz	N3RG FM29ki Ray
8:00 PM	144.150 MHz	K3GNC FN20ja Jerome
8:30 PM	222.125 MHz	KB1JEY FN20je Michael
9:00 PM	432.110 MHz	WB2RVX FM29mt Mike

Microwave Tuesday:
7:30 Coordinate QSO's on 144.260 for all Microwave bands you'd like to work. Also setup Q's at w4dex.com/uhfqso or **Packrat Chat Page W3SZ.COM**
Visit the Mt Airy VHF Radio Club at: www.packratvhf.com or www.w3ccx.com

The January Contest Wrap-Up meeting will be virtual on WebEx at 10:00 AM, Saturday January 30th. Please bring your own donuts, snacks, and a good 807! Go Packrats!!

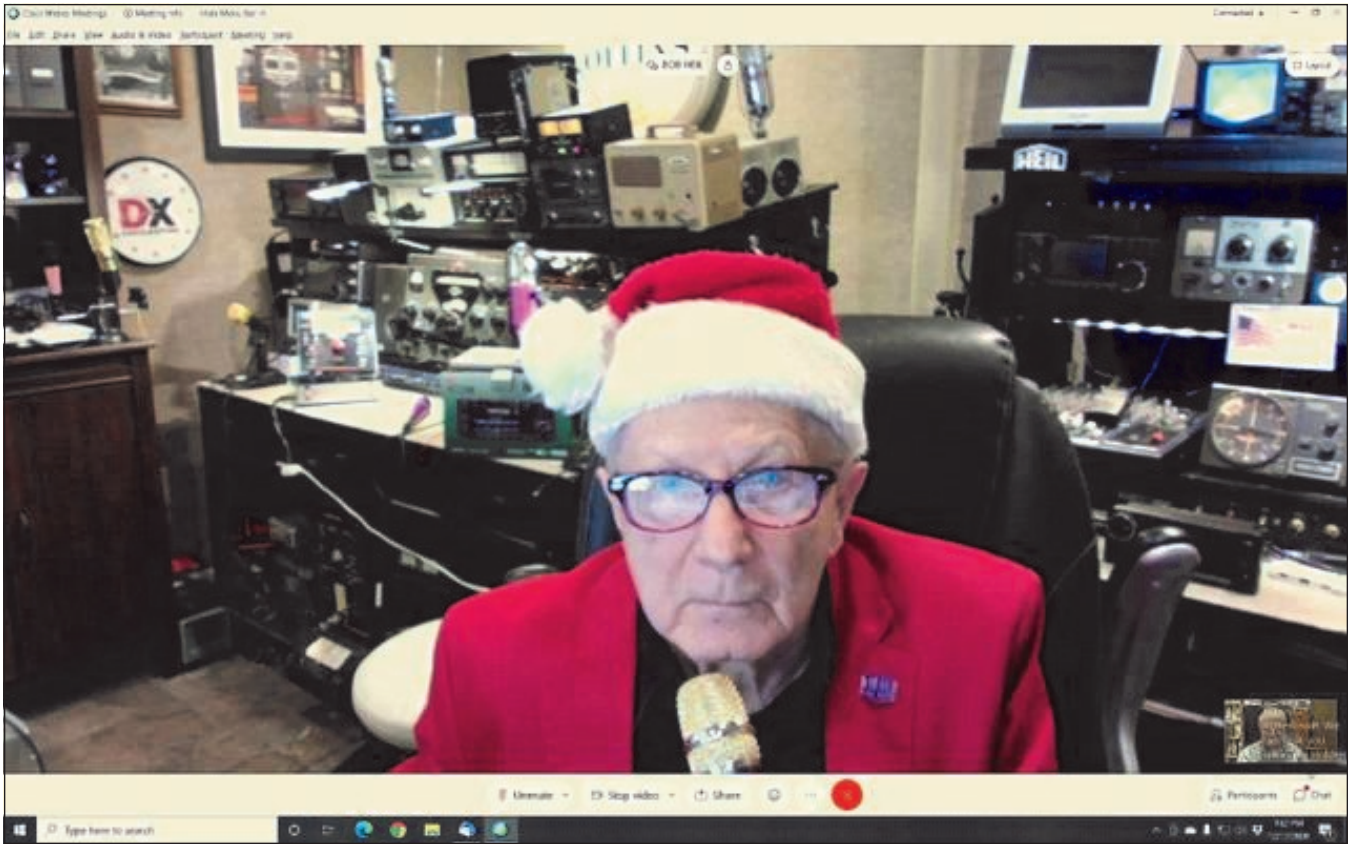
I will be looking soon for three members to serve on the Nominating Committee. Please consider volunteering. From my personal experience, serving on the committee will not exempt you from having your arm twisted to serve as an officer or a member of the board of directors!

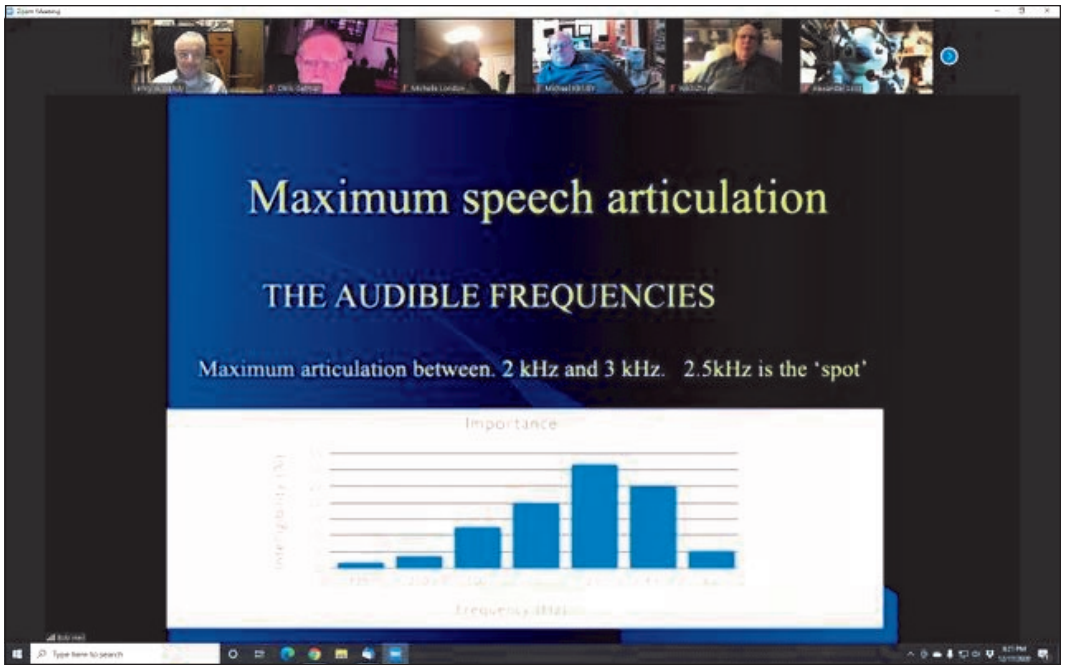
Remember that I am always available for an email or phone call if you have any suggestions or comments about something you think would improve the club experience for all members. I'm also happy to hear about the things that make you proud to be a member of the Packrats!

Meanwhile, finish a project on the bench, keep one ear "listening for the weak ones", and the other on the "Magic Band"!

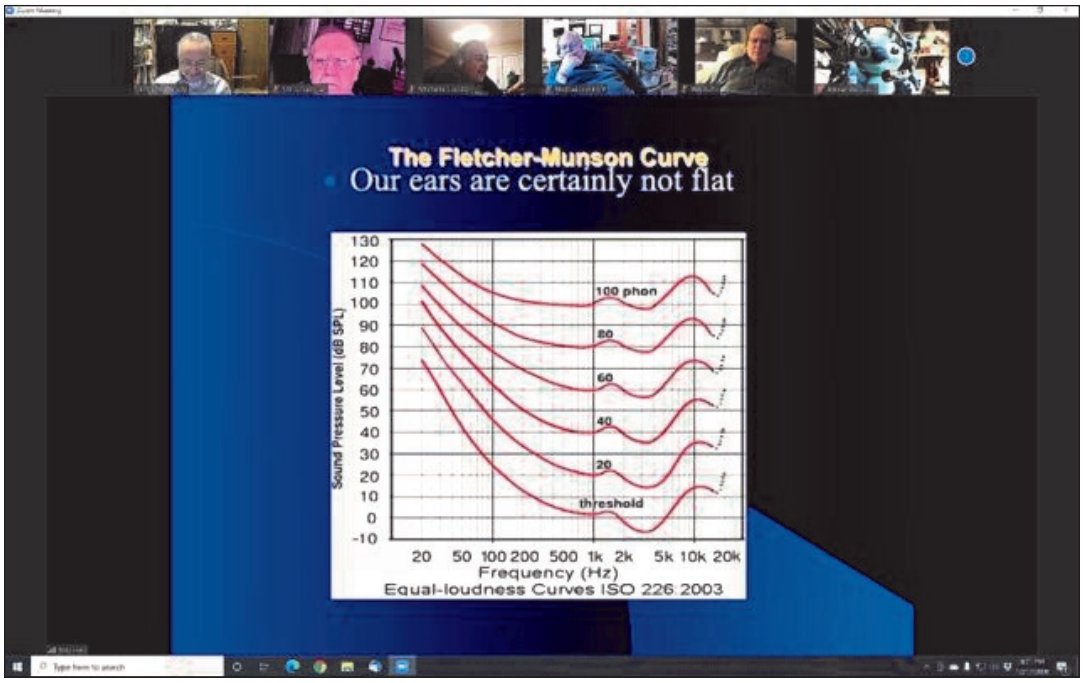
Vy 73,
Bob W2SJ

December (WebEx) Meeting Pics





For intelligibility maximum articulation should be in the 2-3 KHz range. 2.5 KHz is the "sweet spot".

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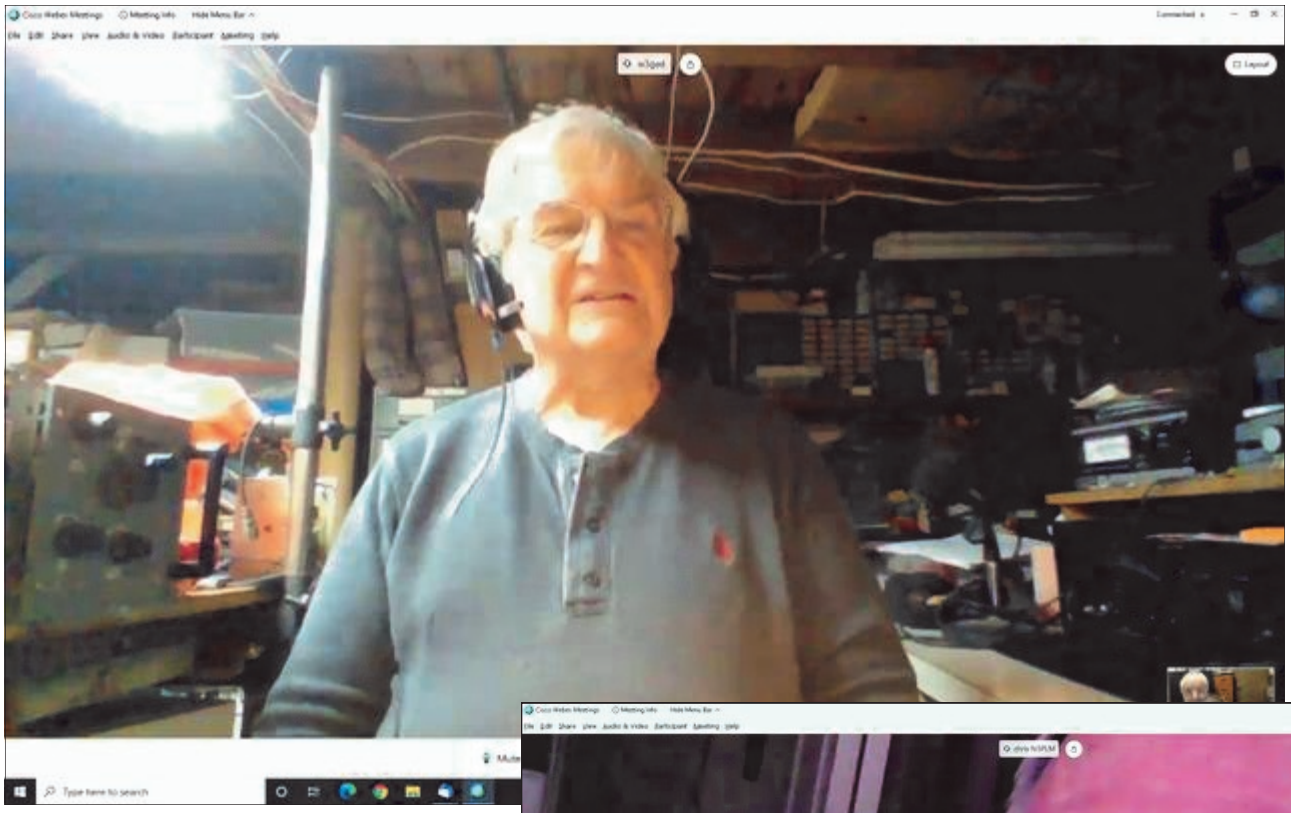
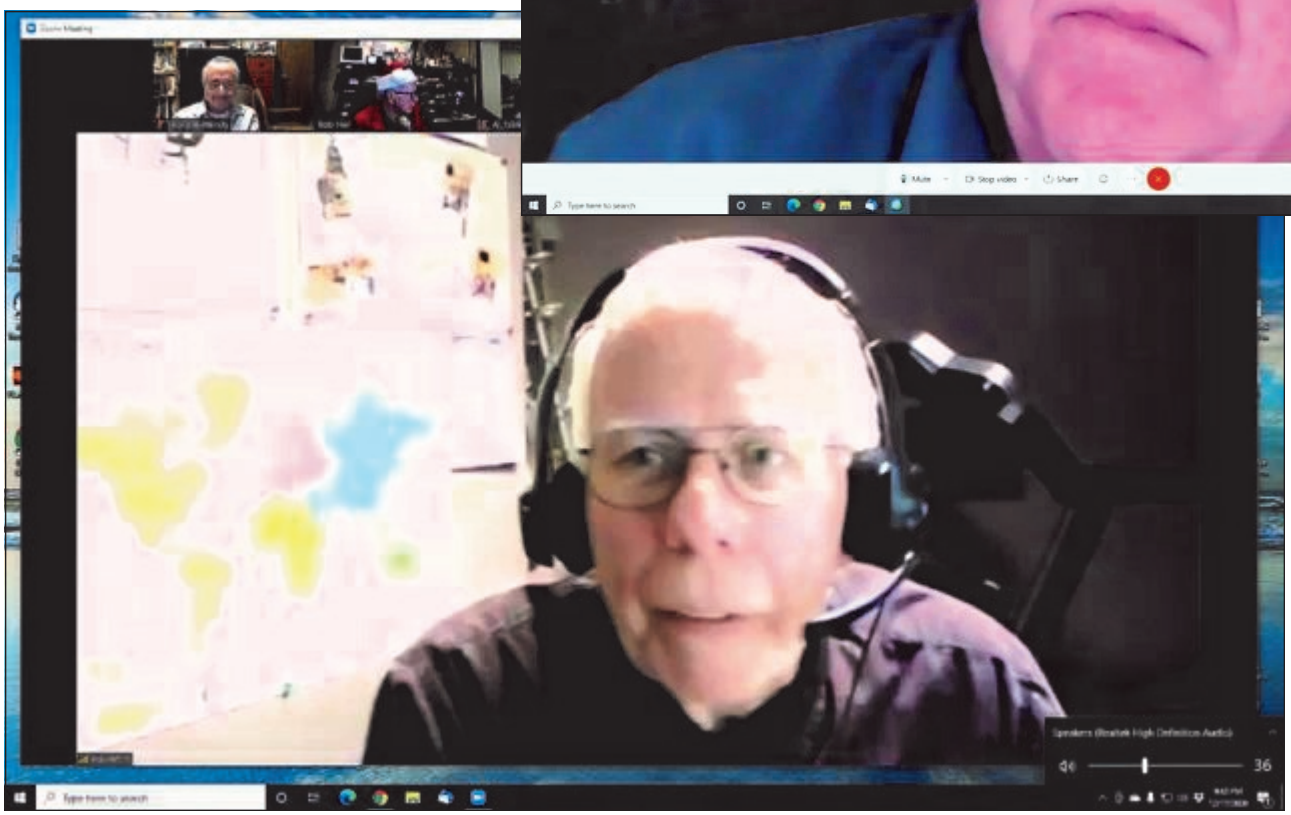




My Second SOTA Activation

Bill WS3O

I enjoyed the Big Pine Hill SOTA activation (which I described in last month's Cheese Bits), so I decided to do another.

Another overcast day. Temperatures near freezing. I was in the Poconos for New Year's, and figured it would be a good time to try another SOTA. I am still working my way up to more challenging summits, so this was going to be another easy target. I selected Broad Mountain, near the town of Jim Thorpe. (Again, I don't like the renaming, so let's use its other name Mauch Chunk...) The SOTA identification is W3/PO-023.

My daughter agreed to go on the hike, again. Still no interest in radio, but she enjoys the outdoors. I used the same setup as before, mostly. The same Yaesu FT-8900R, same vertical, same backpack, same bright orange fleece, and the same PVC mast. However, I now have a LiFePO4 battery, a 15Ah BioEnno unit. That made the hike quite a bit easier than the last time. I also had a no-name squalo for 2m to try out. The squalo had worked well enough for the 2m net the Monday prior, which surprised me, so I brought it along.

This summit lies within PA State Game Lands #141, and overlooks the town of Nesquehoning. Well, it would, if it weren't for all the trees. The entry road, Fire Tower Road, is off of route 93, and supposedly had a parking lot. When we got there, the parking lot was blocked off by construction activity, so we had to drive a little way up the access road, and park in a wide spot there. The walk in was about a half mile long, without too much elevation change. The road was well maintained.

We got to the top, and found that there is a small memorial within the activation zone. I thought it was an odd spot for a memorial, and that it would be rather infrequently visited.

I was unable to drive the guy wire stakes into the frozen ground, so I had to lash my mast to the railing of the memorial. I was hopeful that Lt. Knauf had been in the Army Signal Corps, and this activation would be something he'd appreciate. However, I was told by one of the contacts that Lt. Knauf was a pilot who had crashed there in 1942. A little research afterward turned up this:

> On March 28th, 1942, Lt. Fred Knauf, a Michigan native, crashed into the Broad Mountain near Nesquehoning on a foggy morning and was killed instantly, just three months after earning his wings from the Air Corps Advanced Flying School. The Nesquehoning American Legion Post 172, joined later by the Nesquehoning VFW Post 8008, pledged to memorialize Fred and care for the site which honors his memory. Over 77 years have passed and members of our Post continue to honor our "Adopted Son".
>
> - Nesquehoning Memorial VFW Post

At least he would be familiar with the use of radio. I also had a great-Aunt who's fiancé died in a B-17 crash shortly after flight school.

I had planned to be on the air around 11:30am, but we got a late start, and didn't make it there until noon. I spent about 45 minutes on the air.

I first set up with the 2M squalo. I had hopes for this to work out well, given the results from Monday's net. However, it did not live up to expectations. KR1ST and W2RES both reported me down close to the noise. Well, that made sense for W2RES, as he was on a vertical, and I was horizontally polarized with this. But KR1ST tried both polarizations with little improvement. So, I switched back to the vertical. This made a big difference. I know the trees attenuate, but I guess their polarization makes a difference as well.

I still have not actually made my pack-able yagi. All the parts are here, and I have drilled the beam. I need to complete that soon.

As for contacts, I logged W2RES, KR1ST, KG4KFV, KC3NCS, KA3ZAT, NQ3U, K3JTH, and K2LNS. All on 146.520 FM.

And I got bonus points for a "winter time" activation. That was a nice surprise.

I have now gone to the two most popular SOTA peaks in the Poconos. Next time, I need to get to something a little harder to reach.

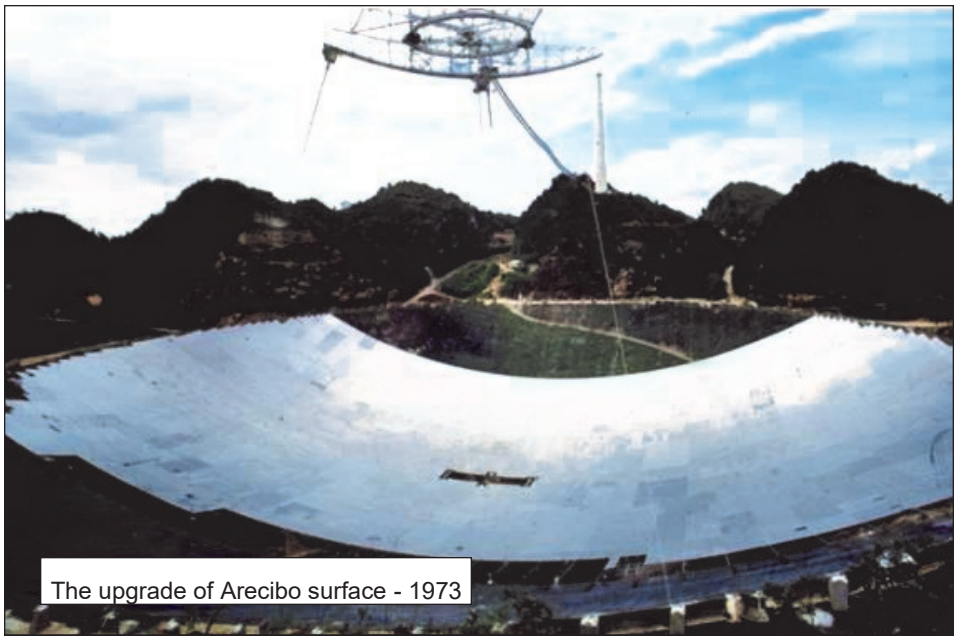
-Bill, WS3O

FAREWELL ARECIBO!

By OK1TEH from the December 2020 “432 and Above News” edited by K2UYH

On 1 Dec the Arecibo Observatory collapsed following its decommissioning by the National Science Foundation the previous month. No injuries were reported. While Arecibo was the most famous and iconic radio telescope in the world, I believe it deserves a small necrology at our astro-section too.

The Arecibo history: In Puerto Rico near Arecibo, until recently, stood the second largest radio telescope on Earth, which was called "El Radar" by the locals and was built between 1960-63. The Arecibo Observatory was part of the National Astronomy and Ionosphere Center (NAIC), and the National Research Center operated with Cornell University in collaboration with and under contract with the National Science Foundation (NSF). It was a spherical (not parabolic) reflector with a diameter of 305 m, built about 20 km south of Arecibo in a natural depression in the mountains. The mirror was spherical, similar to the popular Schmidt-Cassegrain optical telescopes. These types of telescopes often use a "corrector plate”. The corrector plate is a sheet of plastic whose thickness is varied to compensate for the error in path lengths caused by the spherical curve and make the total path length of all rays identical. As the Arecibo radio-telescope had a spherical reflector 305 m in diameter, making a long focal length correction was impractical. The focus of a spherical reflector is an axial line rather than a point, so special feeds are required; depending on frequency, either a line feed or a specially-shaped subreflector. I mention this because not everyone realizes that it is not easy to irradiate such a mirror properly, and therefore signals from the past transmitted from Arecibo to 144 via EME have been relatively weak compared to the ideal 432 antenna feed, which has been optimized for use in planetary radar.


The upgrade of Arecibo surface - 1973

The earthworks had a volume of about 230,000 m^3 of soil. Selecting the location of the antenna in Puerto Rico was also affected by other causes. The temperature there fluctuates little. It was therefore not necessary to place great demands on the thermal expansion of the materials used. Furthermore, there was a natural valley of suitable shape, hidden between the hills, and thus protected from the winds. The location is far from industrial centers - radio interference is minimal.

The surface of the reflector was made of 40,000 pieces of perforated aluminum panels and steel mesh (mesh size 12 x 12 mm), hung on a rope and offset off to the surface to almost exactly a spherical

canopy. During the construction, great attention was paid to the quality of the spherical surface of the reflector. In 1973, the mesh surface was improved by added solid panels.

A cable grid was placed on the basic steel frame, which is permanently tensioned every 1.5 m with weights, so that the spherical shape is guaranteed on an area of 18.5 acres with an accuracy of ± 2.5 cm. The spherical shape of the reflector was also chosen because with the given method of aiming by the movement of the primary emitter, the largest field of view can be achieved. The diameter of the mirror was 305 m, the radius of curvature 265 m, the mirror occupied an area of 7.5 ha, the gain of the antenna in the 432 band was an incredible 60.2 dBi (58 dBd) and the main lobe had a width of about 0.3 angular degrees.

The transmitted RF energy was fed to the reflector and the captured signals were removed from it using a special device located on a 700 tonne platform, suspended at a height of 150 M above the reflector on ropes, which were connected to 3 reinforced concrete towers built in a triangle around the reflector. Each of the towers was located 200 m from the center of the 50 m reflector depression, and its top was 140 m above its upper edge. The aiming was performed by moving the so-called primary radiator on a platform suspended above the reflector. In this way, it was possible to focus on any place in the sky, up to 20˚ from the zenith. In practice, this means that it was possible to communicate by reflection only from those objects that were in the field of view ± 20˚ from the zenith. The radio telescope could thus acquire data from the sky region between about 0 and 38 degrees of declination.

The main purpose of this radio telescope, which was designed as a radar, was to conduct an in-depth survey of the ionosphere and to measure changes in temperature and electron density at altitudes above 50 KM. In the early 1960s, radars could only probe the lower layers of the Earth's ionosphere. The study of the ionosphere was therefore the number one task, also because the observation program, especially in the field of ionosphere research, closely touched on the problems associated with the use of intercontinental ballistic missiles and defense against them. Therefore, the entire construction was largely financed by a number of military institutions in the United States, and the actual construction was carried out by engineering units of the US Army. However, it was also planned to capture echoes from the Moon and solar system planets and other objects that enter the radar's field of view. Attention was also paid to the research of the Sun's hot gases. Already at that time, the observatory was equipped with a transmitter, which operated on the frequency of 430 MHz and which, during continuous keying, supplied 150 kW to the antenna, in pulse operation up to 2.5 MW. In the early 1970s, a new planetary radar in the 2380 MHz band with the power to produce 1 MW pulses also began to be used.

In 1974, this radar also sent a message to potential alien civilizations in the globular cluster M13, and the radiated power was a fantastic 3 terawatts at 13 cm!

Since the start of operations on 1 Nov 1963, the Arecibo radio telescope has made many important discoveries. As early as 7 April 1964, shortly after the observatory opened, Gordon Pettengill's team (who were involved in activating KP4BPZ) determined the exact time of Mercury's rotation, which was not, as previously thought, 88 days, but only 59 days. In 1968, Lovelac discovered the pulsar periodicity in the Crab Nebula (33 ms), the first solid evidence of the existence of neutron stars in space. In the 70's, thanks to the radar in Arecibo (at 420 MHz), the first radar map of the surface of Venus was compiled. In 1974, Russel Hulse and Joe Taylor (K1JT) discovered the first two-star PSR B1913+16 pulsar at Arecibo. These two pulsars are at a distance of 16,000 light-years from Earth and orbit each other once every 7 hours and 45 minutes. K1JT and Hulse found that the two stars approached by three millimeters each other’s orbit. This is a very small distance, but it will increase to meters during the year. Such a reduction in the size of the orbit could already be measured by Arecibo. Their pioneering work showed that the trajectory decreases by exactly the value predicted by Einstein's general theory of relativity when considering the energy carried by gravitational waves. For this result, Joe K1JT and Hulse received the 1993 Nobel Prize in Physics.

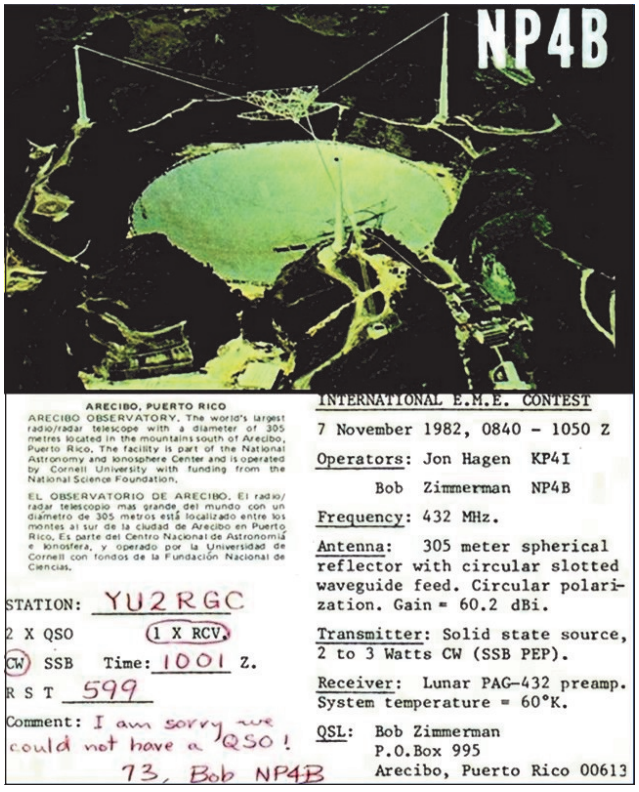
In addition to the discovery of super-fast-rotating pulsars and even a system of 3 rotating neutron stars in 1990, Arecibo also provided the first radar images of an asteroid in history: 4789 Castalia [1989], and in Jan 2008 spectroscopic detection discovered prebiotic molecules in the Arp 200 galaxy.

Arecibo and ham radio: From the point of view of amateur radio, the decisive historical date was 13 June 1964. This was the first time that EME was attempted with large professional radio telescope, in which amateur radio was primarily involved. Under the KP4BPZ callsign, the 305 m radio telescope in Arecibo was used on 144 and 432. The event had a huge response, as dozens of contacts around the world were successfully made, especially at 70 cm. In 1964 and 1965, Arecibo worked at 70 cm with 4 W at the feed by telegraphy and SSB.

In 1968 W1FZJ/KP4 made a 50' [15.2 m] square dish for 432 EME tests. The dish was later planned to be expanded to 150' for use on 144. A movable feed was to be mounted atop a 60' tower in the center of the dish. Unfortunately, Sam never finished the bigger version due to his illness and passing.

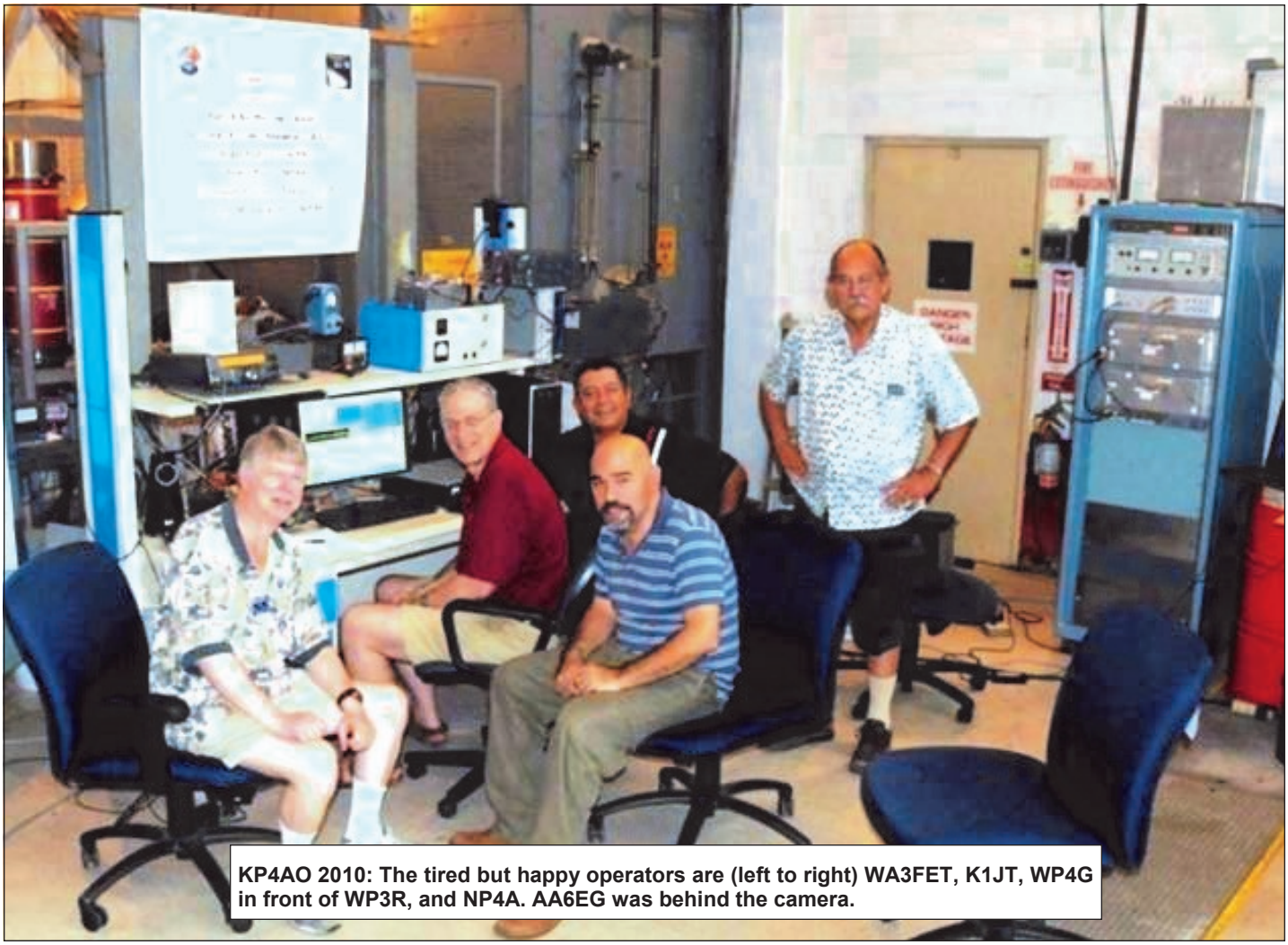
We must remember Sam Harris, W1FZJ. It was no accident that Sam was tapped for an important role in the operation of KP4BZP. Characteristically, it was not long before "a smaller 45.7 M version" of this great array began to take shape over the garden that Helen, W1HOY, had started in their backyard in Arecibo. That it never quite reached the heights of many previous Harris giant EME antenna ventures was due to long illness, which resulted in his death in 1978. However, it was probably the most daring EME project of all times for a single person, hats off!

After Sam's passing, the Arecibo radio telescope was then activated only three times. The first time after 1965, was on 7 Nov 1982, when during the ARRL EME contest without prior announcement; NP4B went on 432 and then established a total of 13 QSOs with 3 W. Then Arecibo was activated again during the ARRL EME Contest in 1987 under the call KP4I and was again worked on 70 cm, power 10 W. Many heard KP4I so loudly at the time that they considered it a local tropo station. At that time, DK5AI even heard KP4I for 35 minutes after his moonset. In total, KP4I managed to establish 82 QSOs without prior notification of activity.



Arecibo was next activated in 2010 under the leadership K1JT. This activity was the most successful event and the KP4AO team made over 240 QSOs. This excellent event is well described at https://physics.princeton.edu/pulsar/_K1JT/Moonbounce_at_Arecibo.pdf and http://www.ntms._org/eme/presentations/VE4MA/EME_2010_Dallas_K1JT_2.pdf

In the following years, other planned EME expeditions were announced, but unfortunately these plans came to an end with the collapse of the poorly maintained rope structure and the subsequent fall of the feed platform to the surface of the mirror.



KP4AO 2010: The tired but happy operators are (left to right) WA3FET, K1JT, WP4G in front of WP3R, and NP4A. AA6EG was behind the camera.

The king is dead, long live the king(?)

Let us hope that in the future politicians will find the courage to finance the construction of a new telescope at the same place. Arecibo was irreplaceable, especially for planetary radiolocation for mapping of dangerous Earth near asteroids, and this function cannot be replaced even by the larger Chinese radio telescope FAST, which is used only for reception. RIP dear “El Radar!

See also https://petitions.whitehouse.gov/petition/rebuild-arecibo-observatory.

Collapsed Arecibo - credits: https://www.nsf.gov

Van Vandalizes Its Own Garage

December 3rd I was putting my TV van away for the winter in the large garage from which I rent space. When I arrived I found a new garage door had been installed which didn't retract all the way up. Because I wasn't sure the mast would clear the door, I parked underneath to make an assessment. Looking like it would clear, though with little room to spare, I got back in the van to drive all the way to my parking spot.

The garage door automatically started closing on the roof of my van about halfway back, though I didn't immediately know that. As I pulled forward, the van's cable basket then the mast itself pulled the door forward. Snagging on the garage door, my mast pulled up as the mast continued to pull the door forward. When I had stopped, it looked exactly as if the mast was already extended and caused the entire mishap (see picture).

Fortunately, the garage owner has multiple cameras that recorded video which shows what I did, and he agreed that stopping under the door was reasonable when I was trying to ensure my van would clear the door. Turns out the garage door installer did not include the "electric eyes" (light beam interrupt detection) that prevent the door from moving when a vehicle (or person) is present, which was part of the old door system. This safety device even comes with cheap consumer garage door openers these days, having installed one myself a few years ago.

The picture was taken in horror by my wife Geraldine as she was waiting to bring me home after dropping off the van.

The cable basket and cell phone antenna are a bit bent but look fixable without new parts. A few days later I operated the mast inside the garage, and at least the first 1.5 segments extend and retract. Between this, a near basement flood that required digging and an emergency pump, and my main computer failing to boot, it has not been a good December so far.

-- Pete K0BAK

Restoring a NAD (HiFi FM Radio)

Like most of us, I have finally come to the realization that I have too much stuff so when the listing of the equipment from AA3GN's estate came out I only scanned it quickly until I got to the NAD 7100. I have always been a fan of NAD equipment because they incorporate innovative circuits and are reasonably priced, so I put in a very modest bid. George informed me that I had won and was gracious enough to deliver it to my house. I was a little disappointed to find out that it was a model 7130 not a model 7100 but my bid was modest so my disappointment did not last very long.

Whenever I get a piece of equipment like this on the bench I connect a 40 W light bulb in series with the line cord in case there is something shorted inside. If something is wrong the bulb comes at full brightness and limits the current into the device under test so nothing further gets damaged. If there are no shorts the bulb glows bright for a second or two while the filter capacitors charge then fades to a dim or no glow. The NAD service manual refers to this as the "dim bulb test." My new 7130 passed the test.

Next I put a signal into the auxiliary input and looked at the signal present at the speaker outputs. One channel produced a clean signal while the other channel's output was missing the negative alternation of the sine wave. Removing the cover it was obvious that the PNP output transistor of the defective channel had been replaced. I removed both the PNP output and driver transistors and tested oth of them with a DVM. Both transistors tested ok so I replaced them and resoldered all of the joints. After doing that the output signal of both channels looked correct.

Next I turned my attention to the FM tuner section. After pushing the channel selection buttons the display went blank and there was no noise from the audio outputs. It turns out that there is a chip that controls the display and the PLL used for the LO. This chip has a 7.2 MHz crystal oscillator. Probing the oscillator with a scope showed that the oscillator was not running. NAD provided a trimmer capacitor to tune this oscillator. Adjusting this trimmer caused the oscillator to start running which started the display and the LO, the tuner came to life.

The center channel tuning indicator did not indicate properly when the tuner was tuned to a broadcast station. Attaching a DC voltmeter to the discriminator output showed that the discriminator was out of tune. Digging up an old tuning tool I was able to adjust the discriminator transformer to get the voltage to be zero. This caused the center tuning indicator to indicate correctly.

Finally it was not possible to select the desired station using the UP/DOWN tuning buttons. One tap of one of these buttons produced a random increase or decrease in frequency, the switches had a bad case of switch bounce. Taking the front panel apart revealed that the switches were sealed so there was no possibility of cleaning them. Fortunately DigiKey sells the exact replacement for these switches for about $0.39 each. Replacing the two switches fixed the station selection problem.

The receiver was now working fine. The auction listing stated that this receiver was found in Joe's garage, it is now in our garage driving a couple of pairs of loudspeakers. Most of the stereos in our house require turning on multiple components to listen to them. My wife likes this receiver because she only needs to push the big green power button to listen to music while she is potting plants or filling bird feeders in the garage. It was a fun project that turned out pretty well.

Tom
KA3FQS

GPS RECEIVER PROJECT RE-VISITED

"A Packrat GPS Receiver Project", by Gary WA2OMY and Bruce WA3YUE. This article was first presented at the MID-Atlantic VHF Conference in October 2017 and published in Cheese Bits on 26 January 2018. I was inspired and purchased the board. When the kits became available, I also purchased the remainder of the kit including the ARDUINO UNO microcomputer. The design is clearly stated by the authors'. "This project was developed to use surplus GPS receiver boards to provide a precision 10 MHz reference for the ham community for use in equipment that accepts a 10 MHZ reference or clock."

There is nothing unique, it is simply assembling and building a kit designed by others. To make the project fit my application. I added a few features that make it more useful in my station.

On the front panel there is a display on/off switch and multiple 10MHz isolated outputs. The RESET button reboots the Arduino Uno which also initiates a self-survey in the GPS engine. This is handy in case something causes either unit to malfunction. (There is no history of lockups on the GPS engine.)
In the process of building this unit there were a few "improvements" in the Arduino software. One is to automate the self-survey function. The second, much more useful for microwave operators, is to provide a 8 digit grid square display. Build this up for your rover and you can accurately report your grid when running the bands and you will always have an accurate clock for WSJT-X. This project can also provide a 1 pulse per second signal if you have the need for additional timing controls. I have not provided a connector but there are provisions for the signal on the back panel.

Let's take a look inside.
In addition to the GPS receiver and the Arduino Uno I have added a 120 VAC 12/5 voltage power supply seen in the upper left (fused) and a Down East Microwave 10-4 distribution amplifier which provides the 4 isolated outputs to the front panel. I still have a few kinks to work out on the 10-4 amp to give me more level control to the various transverters; most require less signal than provided by the 10-4 as built so I am now using outboard attenuators to prevent overdriving transverters.

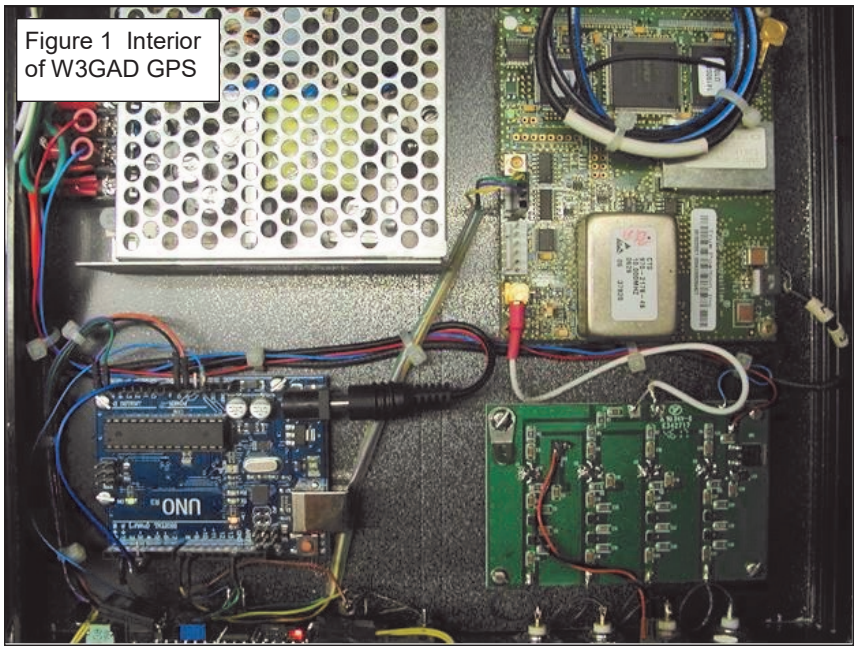


Figure 1 Interior of W3GAD GPS

I do not like soldering directly to the pins on the circuit boards so I salvaged connectors from another project to use with the interconnections to the different modules. The tiny resistor on the back of the switch provides a dimmed state for the display. This is built for rack mounting. I used a salvaged commercial SDR receive chassis from Gary WA2OMY for the enclosure and the 3U panel. A friend with a milling machine provided a made to fit opening for the display, push buttons, display switch and the 10 MHz outputs.

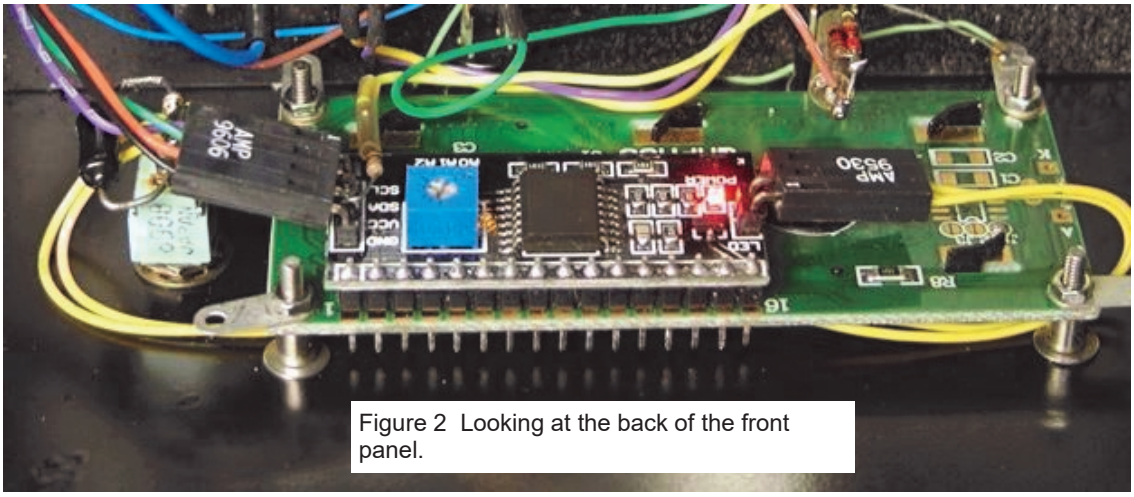


Figure 2 Looking at the back of the front panel.

I made a lot of screen shots of the displays – an expanded explanation of the various screens can be found by looking up the original Cheese Bits article.
Here I will show the various DISPLAYS.
The first series are the variations of the default screen. These are cycled through every 2 seconds.

Figure 3 Default screen 'A' showing DATE, TIME, Your six digit grid

Figure 4 Default display 'B' showing the status of the 10 MHz crystal

Figure 5 Default display 'C' showing the status of the self-survey - it has recently been surveyed and will count down to a zero

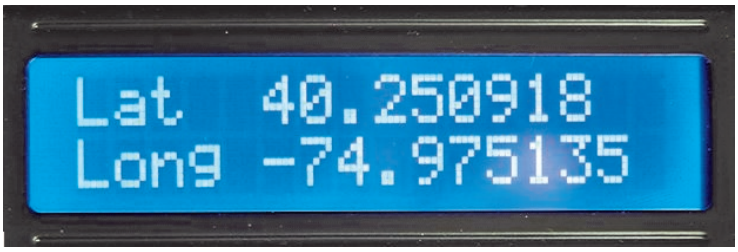


Figure 6 Display with your location selected

Figure 7 Useful display selected - here you get the Altitude of the GPS antenna in meters, useful with the new mapping feature when using the K1RZ/W3SZ database.

Figure 8 The 4th optional screen is is new and provides your 8 digit grid square. (Looks a bit lonely compared to the other screens.)

GPS cont'd…

Well I am very pleased with the outcome and the performance of this project from a Packrat kit. The only limitations on how to package your GPS kit is your imagination.

This project can easily operate using a 12 VDC (13.8) power source by replacing the dual voltage power supply with a simple 9 volt regulator for the ARDUINO and a fused 12 volt bus for the remaining boards.

There is still more to be done. I need to piggyback the distribution amp to provide additional 10 MHz sources for the remaining transverters as all the transverters will have a ref-locked LO in time for the January VHF Contest to eliminate the drifting when using WSJT-X.

There are still some remaining GPS engines available and if there is sufficient interest I believe Gary WA2OMY and Bruce WA2YUE could be persuaded to put together more kits.

73 DE DOC **W3GAD**

YAGIs on Cars

Andrea K2EZ has a nice video of her Yagis (and Loopers) rotating as she drives. See https://youtu.be/jCUipp3ds6E

Here's Bill K1DY's Rover in 2010 with lots o' yagis

Here's Mike, N1JEZ/R's Rover, also in 2010 with rotatable yagis

SK's AA3GN & W3IIT equipment give-away. First day. The only Packrat to stop by was Brian, N3EXA. He left with about a dozen items. I guess the short notice and being a holiday weekend kept the crowds away. (Just kidding). Had the usual local suspects (non-Packrats) show up too! Joe KC2OBI, Jim KA2OON and Karole KB2EYN. Everybody left with at least a box full of stuff. **Warren WB2ONA**

ARISS for the General Public

A very well written article on ham radio communication with the International Space Station can be found at https://phys.org/news/2020-12-earthlings-astronauts-chat-ham-radio.html?utm_source=nwletter&utm_medium=email&utm_campaign=weekly-nwletter
Didn't realize that astronauts made random QSO's from the ISS and they really enjoy doing it. I thought all the Q's were pre-arranged with school groups. A great read!

—W2BVH

Project Moonray

A short biography of Nick W6OLO/ K2SS (SK) by Jeff Pawlan WA6KBL includes a fascinating description of a (possibly) nuclear powered (RTG) repeater Nick was planning to be placed on the moon. It was to be a wideband linear transponder, (432 up, 1296 down) and located under the seat of the Lunar Rover used by Astronaut Owen Garriott, W5LFL. The article is at http://www.nitehawk.com/rasmit/nick.html

—W2BVH

How Long is that Cable?

Many times the situation comes up as to how long is a cable, which might be on a roll or just a random length laying on the floor.

There is a flood of the market with a large variety of antenna analyzers. The easiest to use are the ones that have a Smith chart display. Two of these models are Sark 110 and the NanoVNA. These units have synthesized signal generators that go down to approximately 0.5 Mhz. These units have a Time Domain function which will tell the length of a cable. These functions have shown some difficulties. Below i describe an alternate method which is very accurate and easy to use.

A property of transmission lines is that if the far end is open-circuited, then one quarter wavelength away will measure a short. If you hook up your cable you can adjust the frequency to the point of where a short circuit is shown. This is the frequency of at which the electrical length of the cable is ¼ λ. Since these analyzers will measure down to approx. 0.5 Mhz. A cable that is a ¼ λ at 0.5Mhz. Is 11803/.5=23606 inches/4 =5901/12=491.8 feet. This should be long enough for practical use. As a test I measured a coax cable I had adjusting the frequency of the analyzer until I got to the short circuit point. This turned out to be 41 Mhz. 11803/41 = 287" ; 287/4= 72" this measurement was for a 48 inch cable. 48/72=.67 the velocity of propagation of polyethylene.

73, Walt K3BPP

Congress Asks for Report on Arecibo Radio Telescope Collapse

Two excellent reports with good pictures and videos:

https://www.space.com/amp/arecibo-observatory-congress-report-puerto-rico-funding.html

https://physicsworld.com/a/how-the-arecibo-observatory-created-a-scientific-legacy-for-puerto-rico/

NanoVNA Update

I have updated my inexpensive test gear paper to include information on the NanoVNA:

http://www.packratvhf.com/index.php/technical-articles/228-some-of-my-favorite-test-gear-comes-from-china

A quick tip: If (initially) all you want to do is inspect SWR, visit the following YouTube tutorial: #480 NANOVNA Made Simple https://www.youtube.com/watch?v=QJYeFpiqY8c&t=15s It quickly shows how to calibrate your NanoVNA and turn off features that may be extraneous to measuring SWR

Of course Alan Wolke W2AEW tutorials on the NanoVNA are also highly recommended: https://www.youtube.com/user/w2aew

73, Michael **KB1JEY**

The InfoAge Space Exploration Center Presents

A FREE ONLINE LIVE ZOOM Event

Zoom Meeting ID: **972 2218 5664**

January 10, 2021-10:00 am - 4:00 pm

THE 75th Anniversary Of The PROJECT DIANA MOON-BOUNCE!

Hear The First Radio Signal Received on the Earth from Above the Iono-sphere!

Newly Discovered Information by InfoAge His-torians about

Edwin Armstrong's Contribution to Project Diana

ALL FREE!

How to Prevent ESD Damage

Dan KB6NU has a nice page and a half write-up on steps you can take to prevent ESD (electrostatic discharge — otherwise known as static) damage while building up circuits. It's an ODT file you can download from https://click.mlsend.com/link/c/YT0xNTgzNTMxODg5M-jQ1ODIwMjgzJmM9cjd4OCZlPTEwMTQmYj00ODY4ODAwMDAmZD1lNncwaTh0.vrDQkQDiioDBHn4rJAW3Qqe9nwDbb8UxpIyNnSDOIYc

It can be read using LibreOffice or MS Word

Easy and practical steps to increase your chance of the circuit working the first time.

Image Reception this morning via Ed Fong Tri-Band J Pole in the attic, TS 2000 and MMSSTV Program. Transmissions are indicated to continue through the New Year. 73, Good Listening and Happy New Year. Griff NE3I

Toroid and Impedance Matching Network Calculators

An online interactive toroid inductance / turns calculator and an impedance matching calculator: As a start, go to: http://toroids.info/FB-43-101.php. You can select the donut of your choice there and then calculate the inductance, turns count, and capacitor value for the matching network you need.
—W2BVH

UV Photo of the Sun

You can find a stunning UV photo of the sun at https://apod.nasa.gov/apod/ap180204.html . In the upper part of the picture the planet Venus is backlit. Equally dramatic pictures can be found by clicking the link "Discover the Cosmos" near the top of the page.
—W2BVH

Minimalist QRP Book

The "Minimalist QRP Book" by IZ3AYQ is available to read online or download as a PDF (for free) at https://drive.google.com/file/d/1dw61-PQ-4JA9feh93H_KrldD4RpN1zZT/view

It's a 77 page self published book with dozens of designs for QRP Transceivers, Receivers and Transmitters. Many have just a few dozen components and can be built in half a day or so. You might be hesitant to build the ones that use quartz crystals, because they're hard to obtain. But a quick look on the internet shows that's not true. Crystals at the usual QRP frequencies are commonly available for all HF bands and are very inexpensive.

You may also hesitate, thinking that you can't do much with the 100 mW to 5W that many of these radios make. As weak signal VHF ops we should know better. I built the (relatively) famous "Tuna Tin 2" transmitter years ago, when it first became available (as a $10 kit — minus the tuna can). That transmitter makes 0.35 watts and my third or fourth QSO with it was Italy.

See what you think…. —W2BVH

The Wayback Machine
In CHEESE BITS, 50 Years Ago

Nibbles from January 1971. Vol. XIV Nr. 1
de K3IUV Bert
(*author's comments in italics*)

"**Our Prez Sez"**. Prez El, **K3JJZ** (*also editor at the time, and our current auctioneer*) emphasized member's contest preparations. "New converter not done? Antennas still in the garage? Do what industry does when it falls behind. 1) work overtime. Spend less time at the boob tube. 2) Put more men on the job. Ask for help. We have it. 3) We are currently #1, and intend to stay there. Do your part!"

Tidbits. Club member Paul, **K3WEU**, and the Inglis House Radio Club were the subject of an article in the Evening Bulletin (*another "thing that isn't there anymore"*). The club had been actively supporting the creation of this club at the Senior Center. Also. The date for the 15th Anniversary dinner has been set for May 8. Location will be The Buck Hotel in Feasterville. "Many surprises will be in store, as well as an excellent meal. Keep the date open!"

Technical Article. An interesting article described an Ordinance enacted by the Township of Princeton, NJ. The Ordinance attempted to define and control "Electromagnetic Radiation." Comments on the Ordinance by several of our members cast doubt on the legality of the Ordinance. (*Too lengthy to treat here. Read about it on our website*.)

From the Book Rack. Paul, **K3WEU**'s monthly column discussed the book "1970 Popular Tube / Transistor Substitution Guide". Published by TAB books, and available for $4.95 with leatherette binding, or paperback for $2.95. This was an update of the earlier edition, with the **transistor section added**. The new edition includes US substitutes for foreign tubes and transistors. A useful tool for hams and hobbyists. (*In "the old days," a proliferation of tube and transistor types was a problem in servicing equipment. "Substitutes" were usually devices with identical pinouts and equal or better performance*.)

New Products of Interest to Hams. This aperiodic column was written by Lynn, **W3NSI.** He described: 1) A variety of antenna fittings and hardware now available from "Kirk Electronics, Dayton, Ohio." Things like boom clamps, driven element insulators, and other hardware which is hard to come by in the Ham market. 2) A Reversible Ratchet Handle from Xcelite. These handles are now available for their line of nut drivers and reamers. Lynn said "It's one of these 'Why did they wait so long to do this?' items." 3) Antenna Rotator by Radio Shack. Advertised to handle a 3-element 20-meter beam, so it should be useful for handling our stacked VHF beams. With a built-in brake and clutch, it is available for $40.

Calendar. Next meeting, January 20. The topic will be the annual "Crying Towel Session." Each member will be invited to explain "How he thwarted Murphy's Law – or maybe he didn't?" The saddest story will be awarded a prize (*The Towel*?) Coffee will be served, and guests are invited.

Membership. New members this month included: **WA3DNC**, George McCouch and **WA2UUV/3,** Bill Fulling. Look for them both in the January contest.

2 Meter Activity Report. **W2EIF,** Joe, reported some good propagation this month, with **WA4DUR** and **WA4WJP** from North Carolina being worked on CW and SSB. Also worked was **VE3ASO**, Dennis, who reported he would be on from Toronto during the January contest.

January Contest. The co-chairman, Walt, **K3BPP,** and Don, **W3CJU**, emphasized the same things that win contests today. "Get on the air and work as many stations as possible. Let's all try to get the 'worked 50 Packrats certificate. Have fun and hope for good band conditions."

Advertisers. As usual, a page was included which contained Business Card Ads for many suppliers and members. This issue contains 17 such ads. The cost was $1 per month. (*I noticed that with the recent demise of Radio Shack, all 17 are now gone*!)

Swap Shoppe. By W3ZRR. *(Always nostalgia. Now we use the club reflector.*) By Sid, **W3GEW**, a 2E26 6-meter transmitter with modulator and power supply. $15. And a Nuvistor 6-meter converter, $20. From Herb, W2HF, a "wanted to buy," for cables and power supply for an RBB receiver (*anyone remember what that was*?)

Miscellany. *Postage for this copy was still a single 6-cent Roosevelt stamp. 4 double sided, 8-½ x 11" sheets). As usual, many "folksy" comments about members, their families, and activities were included in this edition of Cheese Bits. If interested, or for more detail on any of the above items, visit our website (**WWW.W3CCX.COM**) and read the full issue scanned by **K3IUV** (me), and posted on the website by **W3SO**, our webmaster. I have also posted the club Officers history, club Membership history, and Packrat Inventory (updated frequently) on the **W3CCX** website. These files are password protected, and only accessible to registered members. Have you registered? I hope you enjoyed reading these bits of nostalgia as much as I did in writing the article. If yes, you might let me know. Thanks to those that did.*

Thirty, de **K3IUV** (**K3IUV@ARRL.net**)

Recycling Advice from WF3W

Electronics:
You can sell your old electronics on Gazelle and make some easy cash. Visit their website, find your gadget, answer a few questions, and ship it off for free with their pre-paid envelopes. Payments are made via check, Amazon gift card, or PayPal. **Other Options.** Here are some other companies that will buy your used electronics: GreenBuyback, uSell BuybackBoss.

Scrap Metal:
I know, the thought of scrap metal makes you think of a big junkyard. But the truth is most things that are metal (including cars, bikes, appliances, cans, file cabinets, BBQ grills, etc.) can be recycled for cash. To find out how much you can make, go to GotScrap.com and fill out their online form or give them a buzz.

Events

For inclusion, please direct event notices to the editor.

Winterfest - Hamfest - January 9, 2021. **(Canceled)** Harrisburg, PA.

January VHF Contest - Contest - January 16-18, 2021. See http://www.arrl.org/january-vhf for rules and details. Also see the Packrat web page for club specific info. (Info will be posted shortly).

2M Spring Sprint -Contest– Monday April 5, 2021, See https://sites.google.com/site/springvhfupsprints/home/2021-information for details.

222 MHz Spring Sprint -Contest– Tuesday April 13, 2021, See https://sites.google.com/site/springvhfupsprints/home/2021-information for details.

432 MHz Spring Sprint -Contest– Wednesday April 21, 2021, See https://sites.google.com/site/springvhfupsprints/home/2021-information for details.

Microwave Spring Sprint -Contest– Saturday May 1, 2021, See https://sites.google.com/site/springvhfupsprints/home/2021-information for details.

6M Spring Sprint -Contest– Saturday May 8, 2021, See https://sites.google.com/site/springvhfupsprints/home/2021-information for details.

June VHF Contest - Contest - June 12-14, 2021. . See http://www.arrl.org/june-vhf for rules and details.

Murgas ARC Hamfest & Computerfest - Hamfest - July 4, 2021. Plains PA. http://hamfest.murgasarc.org

CQ WW VHF Contest - Contest - July 17- 18, 2021. Details to follow.

222 and Up Contest - Contest - August 7– 8, 2021. Details to follow.

10 GHz and Up Contest (Round 1) - Contest - August 14 ```– 15, 2021. Details to follow.

September VHF Contest - Contest - September 11-13, 2021. Details to follow.

10 GHz and Up Contest (Round 2) - Contest - September 18-19, 2021. Details to follow.

EME - 2.3 GHz & Up – Wknd 1 - Contest - September Date TBD

EME - 50—1296 MHz – Wknd 2 - Contest - October Date TBD

EME - 50—1296 MHz – Wknd 3 - Contest - November Date TBD

"On FT8, no one knows you're a dog."

Sent to Cheese Bits by Warren WB2ONA

Some Antenna Headings Calculators

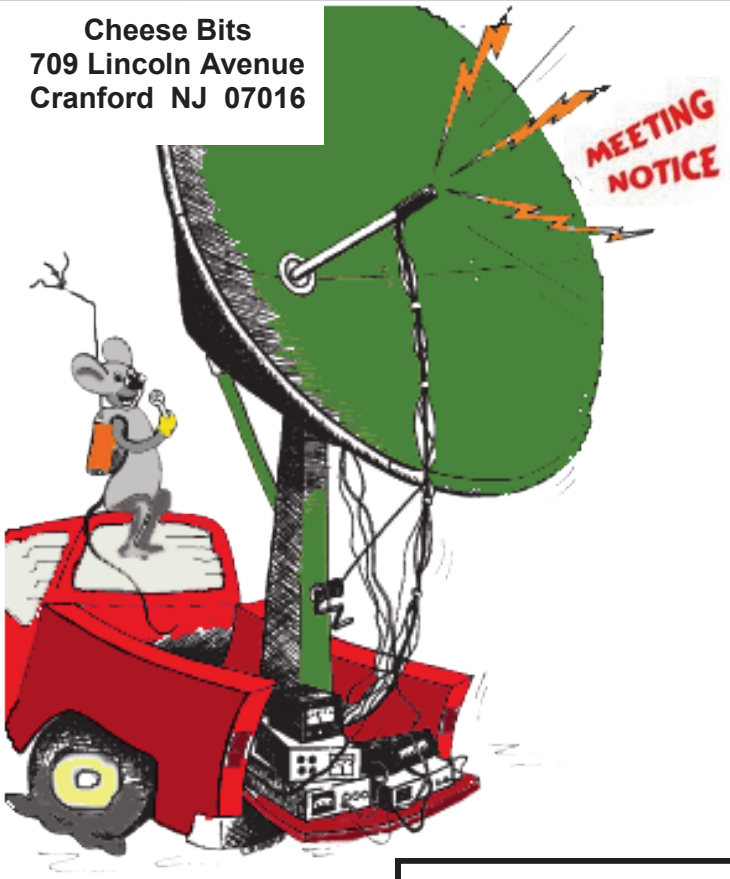
With different features and complexities:

1. http://k2txb.net/WinBd.htm

2. https://www.qsl.net/w3km/
Click on “SQUARES” at the very top of the page

3. PstRotator at https://www.qsl.net/yo3dmu/index_Page346.htm

Cheese Bits
709 Lincoln Avenue
Cranford NJ 07016



TO:

MT. AIRY VHF RADIO CLUB, INC.