

Boulder Amateur Television Club TV Repeater's REPEATER

**March, 2021
3ed Edition**

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

Jim Andrews, KH6HTV, editor - kh6htv@arrl.net www.kh6htv.com



**This ATV Newsletter is focused on
Good News & Bad News**

**The Good News is the discovery of a some new, low
cost (\$80), DVB-T Modulators by K0ZAK.**

**The Bad News was the horrible technical fiasco of the
QSO Today's 2021 Ham Expo and it's impact on ATN**

ATV Upcoming Events

18 March -- Desert RATS, Palm Springs, CA ham club meeting -- "ATN and Amateur Television", by Roland KC6JPG Zoom meeting. For more info -- K6gav@outlook.com

19 March -- Santa Barbara, CA Amateur Radio Club meeting -- The ATN Video "Introduction to Digital Amateur Television" Q&A session follows with Rod, WB9KMO, Roland, KC6JPG, Mike, WA6SVT & Jim, KH6HTV. Zoom meeting. For more info - wb9kmo@gmail.com

24-30 March -- ATN live coverage of Last Man Standing Amateur Radio event. Broadcast over ATN network and the internet. For more info - kc6jpg@charter.net

6 March -- Hendersonville, NC ham club meeting -- DVD "Hi-Definition, Digital Amateur Television", Q&A session follows with Jim, KH6HTV Zoom meeting. For more info - cwebb@hville.net

Last Man Standing

Tim Allen has a TV show called "Last Man Standing". In the show, Tim plays a character named Mike Baxter who is a Ham Operator. Amateur Radio plays a significant role in the show. The character and the show have a call sign (KA6LMS) and Tim Allen's personal call sign is KK6OTD. Tim's real name is Tim Allen Dick

The show has reached its final season and they are planning lots of events, all ham radio oriented using a whole range of modes (e.g., SSB, CW, FT8, Satellite, DMR, EchoLink, ATV, etc.). Events start Wednesday, March 24th and run through March 30th. More information at www.gsbarc.org/lms www.gsbarc.org/lms.

Roland, KC6JPG, is ATN's digital systems director and net manager. He is organizing ATN's participation in the event. ATN plans to have their mobile ENG van on the studio lot. The event will be transmitted live over the ATN network of linked ATV repeaters covering southern California, Las Vegas, Nevada and Arizona. It will also be available on the internet on ATN's You-Tube www.youtube.com/AmateurTelevisionNetwork and the BATC. For more info -- kc6jpg@charter.net

ATV NEWS from Maryland



John, K0ZAK, writes --- I am trying to get some local interest in updating our ATV repeaters to digital. I'm testing the cheapest equipment I can find to try to generate more interest in Digital ATV

There are three ATV repeaters here in the Baltimore, Maryland area. However, two are currently down. Those two are on the top of hospitals and the corona virus has cut off access to them. They were all linked together, but I don't know the current status of the links. The Baltimore Radio Amateur Television Society (BRATS) has a web site: www.bratsatv.org The Baltimore, W2WCQ/R ATV repeater was one of the very first in

the USA. It has been in operations since the mid 1970s. The Chesapeake Amateur Television Society (CATS) has two repeaters operating under the call sign, W3BAB. They are located in Laurel and Towson, Maryland. The CATS club has been active since the mid 1980s. Their web site is: www.qsl.net/wy3w/wy3w/CATSWEB/id23.htm

I was reading your newsletter, talking about the set-top DVB-T receivers. I wanted to let you know that I've put together about the cheapest DVB-T station I could find. While I do have a GT media V7 Plus, I also bought another set-top box for only **\$17** on E-Bay recently just for curiosity.

<https://www.ebay.com/itm/363203887555>

Can't get much cheaper than that. It is as hot as the GT media that I have. It tunes and receives both 434 and 928 DVB-T channels fine, but for some reason it wouldn't actually save the 911 or 928 channels in memory even though it received them OK. It goes through the save motions but just doesn't save. I haven't followed up on that problem yet. It outputs both HDMI and NTSC video/audio. It does have a European power plug on it, but works with a cheap 110V Euro adaptor, or 5 volts from a USB cable.



Here is what I found as a DVB-T transmitter. **\$80** plus shipping. It has HDMI and NTSC video inputs. Set up for 6-8 MHz bandwidth, though the ITI chipset will natively support 1-8 MHz bandwidth. I'm looking into seeing if I can hack the firmware to command it to use the lower bandwidths, however it works fine with an amplifier on 6 MHz bandwidth for now. I've used it on both 434 & 911 MHz. I'll let you know if I have any success with hacking the firmware for the narrower bandwidths. I have already gotten the unit from GECEN. I then found another similar one from Vcan which I have on order.

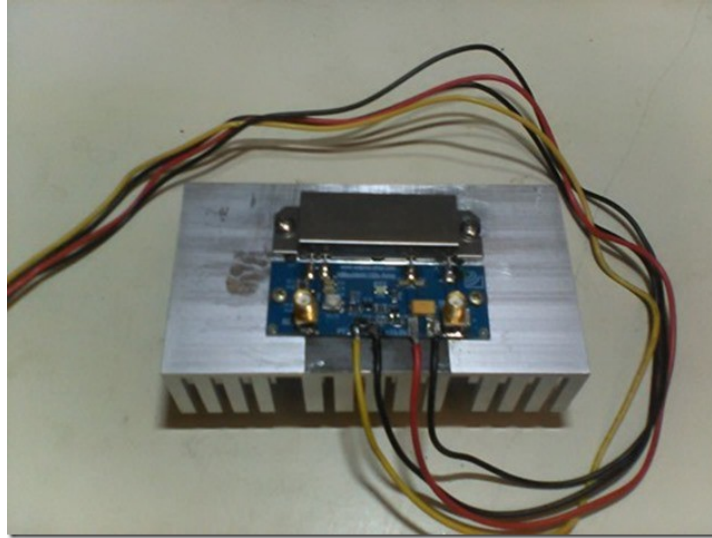


www.gecen.cc

www.Vcan.cc

\$80 Chinese DVB-T modulators

Editor's Note: We hope once John gets the second unit, that he will give us a really detailed technical evaluation of them that we can publish in a future newsletter



I built a cheap, RF power amplifier using the Mitsubishi RA60H3847M1 to work with the modulator. This combination puts out about the same power as my friend's Hi-Des 320 and his Darko-Banko amp at a whole lot less money. Just limited to 6 MHz bandwidth for now.

John, K0ZAK, Reisterstown, MD

CATS on BATC: The CATS ATV repeater, W3BAB, is now streaming over the web via the British Amateur Television Club. <https://batc.org.uk/live/w3bab> We stream our weekly ATV net each Wednesday evening at 9pm (Eastern time). Neil, W3ZQI is behind it. I am the one that picks it up from our Towson, MD, P5 picture. I am just picking it up and put it on the CAT's Laptop. But, Neil has full control of the PC and puts it on the website.

John, KA3ZTC, Baltimore, MD

ATV NEWS from St. Louis

Hi Jim -- I bet you wish you were in KH6 land about now. (*Mel is referring to the fact Colorado is currently buried in deep snow Mid-March*)?

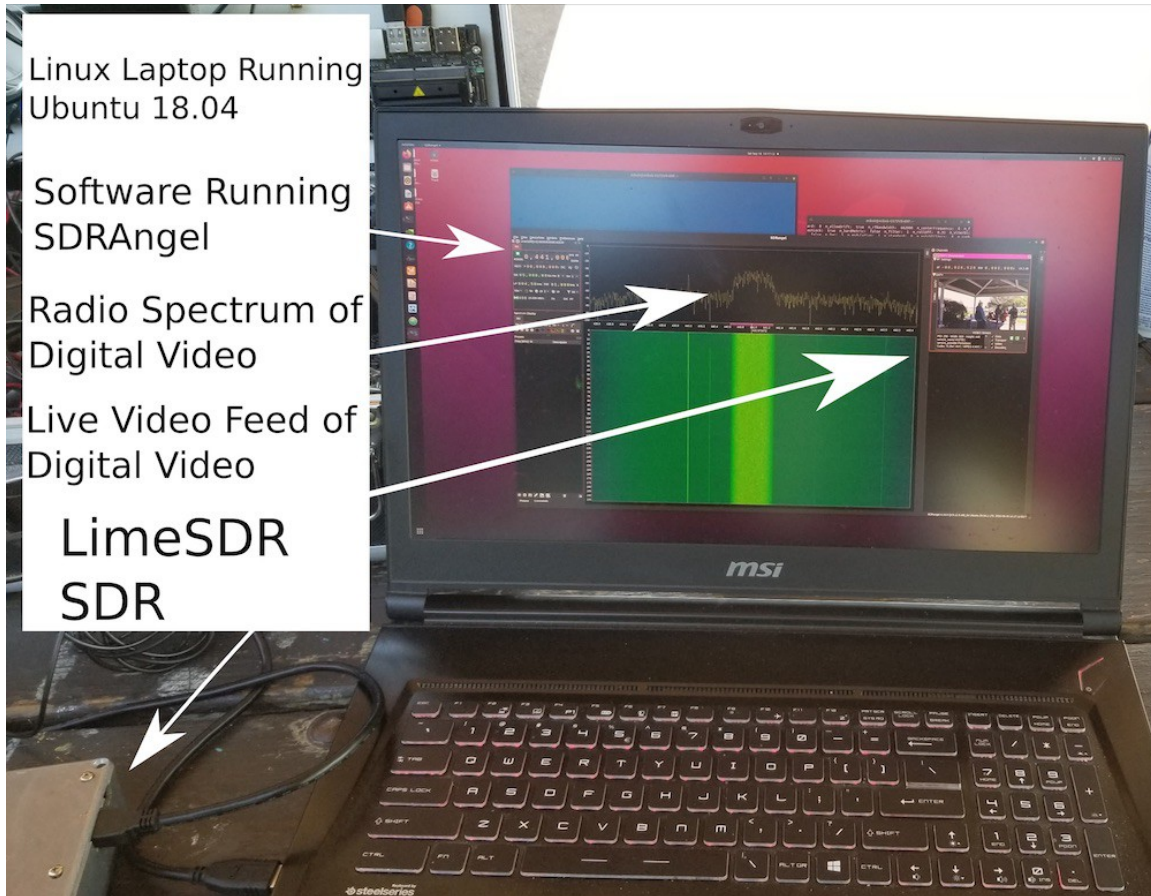
When it snows here, I have now noticed "snow" *increases* the signal strength from / to the repeater here. As matter of fact, several of us have noted the signal can be stronger by 2 to 3 dB. Have you noticed that in your location? I think this may be to the signal path not being LOS/direct view and perhaps the Raleigh channel path reflections from the snow-on-the-ground. However, I assume since you have mountains and LOS the effect may just be the opposite.

I have a one minute video on how I am using the Black Magic Design ATEM Mini pro. It is on my web site. I am really impressed with it... especially when connecting now

that my former “slow” switching external HDMI switch now switches much faster. Black Magic Design has now another model out with 8 ports. As they keep “updating” the switch with more ports and functions, the original mini should eventually be dropping in price especially on the used market.

<http://melwhitten.com/BlackMagicDesign%20Mini%20Switcher.mp4>

Mel, K0PFX, St. Louis



ATV NEWS from Ottawa

Attached is an image of what I setup in the "Parks on the Air" ham radio event here in Ottawa Canada. (Sept 2020) This is basically a Portsdown 2020 Raspberry Pi Boards transmitting a DTV DVB-S2 (or DVB-S can't remember) signal across the park @ 441 MHz with a bandwidth of ~660Khz wide. for a 720P, 30 FPS Full motion video & Audio. (Yes I am Kinda Proud of it !) The frequency was just chosen because it had the least amount of interference at the time. The receiver is another LimeSDR board plugged into my laptop computer running SDRAngel. This software has a DVB-S(2) Software receiver built in! <https://github.com/f4exb/sdrangel/wiki/Quick-start> And a YouTube Video of Mrs. Corrosive! <https://www.rtl-sdr.com/demodulating-dvb-s-digital-amateur-tv-with-sdrangel-on-windows-with-an-sdr/> This is Almost exactly what I have done to get this to work! Except the transmit side was done with the Portsdown software.

I plan to use your RF power amplifier and create a DTV station at my home to broadcast to the Ottawa (Gatineau) area. I have a few Ham friends in the Gatineau area that would be very curious about this working. So I am planning to be feeding this signal into a 12 element yagi. Hopefully I will have more gain from my antenna pointed towards my Ham Friends in Ottawa. If you look at Ottawa, Canada on the Goggle maps you can see right now it's a Very EAST/WEST populated city. I currently live in the East side of the city, and will be pointing my Yagi towards the West if not North West towards Gatineau.

Mike, VA3TEC, Ottawa, Canada

QSO TODAY - HAM RADIO EXPO -- a Bust !

The much touted 2021 Ham Radio Expo sponsored by QSO Today was a technical Bust ! They charged participants a \$10 fee and not sure it was worth it. Right from the get go, they didn't adhere to the advertised schedule due to lots of technical glitches. Thus, each talk lost many potential viewers. My own personal experiences trying to watch it were difficult. The first program I wanted to watch was delayed by 45 minutes and the second one by 20 minutes. Then the third program they kept running the wrong video. Once they got the proper video running, then the moderator was unable to bring up the speaker for the Q&A session. There was also supposed to be an exhibition lobby with lots of vendors sales booths. Clicking on "Lobbies & Exhibition" lead to a blank screen. Going to Auditorium & Lounges and then "Arena" only brought up three vendors -- Flex-Radio, Elecraft and Connect Systems. Then I was unable to see anything at those sites. Throughout most of the day, I was never able to find listed on the talks to chose from our own ATN talk which was supposed to happen at 4pm (Pacific). It did eventually air, but late, and then only due to heroic efforts of ATN's IT specialist Roland, KC6JPG.

I also was very disappointed with the Airmeet platform's video format. The screen had a lot of waste space. The speaker's video for slides, etc. were compressed and only occupied about 1/3 of the screen. There was no way to expand it to full screen. Thus a lot of the power-point slides with smaller type were difficult to read, even on a hi-def monitor. I hope if there are any more on-line Ham Expos in the future, that the Airmeet platform be dumped for this reason alone, aside from the other issues that were encountered.

There was always on the right hand side of the Airmeet screen a place for viewer's to chat and make comments or ask questions. Two of the really classic comments I saw scroll by summarized the whole event. ---- *"Dayton in the rain is still better than this mess !"* and *"The platform was much better last year and we didn't have to pay \$10 !"*

Jim, KH6HTV, Boulder, CO

QSO Today Virtual Ham Expo and Amateur Television Network

Making a Presence to Everywhere – Barely!

By Roland Hoffman – KC6JPG

With the absence of a live conventions due to the Great Pandemic of 2020 - 2021, Eric Guth, 4Z1UG came up a brilliant idea: to bring hams from around the world to an amateur radio exposition in a virtual environment. The QSO Today Virtual Ham Expo is the perfect substitute towards this dilemma of the inability to host an in-person hamvention.



Planning their 2nd virtual event, Eric and his team organized a new approach towards a more personal interactive experience. Teaming up with Airmeet for their virtual ambiance platform, they were on their way towards a more personal experience for their attendees . . . so they thought.

Over 80 presenters were scheduled for the 3-day event from Friday, March 12 to Sunday, March 14, 2021. Covering a wide array of topics from HF operations to networking in the hamshack. The Amateur Television Network was also on the schedule to present, “Introduction to Digital Amateur Television” by Rod Fritz – WB9KMO, Jim Andrews – KH6HTV, Mike Collis – WA6SVT, and myself to our attendees interested in fast scan amateur television with an emphasis on DATV – digital amateur television.

Let the Expo Begin! --- Friday, March 12th. I fire up my 10-year-old custom build Asus powered PC with an AMD Phenom processor with 8 GB of memory running Ubuntu Linux 20.04 “Focal Fossa” (mediocre compared to today’s standards), I am equipped to participate in the virtual expo in the KC6JPG / ATN studios, ready to show the world the magic of fast scan amateur television & digital amateur television to the world.

The Troubles Begins --- Attempting to log into the HAM-vention site using my e-ticket (yep, I paid my \$10.00), I was not able to enter the “show.” At the time, there was no recourse to “fix” this problem online. Bill Brown WB8ELK was a godsend as he forwards our ATN’s “presenters” e-ticket to my in-box. Entering the new credentials, I have entered the show’s home page and entered “Sessions and Lounge,” I was greeted with the Airmeet splash screen and entered the “lobby” of the virtual convention. Now the notifications are popping up, “Airmeet can not connect your camera and microphone” is displayed. Thinking that my computer is too “old” to run Airmeet, I decided to try my Asus i5 8 GB Zenbook notebook, also running the Ubuntu “Focal Fossa” OS. Same problem! Camera and microphone issues. Going into my options panel in my favorite

browser (Firefox) to allow access to my camera and mic, Firefox would not bring up the Airmeet system's URL to allow my media devices to open. Next step is to use Google Chrome (which Airmeet recommended to use). Same issue. My last recourse after an hour and a half of frustrations was to use another Asus i5 Zenbook notebook in my arsenal running Windows 10 with Chrome browser. I was able to open my camera, but my audio was not recognized. Going into device manager, I reset my audio "connections", tried it again . . . and it worked! Now I am able to sit in my lovely "virtual chair" at our ATV (Amateur Television) table #7 in our lounge. With a few hams stopping by, they were fascinated with my small demo of ATV as they witnessed our live video of our ATN's Santiago Peak ATV amateur television repeater in Southern California.

The Airmeet system is a great concept for hosting a virtual convention, but the web-based application requires a huge demand on computer resources. To reach a level of enjoyment for the participant and the presenters using the Airmeet application during the QSO Today Virtual Ham Expo, a MINIMUM of an i5 / Ryzen class of processor with multiple cores with at least 8 GB of memory is needed. Like most hams, including myself, we enjoy turning dated PC's and notebooks into usable "tools" for the hamshack, especially utilizing video and audio for ATV purposes. Anything less than an i5 class of processor and an internet pipe of less than 50 Mbits/s would have a horrendous experience.

The Show Must Go On! --- Saturday, March 13th, I successfully logged into the Expo and on the ready at our ATV lounge table a little after 8:00am Pacific Standard Time. During the morning, I was greeted by Mike Collis – WA6SVT, Rod – WB9KMO, Bill Brown – WB8ELK, and MANY HAM's that were curious about the exotic mode of ATV. The experience was much better at our table compared to Friday, but now I am witnessing notification banners popping up, with many presentations were starting later than their schedule times. Even worse, some presentations including our own Digital Amateur Television presentation was completely dropped from the schedule strip in Airmeet. Rod came to the rescue as he contacted Eric directly along with the support team at Airmeet for the attempt to bring our ATV presentation back on the schedule strip. In the meantime, I was receiving a BARRAGE of texts and notifications from our attendees and ATV "family" asking why our presentation was cancelled. I replied and let our potential audience know that "The SHOW will GO ON" and we are currently working on the problem. Have no fear, we WILL host our presentation.

Over an hour has passed from the official 4:00pm PST start, we are back up on the Airmeet's schedule strip, and gained host privileges to BEGIN the presentation. Expecting over a thousand or more attendees to watch our digital ATV presentation, Our ATV / ATN team of presenters were very pleased as over 160 attendees did wait out the "digital darkness" and attended our DATV talk. Even though the SHOW DID GO ON, just shy of 5:30pm Pacific Standard Time, we did lose the bulk of our audience during the "darkness" between 4:00pm – 5:25pm PST.

The presentation itself was phenomenally successful. We received a HUGE number of

positive comments, including “Best presentation of the day,” “Well organized”, “Great Video,” and “Great Job to the ATN Team,” including lots of “smiles and hearts” emojis pouring in our presentation screen. I belted out laughing from a comment in the chat box while our audience was watching our Hammy the Hamster segment and it said “I think the video may have been hacked.” Priceless!

After a successful presentation, our ATN team headed back to our famous “Amateur Television - Table #7 ” in the lounge. Hams attending the DATV presentation stopped by and thank us for a job well done and also shared their own successes with amateur television. As the Expo has drawn to a close for the evening, its time to “spring ahead” towards a new day tomorrow!

Time to Change the Clocks! --- Sunday, March 14th. Waking up with a loss of an hour’s sleep, I logged into the Expo again. Unfortunately, my presenter’s credential was a problem as I was getting dropped from the system due to “your e-ticket is being shared on another tab” notification. Deciding to go back to my paid “e-ticket” code, I was able to log back into the system and attended at our ATV table for the last day of the SHOW. I was greeted with new visitors and returning hams at our table. After 12:00 noon Pacific Daylight Time, it was time to push in my virtual chair and turn off the virtual light at our ATV lounge table to conclude our ATN’s participation with the QSO Today Virtual Ham Expo – 2021.

In conclusion, I share the quote from Jim Lovell – Commander of the Apollo 13 space rogram: Our experience of the 2nd running of the QSO Today Virtual Ham Expo can be described as a “successful failure.” The attendees ultimately received the short end of the stick of the March 2021 QSO Today Virtual Ham Expo due to the sessions not starting on time or dropped from the schedule. After all, paid attendees have high expectations. They paid their hard-earned money to attend an event (just like paying for a ticket to watch a movie in a theater), acquire a “take-away” from the event, while having a very enjoyable experience. I do hope the organizers of these ham Expos in the future will be able to perform rehearsals with their presenters to iron out the technical issues prior to SHOWTIME! On-line hamfests are greatly needed today, especially for the Amateur Television Network to get the word out about the fascinating mode of fast scan amateur television to our ham population throughout the world.

I am grateful and proud of our outstanding team within our ATN / ATV “family” that enable us not only enabling us to participate in the Ham Expo but endured extremely long hours in a truly short time to prepare and execute our DATV presentation. Even more impressive is the heroic efforts of our ATV team, especially Rod, Mike, Jim, Bill and many others to ensure the DATV SHOW MUST GO ON! I also want to especially thank the brave and heroic efforts of Eric Guth, 4Z1UG and his team for doing the best they could under extreme circumstances and consequences in hosting and executing a mammoth project of this caliber, especially for his invaluable assistance in getting our ATV presentation back on schedule and executed in our session room. The Airmeet system is a great concept, but it is still in its infancy and needs to be vastly improved to accommodate the numbers of attendees. Also, the Airmeet system needs to be scaled to

accommodate a wide variety of systems and mobile devices so attendees from mobile devices, notebooks, and desktops capable of simple videoconferencing will have an enjoyable experience. Our ATV and ATN family are looking forwards in our return towards the next Virtual Ham Expo in August.

73! Roland, KC6JPG, Rancho Cucamonga, CA

APOLOGY LETTER from HAM EXPO

First of all, I would like to apologize for the poor experience that many of you had at the QSO Today Virtual Ham Expo. After our very successful August 2020 Expo, I had a vision of combining what I loved about the vFairs platform (which is what we used last time) with a new technology that would provide a lot more interaction between attendees, speakers, and exhibitors.



Unfortunately, we had many technical issues with the Airmeet Presentations and the integration of the vFairs and Airmeet platforms. My brilliant programmer offered his resignation and to return his salary. Ridiculous, as the failure of this project was mine alone. I am deeply sorry for letting you down.

Fortunately for all of us, we had all the video presentations pre-recorded in the event of a technical disaster. Therefore, all of the presentations that were to take place over the weekend are now in the final editing stages and will be available in the Expo Auditorium within 48 hours. These videos are in glorious 1080P, high resolution, and streaming from Vimeo (a proven and strong video platform). All of the 80+ speakers gave fantastic presentations.

One of the things that we've stressed in all of our communications is that the QSO Today Virtual Ham Expo team is committed to constantly learning and improving what we do. Virtual conventions of this magnitude are new territory. We believe that there's a place for a virtual ham Expo to serve the needs of the very large amateur radio community, especially those that don't attend in-person national or regional events (or even local events). We are committed to making that happen. Our first Expo was a great success, our second one not so much. Setbacks happen but it's important to keep moving forward. As such, we are committed to getting "back on that horse", learning from our mistakes, and making sure that the next one is back on track. Please stay patient with us and we'll prove it to you. The QSO Today Virtual Ham Expo will return on August 14th and 15th.

Humbly yours and 73, Eric Guth, 4Z1UG

FEEDBACK:

FREE High Power Amplifiers: John, WB0CMC, of Omaha, Nebraska writes --- "Thought you'd like to know, I've shipped out 6 of these amps already. Each pkg contains 2 pallets and a PS plus 2 terminations and a cap for the PS. I do have quite a few more if there is any interest." Interested? give John a call at 402-932-3443. The amplifiers are 300 Watt, 70cm, which John described in an earlier newsletter. See the February, 2021 issue #70, pp 5-8.

DOES DATV RADIATE AS FAR AS FM-VOICE ?

Jim, KH6HTV

The quick answer usually is **NO !** Although this is also dependent upon terrain.

Recently Tom, W6ORG, referred Murray, K0TA to me. Murray lives in Chadron, Nebraska, in the far north-west corner of the state, just below the Black Hills of South Dakota. The Dawes County sheriff had asked Murray for the hams there to provide the county with an ATV repeater system. Murray was going to file for a grant to fund the project. I have been working with Murray to try to engineer an ATV repeater system. Our first step was to prepare RF coverage maps for several potential repeater sites Murray had identified. When I gave Murray some maps, he was shocked at the lack of coverage. Murray is a two way mobile expert and was quite familiar with what he could accomplish with two way FM voice radio repeaters in his area. My maps showed far less coverage. Murray asked "Why ?"

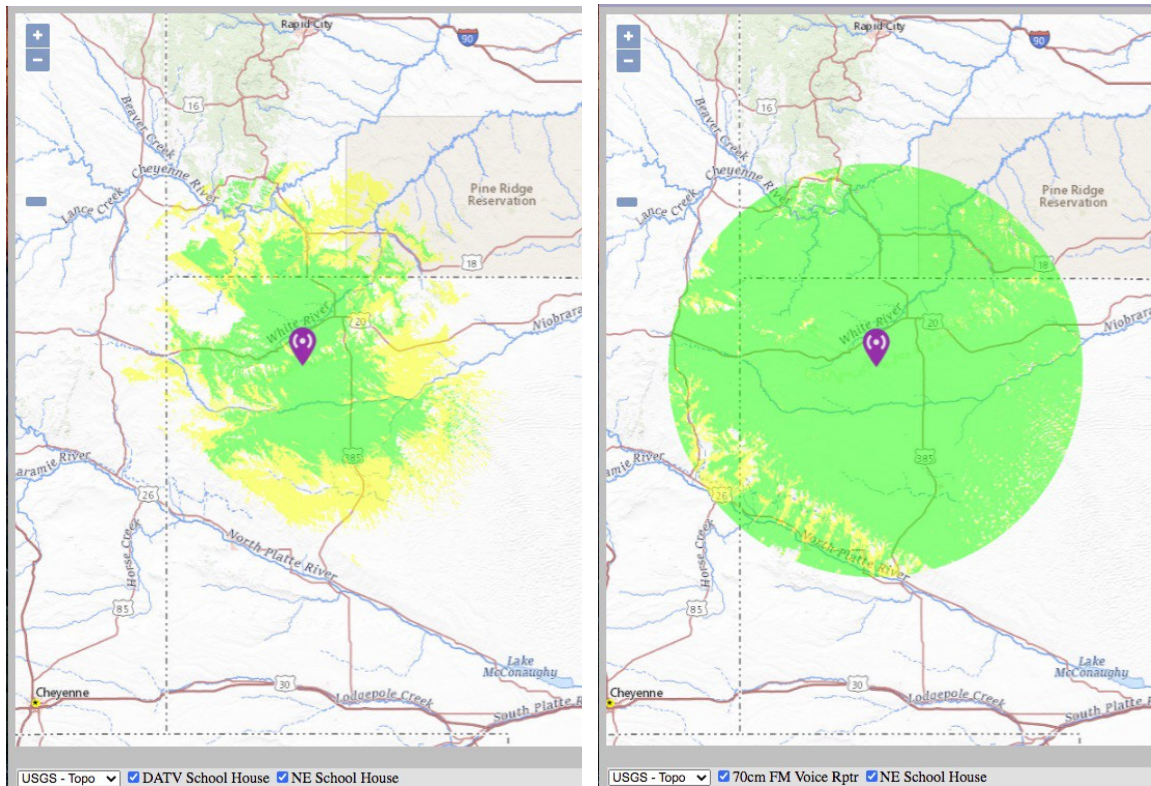
Well, the first and biggest difference is related to Bandwidth and the resultant Noise Floor. So, let's take some typical numbers to analyze. The basic equation for thermal noise power is: $P_n = k * T * B$. k is Boltzman's constant ($1.38064852 \times 10^{-23}$) T is absolute temperature in Kelvin's (normal room temperature is assumed to be 295°K). B is band-width in Hertz. Using this equation for a 6 MHz, DATV signal, the noise floor for a receiver will be -106dBm. For an FM voice rig with 15 kHz bandwidth, it is -132dBm.

Now for the FM voice rig we want a minimum of 10dB S/N for a readable signal, or -122dBm ($0.18\mu\text{V}$). For DVB-T using a good low noise pre-amp on the receiver and 6 MHz BW, QPSK, 1080P resolution, and normal FEC of 5/6, the min. detectable signal requires 8dB S/N, or about -98dBm ($2.8\mu\text{V}$). So right away, DATV has a -24dB disadvantage.

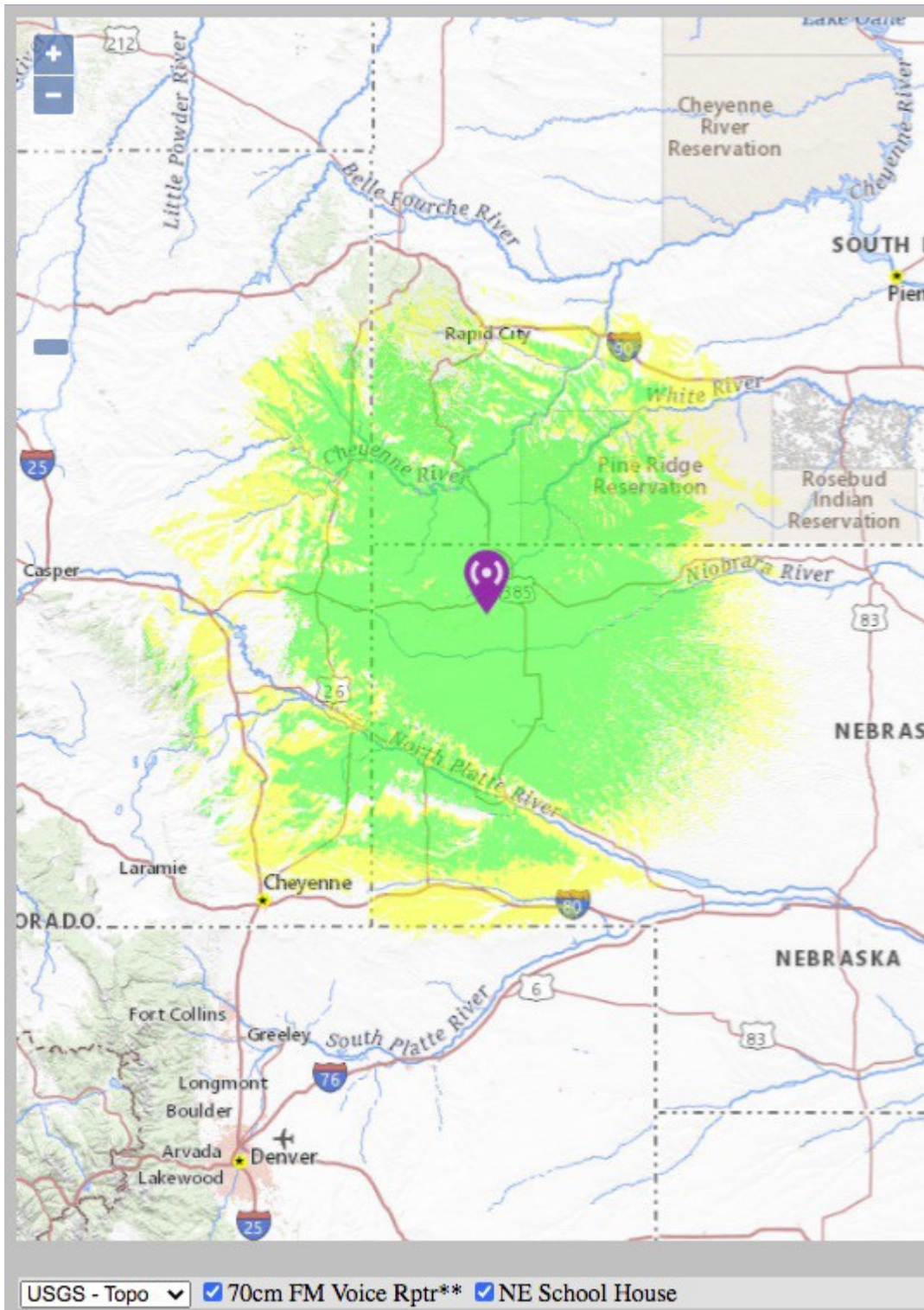
The next issue is that of available transmitter power. Let's use the same amplifier for both services. Taking my model 70-9B as an example. In FM service, it will put out 70 Watts (saturated). But for DVB-T service it puts out only 10 Watts (rms). The amplifier has to provide at least 8dB of head-room to accommodate the high peaks in the

random, noise-like digital signal. So we see still another 8dB disadvantage. We are now up to a total of -32dB.

So, I will now run these numbers for one of Murray's Chadron, Nebraska repeater sites. I will use the same antennas, tower heights and coax feed lines. The receiving station will be Murray's 60ft. crank up tower with a high gain Yagi antenna. The maps shown below are the results of the comparison. The difference is quite dramatic.



70cm, DVB-T coverage map (left) and 70cm, FM voice coverage map (right). Maps generated to a max. radius of 100km (62 miles). The tear drop denotes the repeater site. Yellow shading is for weak signal area (0 to 10dB). Green shading is for strong signal area with signal > 10dB above threshold.. Note: Rapid City, SD is at top of map and Cheyenne, WY is in lower left corner of map.



RF Coverage Map for 70cm FM voice repeater now computed for a 200km radius

W0BTV Details: **Inputs:** 439.25MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243MHz/6MHz BW, DVB-T
Outputs: 423MHz/6MHz BW, DVB-T, or optional 421.25MHz, analog VUSB-TV. FM-TV output on 5.905 GHz (24/7).
Operational details in AN-51a Technical details in AN-53a. Available at: <https://kh6htv.com/application-notes/>

ATV Net: We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time. The net typically runs for 1 to 1 1/2 hours. A DVD ham travelogue is usually played for about one hour before and 1/2 hour after the formal net. ATV nets are streamed live using the British Amateur TV Club's server, via: <https://batc.org.uk/live/kh6htvtvr> or n0ye. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz (-600kHz, 100 Hz PL tone required to access).

Newsletter Details: This is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 400. News and articles from other ATV groups are welcomed. Permission is granted to re-distribute it and also to re-print articles, as long as you acknowledge the source. All past issues are archived at: <https://kh6htv.com/newsletter/>

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