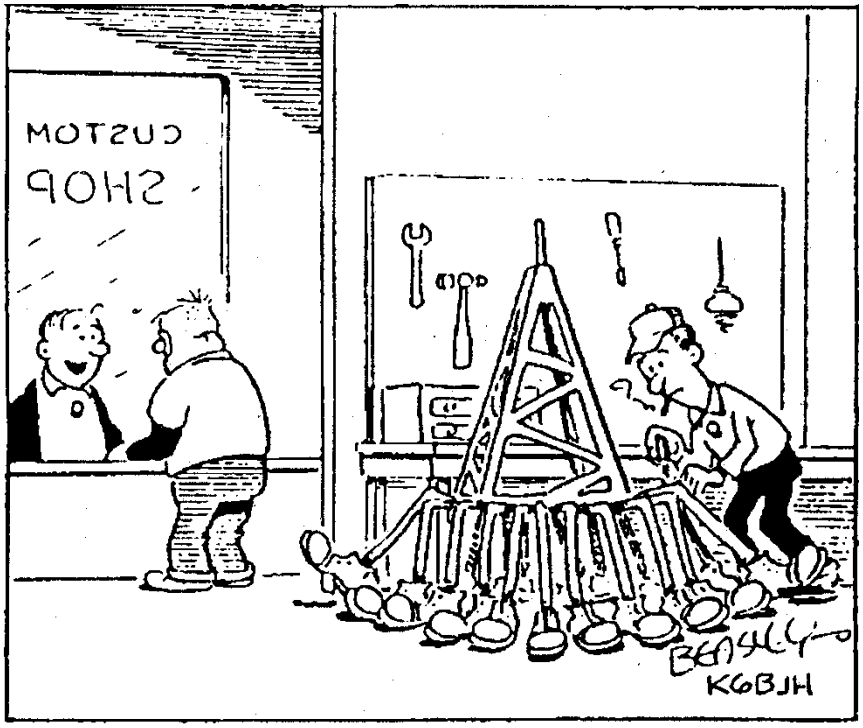
ATCO NEWSLETTER

VOLUME 37 NUMBER 1 **January 2020**

The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Thanks to Beasley, K6BJH (SK) for allowing us to share his cartoons.



HAVE YOU FINISHED BUILDING MY 50 FOOT TOWER ?

ACTIVITIES ... from my Workbench

Hey, I usually start out here talking about how bad the weather is…nope, not this time. I have absolutely no room to complain. Moving on…

The repeater 439 interference is still there and I've had no word from the FCC about it. As you probably remember, it's a digital type of wide bandwidth RF signal present only at night blocking the 439 MHz ATV repeater input. It now seems that the FCC doesn't care as we're secondary users and it's not blocking anyone else (to my knowledge). Reasoning it out, the FCC office is in Chicago so it would take at least a team of two to travel here, stay overnight to check it and go home the next day at a minimum. That's stretching their resources so it's my guess that they don't really care and if they wait long enough, it will go away on its own. I understand that reasoning based upon their strained resources. Soooooooo…I'm thinking about taking matters in my own hands. I figure that if I find its exact location, and list the exact coordinates, the FCC would be willing to issue an official memo to the interfering party to stop transmitting. OK, that sounds good but how do I go about positively identifying the source given the fact that I'm told I'm not allowed in the building where I suspect the interference is originating. Let me think about that one.

I've got it!!!! I'll install a 439MHz TV transmitter at the repeater and connect it to our 439 receive antenna. I'll start transmitting at dusk and shut it off at dawn. The 439 input is useless to us the way it is so no harm to us but I'm hoping it'll cause interference to the one causing us interference. If I identify my ATV signal with my call sign, I'm sure I'm legal. I'll see if that works and let you know (if I'm not in jail).

The next hot topic is about the teleconference system we set up for the Tuesday night net on 147.48MHz. Instead of streaming the video on BATC, we are now using a computer program called ZOOM, similar to Skype but MUCH better and with almost no latency. The BATC system worked but the latency became intolerable starting out as a few seconds but gradually increasing to minutes within about ½ hour. ZOOM is free to use and VERY easy to install on the computer, I-pod or smartphone. It will handle up to 100 participants which is way more than we need and it's fully interactive so it is just like talking to a group in the same room. Now, it's been said, "That's not HAM RADIO" (or ATV) which is correct. However, it's a great introductory way of getting together and discussing ATV. It only takes a computer which almost everyone has so prospective Hams can join in too. Actually, we have had some non-Hams join us and say it's nice to discuss the topic. They've been thinking about joining and talking about potential receiver and transmitter choices!

Next, it's about Jones Road linking to Dayton. Dave, AH2AR and I are working on a DARA / ATCO link to connect us together. So far, we've installed 1280 MHz loop yagi antennas pointing to both DARA and ATCO. (That's me pointing the DARA loop yagi toward them. The ATCO loop antenna is above it.) We also have a 439 MHz rib cage slot omni direction antenna that works well to receive both DARA and ATCO as is. Dave has been using it with his "Gap-Filler repeater unit to receive both DARA and ATCO. Then after about 2 weeks of perfect operation, all of a sudden, the signals degraded. We think something happened to the antenna, (I installed it over 15 years ago intended to be used as a remote 439 ATV signal input). Since I'm not willing to climb the tower to retrieve it in this weather (to the 50-foot level), activity is minimal till Spring when my hands won't stick to the tower sections. More on that activity in the Spring.

That's all for now. More later, Stay tuned!
...73 WA8RMC

ATV NEWS FROM OTHER CLUBS

1 - I've heard about a small group of Amateur Radio TV operators in, Redding, California. The WR6TV REDDING REPEATER AND ATV SOCIETY which operates on 3.4GHz output 500 mw. I'm going to find out more about how they operate that simple but reliable setup, stay tuned.

2 - Tuesdays activity on the W6CX, Mt. Diablo ATV group is always interesting hearing more about systems improvements both on the mountain top repeater site and back home with the ACAMPO 23cm transmitter updates given by Bob, WB6ASU. Interest also on upgrading to DVB-S2 is one subject. W6ATN, lots of maintenance, adjusts and upgrades being conducted by Mike, WA6SVT and the team. A DMR Talk-Group set up on 9410 for those with DMR transceivers, can get you in as participant during the net ask your questions about current activities with the group. No ATV equipment but want a taste of TV with the group, IP conference application, "Whereby" can get you connected to ATN. Easy video meetings with no login or downloads. Video conferencing with screen sharing, recording and much more.

3 - Wednesday nights with the W8BI Dayton, OH {ATN Affiliate] with David, AH2AR and Reuben, W8GUC [Net-control] is a great network to visit. Great participation by the team. Technical show and tell by David are always a pleasure to watch and learn. This past week more testing with the ATCO, WR8ATV group linking project. You'll need to watch the DVR of the net to see and hear what I'm talking about.

4 - W2NYC, Ben [Net control] for K6BEN Silicon Valley ATV Group is a wonderful group leader for his team, good participation by all, great signals on to the repeater, P5 video always.

5 - W0BTV- Boulder, CO - Jim Andrews, KH6HTV and Don, N0YE always present a great informative net. Jim conducted a technical show-and-tell and I always learn so much from Jim. subject matter PA comparisons from those Made in China compared to his products, Jim you win hi hi! And it's always a pleasure to see and hear from the members also. I always enjoy the travel videos from Jim, interesting indeed.

6 - No news or updates from Washington States, WW7ATS ATV Group in Seattle and the, W7AMQ ATV, Portland, OR.

7 – SD | Oceanside DATV Group - Come January 2020 we will be taking both DATV repeaters out of service for upgrades. Site One located in the City of San Diego [R1] and the Oceanside [R2] unit since they are twin systems. The operating software to the matrix repeaters controllers will getting some major updates to help improve the auto time slot linking processing, IP Ethernet port switching, Wifi/Bluetooth interface {remote maintenance related application access} and more. The VR-Link DATV X-Band Repeater will cover our service area till the other units are placed back in service since most of us live along the coast and can access the VR-Link unit. We are working also on the Singapore DV transmitters adjusting for smaller bandwidth operation. The default lowest is set to 5 MHz the rest is just too wide for Amateur Radio TV. RF output adjustment via UART is no issue, a built in Class A Liner PA is built in to the unit. We are trying to get this to where it is acceptable for bandwidth usage and adjustment. Our goal DVB-T uses in 13cm and 23cm.
…Mario KD6ILO

News from San Diego I thought I'd share this with the group, our RPA HL {Heavy Lift} Drone we call "SARDRONE". We did a test flight early this morning near a experimental field near Chula Vista, we did stay just below 350' since we were also testing new motors for more lifting with an upgraded HD camera payload, 5.8Ghz FM transmitter package and smart phone as an airborne hot spot and extra eyes using, Vsee, a video conferencing link.
…Mario KD6ILO

HIDES BR-101E GAP-FILLER/REPEATER PRELIMINARY TESTING

Preliminary testing of the BR-101EH used as a cross band demodulator/modulator link shows excellent potential as one leg of a standalone cross band repeater. For the test, I provided a signal from a distant DVB-T transmitter running on 428 MHz (Dayton W8BI DVB-T output) and prior to the test, set the parameters of the BR-101E for the demodulator parameters of the incoming signal at 428 MHz with a 2 MHz bandwidth, QPSK constellation, with 641/642 PID value (photo #1). I configured the modulator side of the BR-101E to transmit on 1280 MHz, QPSK @ 2 MHz bandwidth, also set to the same PID values: 641/Video 642/Audio (photo #2).

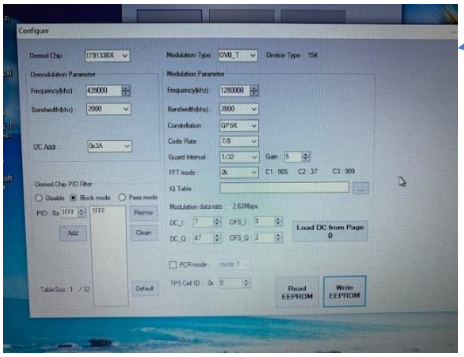


PHOTO #1: Straightforward config. menu shows the GUI for mod. / demod. Parameters.

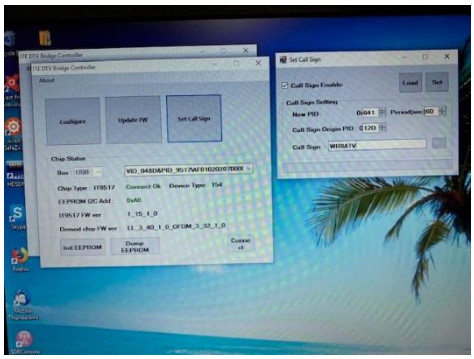


PHOTO #2: GUI for PID VALUE & Callsign Parameters for modulation section

The DVB-T RF output of the re-transmitted signal from the BR-101E is -18 dBm, and is adjustable with an internal attenuator/gain adjustment and the system parameters are initially configured with a Windows PC. It's important to note that a personal computer IS NOT required during its operation. The unit has a "DONGLE/SDR appearance" (see photo) and a quick glance at the HiDes advertisement would wrongly infer that the dongle-sized unit appears as if it would require a computer for operation, (such as what is required for the HiDes UT-100 transceiver dongle), but this is not the case. Consequently, being standalone provides more reliable communication as computers in-the-loop sometimes create problems during power failures or computer crashes and are normally unusable at unattended sites.

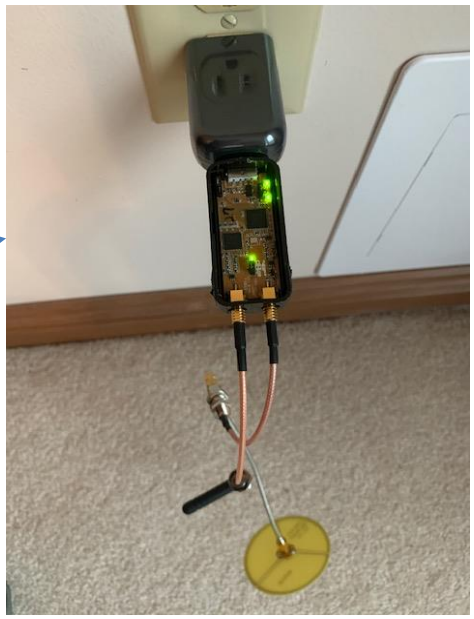


PHOTO #3: BR-101EH transmitting with "Valid Green LED" indicating demodulation in **progress. Directly plugged into 5 VDC, with "gimmick" antennas for 70cm and 23cm antennas for testing in-shack.**

The unit is powered by a 5 vdc USB cable. This same USB cable that provides DC power is also used to initially configure the system parameters with free software provided by HiDes.

For the preliminary test, I used a MINI-CIRCUITS ZHL42W amplifier as a means to increase the BR-101E's transmitted RF power up to approximately 1watt output (See photo) with a resultant acceptable 30 dB shoulder. There are a number of other amplifiers that can provide the necessary gain to bring the BR-101E's -18 dBm RF output up to a usable RF power level, in order to drive an amplifier. We have yet to examine whether filtering will be needed for out of band harmonics.

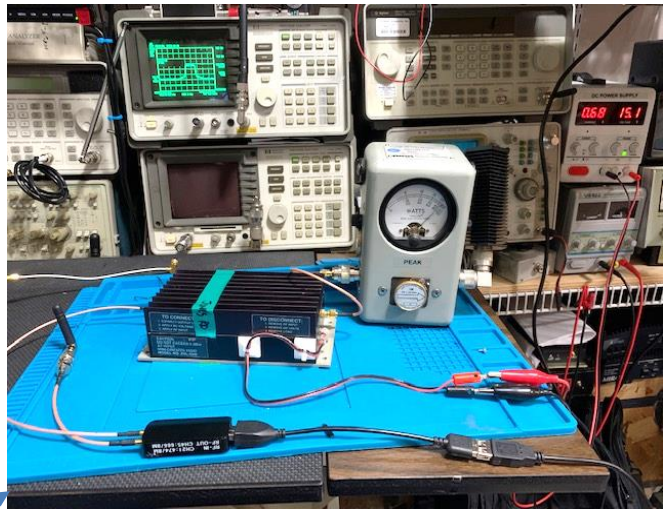
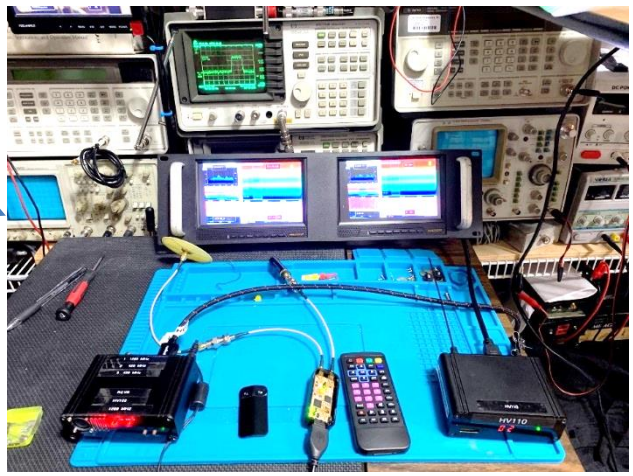


PHOTO #4: Mini Circuits amplifier (driver) in line on the test bench with the BR-101EH Gap-filler/repeater. (Note that the Bird 43 wattmeter is being used for relative RF output only... **Wattmeter indicating ~ 1 watt)**

When powered on, the BR-101E provides a continuous output with a blank raster (on 1280 MHz in this case) when it is not receiving for about one minute after the received signal leaves the air, then the modulator ceases transmission until another signal is received. It also has a CALLSIGN feature that can be set to any unique callsign within its graphical user interface during initial configuration. The specified callsign/TS file transmission functionality that allows for timed callsign display has not been explored yet, and more information about this important function will be forthcoming. I was initially unable to understand how this function is properly configured with the instructions provided. I will further explore this function.

When receiving a distant signal, it re-transmits whatever DVB-T signal it is receiving (with the configured parameter values) and there is absolutely no degradation of the re-transmitted video as it uses a transport stream internally between its demodulator and modulator so no video or audio data is lost. Although not clearly seen in the photo, the two separate HDMI monitors show the HDMI signal on 439 MHz before entering the BR-101EH and also the re-transmitted signal from the BR-101EH on 1280 Mhz. There is virtually no discernible difference in video quality when compared side-by-side. Off angle viewing in the photo makes it appear there is a difference, but there is none, honest!!

PHOTO 5: HV122 1280 MHz receiver on the left side of the bench is receiving the BR-101EH signal. The HV110 on the right is receiving the 439 MHz signal that is being transmitted from the out-of-frame HV310. Comparison of the re-transmitted signal on 1280 MHz is virtually identical from the original DVB-T signal being received on the right-hand-side HV110 receiver.



The Gap-filler output looked as good as the original signal being transmitted, and for the preliminary test, the unit faithfully retransmits the received video without loss of any resolution, picture quality or detectable pixelating.

For cross-band repeater use it works superbly. I have as-of-yet to see whether it will work for in-band repeater use because modulator/demodulator de-sensing will likely will be an issue, since there is no physical isolation between modulator and demodulator and consequently likely won't work for that purpose, but as I get further into this, I will see whether this is feasible. Jeff at HiDes indicated that he did not believe the unit can be used as an in-band repeater, but he stated that he is curious to hear what further testing may be unearthed.

Lastly, when it is demodulating a DVB-T signal, the PCB has a "green valid signal LED" that can be exploited to switch a relay or provide other functions. The valid signal LED is used on other HiDes receivers for relay control switching and there is no reason why this methodology can't be employed with the BR-101E to support other functions. The only limiter here is the surface mount LEDs are exceedingly small.

The unit gets very warm to the touch (but not hot) during extended operation and the heating could likely help to bring it down to a lower operating temperature by fan cooling for repeater use. HOWEVER, note that when the incoming received signal leaves the air, the unit stops transmitting in 60 seconds. When the signal comes back up, the modulator once again becomes active/starts transmitting.

Pass-through latency is about 1 second, because there is no decoding and encoding occurring since a transport stream is employed between its demodulator and modulator and is not going through a second encoding/decoding step or analog to digital conversion. These and other functions need further checkout and I still have to figure out how the callsign features work on this unit. It's there, but the instructions are a little unclear (for me!) Hopefully, Jim Andrews KH6HTV will be able to provide a further in-depth review of this unique "micro" Gap-filler/repeater that literally can be lost inside your pocket.
…Dave AH2AR

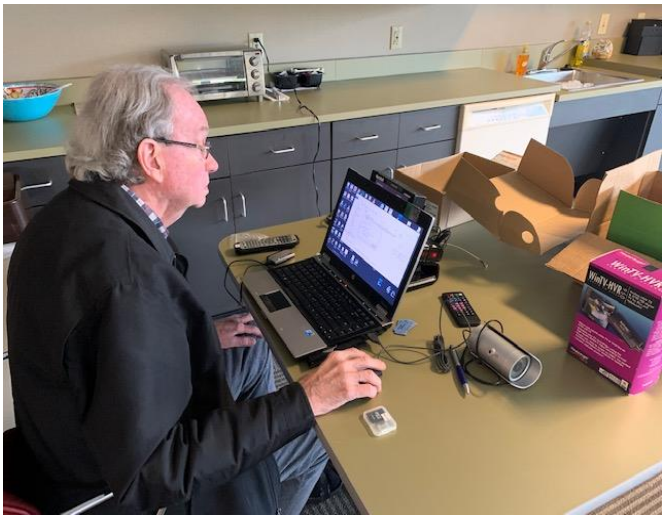
ATCO FALL EVENT DETAILS

I attended the ATCO Fall event on 27 October near Columbus. ATCO puts on an excellent twice-a-year get-together. Ken W8RUT donated a number of door prizes and my ticket was the first to be drawn out of the barrel... errr... hat and I walked away with a 440 MHz mobile radio... not ATV related but still a nice prize indeed! The ATCO Newsletter took fourth place in the U.S. via an ARRL selection this year with good reason. Art always does a terrific job in providing information of ATV interest to ATVers in the region. Maybe this note will show up in next month's ATCO newsletter!

…AH2AR

ATCO members at the Westerville Fall event.

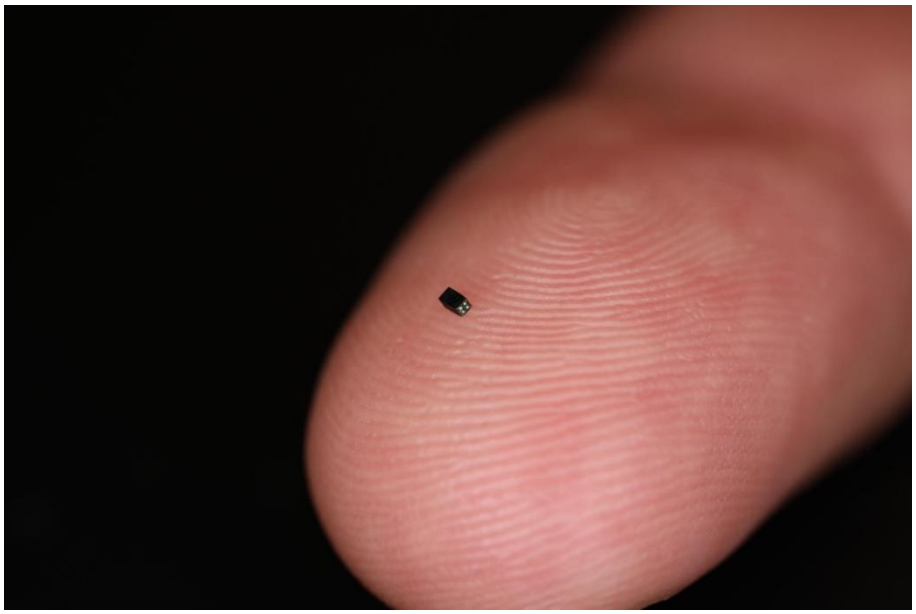
More door prizes than attendees... Good reason to attend!



WB8CJW Dale programming four HV110s with a channel list for repeater and simplex use

OMNIVISION ANNOUNCES WORLD RECORD FOR SMALLEST IMAGE SENSOR

by Bob Yirka, Tech Xplore
https://techxplore.com
Credit: OmniVision



OmniVision, a developer of advanced digital imaging solutions, has announced that it has won a place in the Guinness Book of World Records with the development of its OV6948 image sensor—it now holds the record for the smallest image sensor in the world. Along with the sensor, the company also announced the development of a camera module based on the sensor called the CameraCubeChip.

In its announcement on the company website, representatives of OmniVision suggest the main use for the new sensor and camera module is for medical applications. They claim the camera module can be affixed to disposable endoscopes to capture high-resolution images of very tiny parts of the body via blood vessels such as nerves, eye parts, the heart, the spine, gynecological areas, inside joints and in parts of the urological system.

Reps for the company note that the U.S. Food and Drug Administration has recently pointed out that cross-contamination issues related to the reuse of endoscopes requires prevention. The new camera, when used with new disposable endoscopes, solves the problem by removing the need to reuse such devices.

Features of the new camera with the tiny sensor include a 120-degree field of vision along with a focus range of three to 30 mm. The sensor has an image array that allows for 200 x 200 resolution and can process video at 30 fps. The camera also has an analog feature that transmits image data to a distance of four meters. The camera will also be noticeably cooler than traditional probes, allowing for longer periods of use inside of patients—it consumes just 25 mW of power.

The company also reports that the camera module has a wafer design and is just 0.65 mm x 0.65 mm square—and it is just 1.158 mm thick, making it approximately the size of a grain of sand. OmniVision reps further note that its small size allows its use in more than just endoscopes—it can also be used with guidewires and catheters. The difference in size will no doubt be much appreciated by patients who have had to undergo uncomfortable and sometimes painful invasive procedures with current technology. The company also hopes to expand the range of potential users to include veterinarians, dental practitioners and those in industry.

NATIONAL ATV NEWSLETTER?????

Mario Badua KD6ILO proposes a National newsletter describing active projects in the USA.
I respond by saying,
OK, I take it that it is something you'd like to initiate, not something that currently exists. Right? It sounds like a new start to the now defunct ATVQ Magazine the editor wanted to re-start as an internet publication**.** Sounds great! Who will initiate that? Art.

Well Art, its' *all of us in the U.S.* that are active members of the Amateur Radio TV community. This is something I want to share and start, maybe writing about what all of us are doing in the Amateur Radio image communications sector, just knowing how well and what all of you are doing to bring together and improve our participation, networks, sharing of technical improvements upgrades to our networks. I also try to find those ATV stations {small clubs, societies etc.} that are in parts of the country that are hidden and bring them the information that ATV has a very active network. Hope that answers part of your question? I found an ATV Society in Redding, CA that I never heard of, WR6TV.

3.4 AND 5GHz HAM BANDS MAY BE GOBBLED UP BY BROADBAND

Attention Ham users of the 3.4 and possibly the 5GHz ham bands. We are likely to lose it! The broadband companies need more bandwidth for their 5G operations and are willing to shell out money to get it. As a result the FCC is asked to find space for them so they sharpened their pencils, found some infrequently used Ham Radio spectrum and went to work. It's my assumption that since the Hams put up less noise about it and are a weaker force, we're a big target. Below is summary of the rulemaking:
November 21, Shared Use in the 3.1-3.55 GHz Proposed Rulemaking - WT Docket No. 19-348
Background: The MOBILE NOW Act requires the Commission and the Department of Commerce to make available new spectrum for mobile and fixed wireless broadband use, and further requires the Commission to work with the National Telecommunications and Information Administration to evaluate whether commercial wireless services and federal incumbents could share use of spectrum between 3.1 and 3.55 GHz. This Notice of Proposed Rulemaking would propose to remove the existing non-federal allocations in the 3.3-3.55 GHz band as a step towards potential future shared use between federal incumbents and commercial users. By taking the initial step needed to clear the band of allocations for non-federal incumbents, the Commission furthers its continued efforts to make more mid-band spectrum potentially available to support next generation wireless networks—consistent with the mandate of the MOBILE NOW Act. What the NPRM Would Do: •Propose to clear the 3.3-3.55 GHz band of existing non-federal users by removing the non-federal secondary radiolocation and amateur allocations in the 3.3-3.55 GHz band;•Propose to relocate incumbent non-federal users out of the band;•Seek comment on relocation options and transition mechanisms for incumbent non-federal users, either to the 3.1-3.3 GHz band or to other frequencies; •Seek comment on how to ensure that non-federal secondary operations in the 3.1-3.3 GHz band will continue to protect federal radar systems; and prepare the band for possible future shared use between commercial wireless services and federal incumbents, potentially making as much as 250 megahertz of spectrum available for flexible use, including 5G.

Of the frequencies between 3100 MHz and 3550 MHz, NTIA has identified the top 100 megahertz in the 3.45-3.55 GHz band as the most promising portion for sharing in the near term and is conducting a feasibility assessment in collaboration with the Department of Defense and continues to study the feasibility of sharing in the entire 3.1-3.55 GHz band with existing and future federal users. Currently, the entire 3.1-3.55 GHz band is allocated for both federal and non-federal radiolocation services, with non-federal users operating on a secondary basis to federal radiolocation.
It is my understanding that the proposal has been approved and awaiting a vote to put it into effect. We'll see how it turns out. Currently we have no operations in the 3.3 GHz band in the Columbus area.
…WA8RMC

MORE INFO ABOUT THE 3.5GHz GHz BAND

https://www.comsoc.org/publications/ctn/terahertz-communications-quest-spectrum <https://www.comsoc.org/publications/ctn/terahertz-communications-quest-spectrum>

Terahertz Communications: The Quest for Spectrum

If there is a trend in wireless communications, it is the unrelenting increase in signal bandwidths. For decades, bandwidths have increased within a restricted –and increasingly congested– frequency range in the microwave realm, between 1 and 6 GHz, where radio propagation is favorable. Higher frequency bands were perceived as inhospitable because of the harsh propagation conditions and the prohibitively expensive hardware. In recent years, though, research has broken through the mmWave frontier, and early 5G deployments are underway with components in the 30-GHz bands and above. Transmission ranges have become short enough to be compatible with mmWave propagation, which in turn has revealed itself somewhat more benign than anticipated.

With higher frequencies gates open, perceptions have changed. Now it seems the sky is the limit, to the point researchers are already looking into the sub-THz (100-300 GHz) and full THz realms, where many GHz of idle bandwidth await.

… Jim A, KH6HTV

…and now ARRL responds,

ARRL to Oppose Proposal to Eliminate 3.3 - 3.5 GHz Amateur Allocation

At its December 12 open meeting, the FCC will consider adopting a *Notice of Proposed Rulemaking* (*NPRM*) that proposes to remove the amateur radio 9-cm. allocation at 3.3 - 3.5 GHz. ARRL plans to comment in opposition to the proposed action. According to an FCC "Fact Sheet," the proceeding WT Docket 19-348, "Facilitating Shared Use in the 3.1 - 3.55 GHz Band," is a follow-on from the MOBILE NOW Act, approved by the 115th Congress, which requires the FCC and the US Department of Commerce to make available new spectrum for mobile and fixed wireless broadband use. It also requires the FCC to work with the National Telecommunications and Information Administration (NTIA) to evaluate whether commercial wireless services and federal incumbents could share spectrum between 3.1 and 3.55 GHz. NTIA manages spectrum allocated to federal government users.

"This *Notice of Proposed Rulemaking* would propose to remove the existing non-federal allocations in the 3.3 - 3.55 GHz band as a step towards potential future shared use between federal incumbents and commercial users," the FCC Fact Sheet explains. "By taking the initial step needed to clear the band of allocations for non-federal incumbents, the Commission furthers its continued efforts to make more mid-band spectrum potentially available to support next generation wireless networks."

The *NPRM* proposes to clear the 3.3 - 3.55 GHz band of existing non-federal users by removing *non-federal secondary radiolocation and amateur allocations* [emphasis added] in the 3.3 - 3.55 GHz band and to relocate incumbent non-federal users out of the band. The FCC would seek comment on relocation options and "transition mechanisms" for incumbent non-federal users, either to the 3.1 - 3.3 GHz band or to other frequencies.

Regarding the Amateur and Amateur-Satellite Service allocations, the FCC *NPRM* asks whether existing amateur spectrum in other bands might support operations currently conducted in the 3.3 - 3.5 GHz band. The 3.40 - 3.41 GHz segment is designated for amateur satellite communication. "We seek comment on the extent to which the band is used for this purpose, whether existing satellites can operate on other amateur satellite bands, and on an appropriate timeframe for terminating these operations in this band," the FCC *NPRM* says.

Also, at its December 12 meeting, the FCC will consider another *NPRM* in WT Docket 19-138 that would "take a fresh and comprehensive look" at the rules for the 5.9 GHz band. The amateur radio 5cm allocation is 5650.0 - 5925.0 MHz, and the *NPRM*, if approved, would address the top 75 MHz of that amateur secondary band. ARRL will also file comments opposing any changes affecting the 5-centimeter amateur allocation. Both draft FCC proposals are subject to change prior to a vote at the December 12 FCC meeting.

HOW DID WE BECOME KNOWN AS “HAMS” ?

From the Assistant Section Manager

John Perone, W8RXX

There are a few versions of the story how we became known as “HAMS”. Here is one that perhaps makes sense. This comes from the Florida Skip Magazine way back in 1959.

Have you ever wondered why radio amateurs are called "HAMS?" Well, it goes like this: The word "HAM" as applied to 1908 was the station call of the first amateur wireless stations operated by some amateurs of the Harvard Radio Club. They were ALBERT HYMAN, BOB ALMY and POOGIE MURRAY.

At first, they called their station "HYMAN-ALMY-MURRAY". Tapping out such a long name in code soon became tiresome and called for a revision. They changed it to "HY-AL-MU," using the first two letters of each of their names. Early in 1901 some confusion resulted between signals from amateur wireless station "HYALMU" and a Mexican ship named "HYALMO." They then decided to use only the first letter of each name, and the station call became "HAM."

In the early pioneer days of unregulated radio amateur operators picked their own frequency and call-letters. Then, as now, some amateurs had better signals than commercial stations. The resulting interference came to the attention of congressional committees in Washington and Congress gave much time to proposed legislation designed to critically limit amateur radio activity. In 1911 ALBERT HYMAN chose the controversial WIRELESS REGULATION BILL as the topic for his Thesis at Harvard.

His instructor insisted that a copy be sent to Senator David I. Walsh, a member of one of the committees hearing the bill. The Senator was so impressed with the thesis that he asked HYMAN to appear before the committee. ALBERT HYMAN took the stand and described how the little station was built and almost cried when he told the crowded committee room that if the bill went through that they would have to close down the station because they could not afford the license fees and all the other requirements which the bill imposed on amateur stations.

Congressional debate began on the WIRELESS REGULATION BILL and little station "HAM" became the symbol for all the little amateur stations in the country crying to be saved from the menace and greed of the big commercial stations who didn't want them around. The BILL finally got to the floor of Congress and every speaker talked about the "...poor little station HAM." That's how it all started. You will find the whole story in the Congressional Record.

Nation-wide publicity associated station ""HAM" with amateur radio operators. From that day to this, and probably until the end of time in radio an amateur is a "HAM."
…73, John W8RXX

TEXAS DATV BALLOON LAUNCH

The South Texas Balloon Launch Team - BLT launched the major flight of 2019 in late September with live DVB-S2 video during the flight. The video signal chain was made up of Portsdown software running on a Raspberry Pi 3+ with a Pi Cam feeding a LimeSDR Mini driving a 1Watt linear amplifier at 1280 MHz. The transmit antenna was a WA5VJB 'wheel' custom tuned to 1280 MHz and the receive antenna at the launch site was a yagi on an auto-tracking AZ/EL system. A Minitiouner was used for the receiver. DVB-S2, QPSK, H264, SR1000 and 4:3 were chosen due to extensive but unscientific testing for signal lock and fast recovery when the signal was lost. P5 video was received and recorded with few drops from launch to the balloon burst altitude of over 115,000 feet and a range of over 25 miles. A short You Tube video link: https://youtu.be/unVOdFurmcY
…Tom K5SAF

SOLAR CYCLE 25 SUNSPOTS APPEAR

December 30, 2019

New Solar Cycle 25 is on the way, but just when the transition from Solar Cycle 24 to Solar Cycle 25 will take place is not entirely clear.

On December 24, two new sunspots - one in each hemisphere – emerged on the face of the Sun that exhibit the reversed magnetic polarity marking them as belonging to Solar Cycle 25. According to Hale's Law, sunspot polarities flip-flop from one solar cycle to the next, the National Center for Atmospheric Research explains.

"The Sun is currently in solar minimum - the nadir of the 11-year sunspot cycle," Tony Phillips said in his article, "Reversed Polarity Sunspots Appear on the Sun" on the Spaceweather.com website. "It's a deep minimum, century-class according to sunspot counts." The remarkable sunspot scarcity has prompted discussion of a possible "extended minimum" akin to the Maunder Minimum in the 17th century, when no sunspots appeared for decades, Phillips said. "Such an event could have implications for terrestrial climate." This article can be found online at, https://spaceweatherarchive.com/2019/12/25/reversed-polarity-sunspots-appear-on-the-sun/

"Today's new-cycle sunspots (along with isolated new-cycle spots earlier this year) suggest that the solar cycle is, in fact, unfolding normally," Phillips wrote, adding, a new Maunder Minimum does not appear to be in the offing.

Earlier this month, the NOAA/NASA-co-chaired international Solar Cycle Prediction Panel released its latest forecast for Solar Cycle 25. The panel's consensus calls for a peak in July 2025 (+/- 8 months), with a smoothed sunspot number of 115 and the solar minimum between Solar Cycles 24 and 25 occurring in April 2020 (+/- 6 months). If this solar minimum prediction is correct, it would make Solar Cycle 24 the seventh longest on record at 11.4 years.

The forecast can be found online at, https://www.swpc.noaa.gov/news/solar-cycle-25-forecast-update .

Climate scientist David Archibald speculates that the Solar Cycle 24/25 minimum could occur as late as March 2021, and that Solar Cycle 25 maximum might not happen until 2027.

"We are well into the Solar Cycle 24/25 minimum but [Cycle] 24 may not have ended yet," Archibald said in a December 22 update on the "Watts Up With That?" website. "A solar cycle isn't over until the heliospheric current sheet has flattened. And that could be as late as March 2021. Solar cycle amplitude does matter with respect to climate and the amplitude of Solar Cycle 25, from projecting trends from the last three cycles, looks like being about 80 in 2027."

The Solar Cycle Prediction Panel agreed that Solar Cycle 25 will be of average intensity and similar to Solar Cycle 24.

In an article posted on NOAA's Space Weather Prediction Center site, Scott McIntosh, the Director of the High Altitude Observatory at National Center for Atmospheric Research (NCAR - https://ncar.ucar.edu/), stresses that Solar Cycle 25 will happen, "but a sunspot cycle could be small."

Predictability comes with some physical understanding of the underlying process, McIntosh asserts. "The sunspot cycle is erratic," he said in his presentation, "provocative of a chaotic turbulent solar interior where sunspot progressions with time and latitude are the only tracers..."

...ARRL

NEXT-GEN RADIO SYSTEM READY FOR SPACE STATION LAUNCH

Amateur Radio on the International Space Station (ARISS) reports that its first Interoperable Radio System (IORS) flight unit -- serial number 1001 -- has been delivered to NASA's Johnson Space Center for launch in early March. The IORS represents the first major upgrade in ARISS equipment on the International Space Station since Amateur Radio gained a permanent presence onboard the ISS in 2000. In December, ARISS received approval from NASA Safety to launch the IORS on SpaceX CRS-20 and stow the radio system on the ISS for future installation.

"The IORS is a foundational element of the ARISS next-generation radio system and is an incredible engineering achievement by the ARISS hardware team," ARISS International President Frank Bauer, KA3HDO, said. "This first element delivery will support easier radio mode transitions and enable new, exciting capabilities for hams, students, and the general public."

The new system includes a higher-power radio, an enhanced voice repeater, and updated digital packet radio (APRS) and slow-scan television (SSTV) capabilities for both the US and Russian space station segments. The IORS consists of a custom-modified JVC Kenwood TM-D710GA transceiver, an AMSAT-developed multi-voltage power supply, and interconnecting cables.

The IORS set to launch in March will be installed in the ISS *Columbus* module; a second flight unit is expected to be launched later this year for installation in the Russian *Service* module. The ARISS hardware team will assemble four flight units -- and 10 IORS units in all -- to support onboard flight operations, training, operations planning, and hardware testing.

ARISS International President Frank Bauer, KA3HDO.

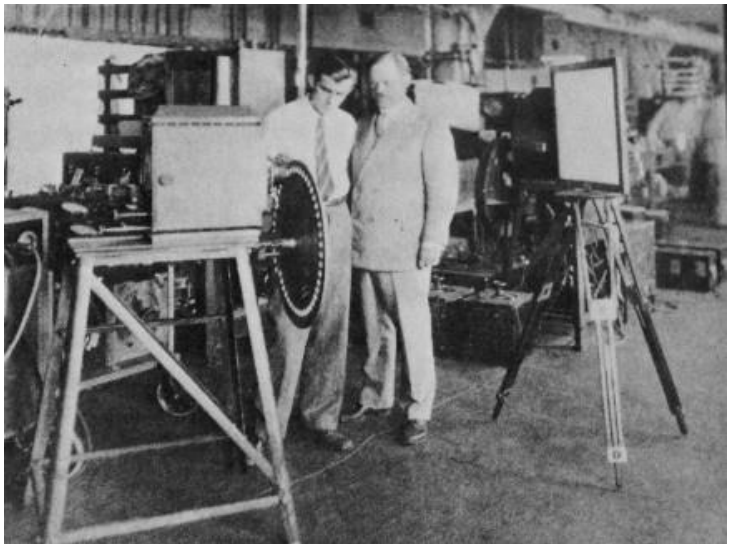
"Future upgrades and enhancements to the next-generation system are in various stages of design and development," Bauer said. "These include a repaired Ham Video system -- currently planned for launch in mid-to-late 2020, L-band (uplink) repeater, ground command operations capability, LimeSDR signal reception, a microwave 'Ham Communicator,' and Lunar Gateway prototype experiment."

Bauer said a lot of "heavy lifting" remains to prepare the IORS for operation on the space station. "ARISS has 92 engineering requirements and our operations Phase III safety review to complete," he explained. "The space agencies take a position of 'trust, but verify'. Thus, these engineering and safety 'verifications' all need to be closed out before the IORS can be unstowed and turned on. This will be the ARISS hardware team's focus over the next few months."

Bauer reminded that ARISS is almost entirely run by volunteers and encouraged donations for next-generation hardware developments, operations, education, and administrative functions.

EARLY DEVELOPMENT OF TELEVISION (*From the Boulder ATV Newsletter*)

Roger Salaman, K0IHX



The invention of television evolved by the invention of its components from the latter 1800's to the FCC final official standards for the industry in 1941. In 1926, Dr. E. F. W. Alexanderson of General Electric Company of Schenectady, New York experimented with revolving mirrors to project a television image of motion pictures on a screen. The next year, Dr. Alexanderson used a scanning disc which revolved at 20 revolutions per second. The first regularly scheduled television service in the United States began on July 2, 1928, fifteen months before television in the United Kingdom. The Federal Radio Commission authorized C.F. Jenkins to broadcast from experimental station W3XK in Wheaton Maryland, a suburb of Washington, D.C. For at least the first eighteen months, 48-line silhouette images from motion picture film were broadcast, although beginning in the summer of 1929 he occasionally broadcast in halftones. WRGB claims to be the world's oldest TV station, tracing its roots to an experimental station founded on January 13, 1928, broadcasting from the General Electric factory in Schenectady, New York under the call letters W2XB. It was popularly known as "WGY Television" after its sister radio station. Later in 1928, General Electric started a second facility, this one in New York City, which had the call letters W2XBA, today known as WNBC. The two stations were experimental in nature and had no regular programming because receivers were operated by engineers within the company. The image of a Felix the Cat doll rotating on a turntable was broadcast for 2 hours every day for several years as the new technology was being tested by the engineers.

The FCC adopted NTSC television engineering standards on May 2, 1941, calling for 525 lines of vertical resolution, 30 frames per second with interlaced scanning, 60 fields per second, and sound carried by FM. Sets sold since 1939 that were built for slightly lower resolution could still be adjusted to receive the new standard. The FCC saw television ready for commercial licensing and the first such licenses were issued to NBCTV and CBS-owned stations in New York on July 1, 1941followed by Philco's station WPTZ in Philadelphia.

The effect of World War II in 1942 significantly affected the progression of television with induction into military service and the need for greater production war equipment. About 7,000 - 8,000 television sets were made in the U.S. before the War Production Board halted manufacture in April 1942, production resuming in August 1945. Television usage in the western world skyrocketed after WWII with the lifting of the manufacturing freeze, war-related technological advances, the decrease in television prices caused by mass production, increased leisure time, and additional disposable income. While only 0.5% of U.S. households had a television in 1946, 55.7% had one in 1954, and 90% by 1962.

After the U.S. entry into World War II, the FCC reduced the required minimum air time for commercial television stations from 15 hours per week to 4 hours. Most TV stations suspended broadcasting; of the ten original television stations only six continued through the war. On the few that remained, programs included entertainment such as boxing and plays, events at Madison Square Garden, and illustrated war news as well as training for air raid wardens and first aid providers. In 1942, there were 5,000 sets in operation, but production of new TVs, radios, and other broadcasting equipment for civilian purposes was suspended from April 1942 to August 1945.

Following the rapid rise of interest in television after the war, the FCC was flooded with applications for television station licenses. With more applications than available television channels, the FCC ordered a freeze on processing station applications in 1948 that remained in effect until April 14, 1952.

Roger & Roy Salaman - Early TV Pioneers in Connecticut

In 1946, New York television stations were on the air only three days a week. In that year, Roger and his brother Roy Jr. interest expanded from photography to television. To earn enough money to buy a television kit, they took pictures of houses around the neighborhood and sold 8 by 10-inch framed prints to the home owner for one dollar. They also sold pictures of the holes at New Haven Country Club, where their family were members. In addition, Roy Jr. and Roger worked with Lefebvre's drug store in Wauwatosa, developing and printing film for customers. From 1946 to 1950, Roy Jr. and Roger built, sold and installed television sets, and became the New England distributor for Transvision Television Kits. Transvision was formed in 1945 and remained until at least 1963. So that they could sell television sets around New Haven, Roger designed, built, and installed guyed rooftop antennas to receive the distant television signals from New York. Roy and Roger also repaired older, 1930's model television sets and converted them to receive the channel 3 when the FCC eliminated channel 1 because of interference with other radio services.


Model 10BL Television Kit with lens built-into cabinet


12" KIT (Table Model)

TELEVISION KITS

7" Std (5 channels)*	$169.00
10" Conversion Kit (converts any electro. 7" set to 10")	69.00
10" Standard, Electrostatic	225.00
10" with FM, Electromagnetic	266.95
7BL Kit	NET 189.00
10BL Kit	LIST 359.00
12BL Kit	LIST 389.00
12" Std (with FM)**	296.95
12" Deluxe***	359.50
15" Std (with FM)**	372.95
15" Deluxe***	429.00

* Television sight and sound only
** Television plus FM Radio, 88-108 MC
*** With Inductuner — 13 TV channels plus FM radio, continuous tuning 50-216 MC

TELEVISION CABINETS & TABLES

7" Table Model—Std or Del.	32.50
10" Table Model—Std or Del.	35.00
12" Table Model—Std or Del.	44.95
12" Console—Std or Del.	95.00
7BL Cabinet	44.95
10BL Cabinet	99.50
12BL Cabinet (same as 10BL)	99.50
15" Table Model—Std or Del.	59.00
15" Console—Std or Del.	105.00
Table for TV sets (wal.) (This table fits any 7"-10"-12"-15" sets.)	19.95

TELEVISION PICTURE TUBES

7EP4—Electrostatic 7" picture tube—ea.	23.25
10HP4—Electrostatic 10" picture tube—ea.	65.00
10BP4—Magnetic Deflection 10" picture tube — ea.	49.50
12JP4—Magnetic Deflection 12" picture tube — ea.	69.75
15AP4—Magnetic Deflection 15" picture tube — ea.	129.50

PICTURE ENLARGING LENSES

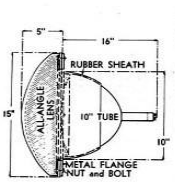
10" Lens (52 sq. in. pict.)	19.95
12" Lens (75 sq. in. pict.)	25.95
15" Lens (125 sq. in. pict.)	36.95
All lenses are provided with mounting brackets.	
Special lens frame to support 15" lens for mounting away from cabinet	8.95

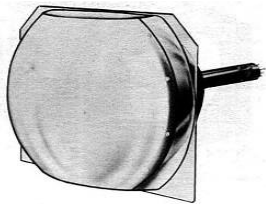
7" AND 10" KIT BASIC PARTS

Part No.	Description	List
	Coil Kit with Peaking Coils	$15.35
16	Peaking Coil, 250 mh	.37
17	Peaking Coil, 125 mh	.37
19	Peaking Coil, 35 mh	.37
22	Filter choke, 30 ma 20 henries	1.95
23	Filter choke, 125 ma, 10 henries	4.95

TRANSVISION TELEVISION KITS

The 10-inch tube was the largest that could be manufactured at that time. Therefore, Transvision developed an oil filed lens that could be placed in front of the tube to enlarge the picture.





Roger's father, Roy Sr., was a cabinet maker at heart. Among other things, he built a TV and Hi-Fi cabinet to house the electronics that Roy Jr. and Roger built and a headboard with bookcase and shelves for the master bedroom. Their family dentist and friend, Dr. Fred Harold also enjoyed building. He built a TV and Hi-Fi cabinet for the TV set Roy Jr. and Roger built for him. This cabinet was unique because he housed the TV tube in a hair dryer

so that it could be turned in any direction. Dr. Harold was President of the American Dental Association.

By 1947 when there were 40 million radios in the U.S., there were about 44,000 television sets (with probably 30,000 in the New York area). Regular networked TV broadcasts began on NBC on a three-station network linking New York with the Capital District and Philadelphia in 1944; on the DuMont TV Network in 1946, and on CBS and ABS in 1948. Roger's mother, Bernie, wrote to the New Haven Register, asking them to publish the television schedule, and they responded that there was not enough demand for television. On June 25, 1948, our parents invited a full living room of friends over to watch the Joe Louis, Jersey Joe Walcott boxing match on two 10 inch black and white television sets that Roy Jr. and Roger built.

Roy Jr. and Roger Worked for New Haven Connecticut WNHC-TV

The New Haven Connecticut TV Station WNHC-TV went on the air June 15, 1948 as channel 6, 6 days after WBZ-TV in Boston, thus just missing being the first operational television station in New England. WNHC was the first TV service for Hartford, Springfield, the Hamptons and Eastern Long Island. In 1946, Roger had built multiple element antennas and mounted them on home roofs so long-distance reception of television signals from New York city was possible. WNHC-TV moved to Channel 8 on January 1, 1954. The call letters then became WTNH in 1971. WNHC, with transmitter located on Gaylord Mountain, 8 miles from New Haven, was the first station to bring network TV to Connecticut. WNHC was the first DuMont affiliate. In the 1946, DuMont began operation as America's fourth television network, with headquarters and television station, WABD in New York City. Hindered by a lack of primary stations and a small budget and by being forced to utilize UHF affiliates in an era when UHF was not competitive, DuMont never achieved the success of the other networks, and folded its television network in 1956.

On its first day of operation, June 15, 1948, WNHC and ran shows like Bishop Fulton Sheen's Life is Worth Living. The 1948 Democratic and Republican national conventions, at which Harry Truman and Thomas Dewey were nominated respectfully, were also broadcast live. At this early stage of television, newscaster, Ben Grawer, provided a real-time view of the transmitter and antenna on the Empire State Building. Television was very informal, and the newscasters did not wear coats.

In 1948, Roger and his brother, Roy Jr. visited the WNHC-TV transmitter after reading in the New Haven Register about the Elm City Broadcasting Company building of the television station for New Haven. Roy and Roger talked to the chief engineer, Mr. deLaurentis, who said Roy, who was 18 years old, could work as a TV cameraman in the studio, and Roger, who was 16 years old, and a Freshman at New Haven High School, was given the job to run the relay station on Oxford Hill, Connecticut. Since Roger didn't have a First-Class Radio Telephone License, Mr. deLaurentis said he should obtain a Third-Class Radio Telephone License and tell anyone that he was supervised by a First- Class Licensee, Mr. deLorentis.

Roger Operated the Television Relay Station. At the relay station, besides switching to the correct network signal on the hour or half-hour, Roger needed to maintain a quality signal for transmission to the TV transmitter on Gaylord Mountain. For pickup of the off-the-air signals, Roger had to switch the television signal to the correct channel and tune the RF section of the receiver for the best quality signal according the video signal on an oscilloscope. Therefore, during the 30 second station break, he fine-tuned the RF signal for best quality, and adjusted the synchronization signal to meet the FCC standard. More times than not, he finished making these adjustments while WNHC-TV was on the air carrying the appropriate television signal for public viewing.

The Oxford Hill Relay station was halfway between New York, where the programs originated, and the WNHC-TV transmitter in New Haven, Connecticut. The relay station had a Microwave transmitter at the bottom of a wooden pole, with a parabola pointed straight up to a reflector which allowed the microwave signal to be beamed to the microwave parabola receiving antenna on a tower at the Gaylord Mountain transmitter station.

The New York signals from WABD, CBS, and NBC were received on a yagi antenna mounted at the top of the wooden pole. Later Roger built and installed a sloping-V antenna to improve the TV reception. The signal was fed inside the relay station to a fixed frequency crystal receiver tuned to receive the WABD signal on Channel 5. The signal from the antenna was also fed to an RCA 630 television set to receive the signals from CBS and NBC on Channels 2 and 4.

Roger's job was to assure the relay station operated correctly to receive the WABD, WCBS and WNBC signals, convert the correct signal, according to the schedule of which station was to be carried by WNHC-TV at that particular time, to microwave, and beam it to the WNHC-TV transmitter on Gaylord Mountain. The WNHC-TV transmitter personnel and Roger established communications by normal telephone calls. There were other externalities associated with this job. Hurricanes Edna, Carol and Hazel pounded New England in the 1950's and knocked the relay station as well as the New Haven television station WNHC-TV off the air. To get the Oxford Hill relay station on the air as soon as possible, Roger drove around debris-littered roads and activated an emergency power generator at the relay station. Roger put the relay station on the air providing the New Haven area with information concerning the hurricane.

Besides its early affiliation with WABD, WNHC-TV was also affiliated with NBC in 1949, CBS by 1949 and ABC by 1950. Because of the concurrent affiliations, WNHC was able to cherry pick the best TV programs and present them to Connecticut viewers. Roger selected the appropriate program when operating the WNHC-TV, New-York to New Haven television relay station in Oxford Connecticut, halfway between New York and New Haven. WNHC-TV moved to Channel 8 on January 1, 1954. The call letters became WTNH in 1971.

REFERENCES:

1. History of Television: https://en.wikipedia.org/wiki/History_of_television
2 Transvision Television Kits: http://www.earlytelevision.org/transvision.html
3. "Early Involvement with Television", Roger Salaman, K0IHX, ATVQ, Winter, 2015, pp. 24-25

Roger, K0IHX, and **Naomi, KD0PDZ** have been active in Boulder ATV since 2008. Roger has an interesting background. During the 1950s & 60s he did fundamental ionospheric radio research at NBS' Central Radio Propgation Lab here in Boulder. In the 70s & 80s he worked in the White House Office of Telecommunications Policy. For more about Roger & Naomi, see the Sept. 2018, issue #3, ATV newsletter, pp. 3-4.
"Off the air" photo taken via the Boulder TV repeater.

…Article courtesy of Jim Andrews, KH6HTV in Boulder, Colorado.

LOCAL HAMFEST SCHEDULE

This section is reserved for upcoming Hamfests. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here; notify me so it can be corrected. This list will be amended, as further information becomes available. To see additional details for each Hamfest, Control Click on the blue title and the magic of the Internet will give you the details complete with a map! To search the ARRL Hamfest database for more details, CTL click ARRLWeb: Hamfest and Convention Calendar …WA8RMC.

01/19/2020 | Sunday Creek Hamfest

Location: Nelsonville, OH
Type: ARRL Hamfest
Sponsor: Sunday Creek Amateur Radio Federation
Location: Strasburg, OH

01/26/2020 | Tusco Hamfest

Type: ARRL Hamfest
Sponsor: Tusco Amateur Radio Club
Website: http://www.tuscoarc.org

02/16/2020 | Mansfield Hamfest

Location: Mansfield, Ohio
Type: ARRL Convention
Sponsor: InterCity Amateur Radio Club
Website: http://www.iarc.club

03/14/2020 | Toledo Hamfest

Location: Perrysburg, OH
Type: ARRL Convention
Sponsor: Toledo Mobile Radio Association
Website: http://www.tmrahamradio.org

03/21/2020 | Mid-Ohio Valley Hamfest

Location: Gallipolis, OH
Type: ARRL Hamfest
Sponsor: Mid-Ohio Valley Amateur Radio Club, Inc.
Website: http://sites.google.com/site/midohiovalleyarc/

04/11/2020 | Cuyahoga Falls Hamfest

Location: Cuyahoga Falls, OH
Type: ARRL Hamfest
Sponsor: Cuyahoga Falls Amateur Radio Club, Inc.
Website: http://www.cfarc.org/hamfest.php

04/26/2020 | Athens Hamfest

Location: Athens, OH
Type: ARRL Hamfest
Sponsor: Athens County Amateur Radio Association
Website: http://www.ac-ara.org/

06/06/2020 | FCARC Summer Hamfest

Location: Wauseon, OH
Type: ARRL Hamfest
Sponsor: Fulton County Amateur Radio Club
Website: http://k8bxq.org/hamfest

07/19/2020 | Van Wert Hamfest

Location: Van Wert, OH
Type: ARRL Hamfest
Sponsor: Van wert Amateur Radio Club
Website: http://w8fy.org

08/01/2020 | 2020 Columbus, Oh Hamfest

Location: Grove City, OH
Type: ARRL Hamfest
Sponsor: Voice of Aladdin/ Audio Unit of Aladdin Shrine
Website: http://columbushamfest.com

12/07/2019 | Fulton County ARC Winterfest

Location: Delta, OH
Type: ARRL Hamfest
Sponsor: Fulton County Amateur Radio Club
Website: http://k8bxq.org/hamfest

TUESDAY NITE NET ON 147.48 MHz SIMPLEX

Every Tuesday night @ 9:00PM WA8RMC hosts a net for the purpose of ATV topic discussion. There is no need to belong to the club to participate, only a genuine interest in ATV. All are invited. For those who check in, the general rules are as follows: Out-of-town and video check-ins have priority. A list of available check-ins is taken first then a roundtable discussion is hosted by WA8RMC. After all participants have been heard, WA8RMC will give status and news if any followed by late check-in requests or comments. We usually chat for about ½ hour so please join us locally or via internet at https://batc.org.uk/live/wr8atv/. Click on WR8ATV.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (10/20/19)	$ 3521.70
Receipts (dues)	$ 170.00
Cash Donation	$ 250.00
Fall Event food	$ (156.73)
PayPal fees	$ (5.31)
CLOSING BALANCE (01/20/20)	$ 3779.66

ATCO REPEATER TECHNICAL DATA SUMMARY

Location: Downtown Columbus, Ohio
Coordinates: 82 degrees 59 minutes 58 seconds (longitude) 39 degrees 57 minutes 47 seconds (latitude)
Elevation: 630 feet above the average street level of 760 feet (1390 feet above sea level)

TV Transmitters: 423.00 MHz DVB-T, 10 W contin, FEC=7/8, Guard=1/32, Const=QPSK, FFT=2K, BW=2MHz, PMT=4095, PCR=256, Video=256, audio=257
427.25 MHz Analog VSB AM, 50 watts average 100 watts sync tip (cable channel 58)
1258 MHz 40 watts FM analog
1268 MHz DVB-S QPSK 20W continuous. SR=3.125MS, FEC=3/4, PMT=32, Video=162, Teletext=304, PCR=133, Audio=88, Service =5004)
Channel 1 is fed from all receivers. Channel 2 is fed direct from 439.25 analog receiver only.
2397 MHz Mesh Net transceiver 600mw output (channel 1 minus 2). ID is WR8ATV-2
10.350 GHz: 1 watt continuous analog FM
Link transmitter: 446.350 MHz: 5 watts NBFM 5 kHz audio. This input is a secondary input and used for control signals.

Identification: 423, 427, 1258, 1268 MHz, 10.350 GHz transmitters video ID every 10 min. with active video and information bulletin board every 30 minutes.
423 MHz digital, 1268 MHz digital & 10.350 GHz analog - Continuous transmission of ATCO & WR8ATV with no input signal present.

Transmit antennas: 423.00 MHz - 8 element Lindsay horizontally polarized 5 dBd gain "omni"
427.25 MHz - Dual slot horizontally polarized 7 dBd gain "omni" major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni
1268 MHz - Diamond vertically polarized 12 dBd gain omni
2397 MHz - Ubiquiti dual polarity omni 13dBi gain slot for channel 1 minus 2 MESH Rx/Tx operation
2397 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (Used for experimental Mesh operation)
10.350 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Receivers: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
439.000 MHz - DVB-T QPSK, 2MHz BW. Receiver will auto configure for FEC's. (Input here = output on all TV transmitters)
439.250 MHz - A5 NTSC video with FM subcarrier audio, **lower sideband**. (Input here = output on all TV transmitters & also direct to 1268 MHz DVB-S output channel 2.)
449.975 MHz - F1 audio input aux touch tone control. 131.8 Hz PL tone. (Input here = output on 446.350).
1288.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1288.00 MHz - DVB-S QPSK SR=4.167MS, fec=7/8. PIDs: PMT=133, PCR=33, Video=33, Audio=49 (Input here=output on all Transmitters)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters) (inactive at this time because of MESH on 2397)
10.450 GHz - F5 video analog NTSC. (Input here = output on all TV transmitters)

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (Shared with 446.350 MHz link output transmitter)
438.00/439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west (Shared with 438 & 439 receivers)
1288.00 MHz - Diamond vertically polarized 12 dBd gain omni (shared with analog and DVB-S receivers)
2398.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (inactive at this time because MESH is on 2397)
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Auto mode Input control:

Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
00*	turn transmitters **on** (enter manual mode-keeps transmitters on till 00# sequence is pressed)
00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
264	Select Channel 4 Doppler radar. (Stays on for 5 minutes) Select # to shut down before timeout.
004	Select 10.450 GHz receiver. **(Always exit by selecting 001)**
001	Select 2398 MHz receiver then 00# for auto scan to continue

Manual mode Functions:

00* then 1 for Ch. 1	Select 439.25 analog /438 digital receiver (if video present on digital, it is selected. Otherwise analog)
00* then 2 for Ch. 2	Select 1288 digital receiver
00* then 3 for Ch. 3	Select 1288 analog receiver
00* then 4 for Ch. 4	Select 2398 receiver
00* then 5 for Ch. 5	Select video ID (17 identification screens)

01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 1288 MHz digital receiver scan enable
03* or 03#	Channel 3 1288 MHz analog receiver scan enable
04* or 04#	Channel 4 2398 MHz scan enable
A1* or A1#	Manual mode select for 439.25 receiver audio
A2* or A2#	Manual mode select for 1288 digital receiver audio
A3* or A3#	Manual mode select for 1288 analog receiver audio
A4* or A4#	Manual mode select for 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	No function at this time
C2* or C2#	No function at this time

ATCO MEMBERS AS OF January 2020

Call	Name	Address	City	St	Zip	Phone
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703	
AH2AR	Dave Pelaez	1348 Leaf Tree Lane	Vandalia	OH	45377	937-264-9812
W8ARE	Terry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964	
K9BIF	Charlie Short	415 West Pike Street	Goshen	IN	46527-0554	
VK3BFG	Peter Cossins	14 Coleman Road	Melbourne	Au	03152	
N9BNN	Michael Glass	6836 N. Caldwell Rd	Lebanon	IN	46052	
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551
N8COO	C Mark Cring	2844 Sussex Place Dr.	Grove City	OH	43123	614-836-2521
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785	301-772-7382
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641	
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198
N8DUK	Ron Reynolds	2173 Noe Bixby Rd	Columbus	OH	43232-4131	
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-405-1710
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210	
N8FRT	Tom Flanagan	6156 Jolliff St.	Galloway	OH	43119	
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147	
WB4IR	Bob Holden	7725 Tressa Circle	Powell	TN	37849	865-314 - 4285
WA8HFK, KC8HIP	Frank & Pat Amore	P.O. Box 2252	Helendale	CA	92342-2252	760-503-8106
W8KHP	Allen Vinegar	2043 Treetop Lane	Hebron	Ky	41048	
WA8KKN	Chuck Wood	5322 Spruce Lane	Westerville	OH	43082-9005	614-523-3494
WB9KMO	Rod Fritz	8334 E. Culver Street	Mesa	AZ	85207	
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	937-548-2492
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334	
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081	
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660	
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856
KB8OFF	Jess Nicely	1888 Woods Drive	Beavercreek	OH	45432	
W6ORG, WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022	
AE6QU	Ron Phillips	2227Via Puerta unit N	Laguna Woods	CA	92637	
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082	614-891-9273
W8RUT, N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021	
KB8RVI	David Jenkins	100 Miller Ave Apt 108	Ashville	OH	43103	614-853-0679
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904	614-276-1689
W8RXX, KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021	614-579-0522
WA6RZW	Ed Mersich	34401 Columbine Trl West	Elizabeth	CO	80107	
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325	
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-1392
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101	
WA8UZP	James Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328
KB9VGD	Gary Oaks	472 Storle Ave	Burlington	WI	53105-1028	
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123	
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011	
AC8XP, KE8GTT, KE8HPA	Troy,Seamus Bonte	5210 Smothers Road	Westerville	OH	43081	
AC8YE	Larry Howell	4080 Dill Road	Centerburg	OH	43011-9771	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064	
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224	
KD8YYP	Anna Reed	818 Northwest Blvd	Columbus	OH	43212	
WB8YTZ	Joe Coffman	233 S. Hamilton Rd	Gahanna	OH	43230-3347	
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771
W8ZCF	Farrell Winder	6686 Hitching Post Ln.	Cincinnati	OH	45230	513-218-3876
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371	

NEW MEMBER(S)

Let's welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood them with information. New members are our group's lifeblood so it's important we aggressively recruit new faces.
No new members this time.

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are $10 per person. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this Newsletter quarterly in January, April, July, and October. It is sent to each member without additional cost. All Newsletters are sent via Email unless the member does not have an internet connection. Dues payments are as of the date paid and will expire on the same month/year on the due date year.

Your support of ATCO is welcomed and encouraged.

Membership expiration notices will be sent out via Email starting 30 days prior to expiration date.
NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received and shows due one year from that date.

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
HOME PHONE _____
NAME_____
INTERNET Email ADDRESS_____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS_____
_____
_____
ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ MONEY ORDER ○

Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, pay dues via the Internet with your credit card. Go to www.atco.tv and fill out the "pay ATCO dues" section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. Credit card payment is made through "PayPal" but you DO NOT need to join PayPal to send your dues. Simply DO NOT fill out the password details and there will be no "PayPal" involvement.

ATCO Newsletter
c/o Art Towslee -WA8RMC
438 Maplebrooke Dr. West
Westerville, Ohio 43082

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF MEMBERSHIP IS EXPIRED.