

BOULDER TV Repeater's REPEATER

July, 2018



We had a successful ATV BBQ/Potluck in June to welcome Mike, WA6SVT, to town. It was our first ever social, face-to-face, get-together of the Boulder area TV hams. As a result, I see us coming together more as an informal club. I would thus like to start a newsletter for us to share items of mutual interest. Hence this first issue. To keep costs to Zero, it will be strictly in electronic, .pdf format and distributed via e-mail. I solicit input from all of you as what you would like to see in the newsletter.

ATV-BBQ: In June, I got word from Mike Collis, WA6SVT, that he and his family were taking a cross country trip to visit family in the mid-west and he would like to stop by Boulder on their way back home to S. California. Mike is a broadcast engineer for the CBS anchor station in Los Angeles. He is the former technical editor of our national ATV magazine, Amateur Television Quarterly. He is also the driving force and guru of the Amateur Television Network (ATN) in the south-west USA.

Knowing Mike would be passing thru Boulder, I felt this would be an ideal opportunity for him to meet the Boulder ATV community. Thus, Janet and I invited the group to our QTH for a pot-luck / BBQ. It was held on Saturday evening, the 16th of June. The weather was threatening earlier in the afternoon, but was perfect for our BBQ. We had a great turnout of hams and spouses with about 24 in attendance. Unfortunately, I forgot to take a group photo. (next time !).

I asked Mike to give us an informal talk about ATN. Everyone came away from it with a great appreciation of the extremely complex inter-linked ATV repeater network, Mike and his fellow hams in California, Nevada and Arizona have but together. We also gained a better appreciation of the unique RF issues and challenges they faced in a major metropolitan area like Los Angeles. We realized we are lucky in Boulder being able to do some DTV technical things that would be impossible to do in RF saturated LA.

BCARES & TV: BCARES has sent out a call for ATV volunteers to help out again this summer with the Dead & Co concerts. These are the BIG rock concert events this summer in the CU football stadium. There will be two concerts held on Friday and Saturday nights, 13th & 14th of July. BCARES has assisted the CU Police Dept with crowd security for these Dead & Co concerts for the past two summers. It is a long work assignment starting at 3 in the afternoon and lasting until about midnight. The rock concert crowd will be a considerably different clientele than seen at CU football games.

It consists of a lot of really old, tie dyed, pot-head, hippies, plus younger ones also. Matt, K0DVB, says "The cameras will be run outside the stadium only - so gas masks are not required ! ! " Use your imagination for what gas will be present. The rock music sound inside the stadium is deafening and it is impossible to hear your HT, even with headphones, while inside the stadium.

BCARES will be staffing a couple of portable TV camera/transmitters outside the stadium monitoring the crowds coming in and out of the stadium. The pictures will be received in the CU police command post. BCARES is now using hi-definition, digital, DVB-T transmitters on the 70cm band. They have the capability of using up to four transmitters simultaneously on all four adjacent channels, (57, 58, 59 & 60). BCARES has their own TV equipment and volunteers do not need to bring any TV equipment, just your hand-held, 2 meter, radio, your BCARES badge, hat and shirt. CU PD supplies box lunches for volunteers. For the rock concert, Matt prefers experienced and trained ATV operators.

BCARES will also be providing similar TV coverage for all of the CU home football games. BCARES has been providing this service to CU since 1995. Game dates are: 9/15, 9/28, 10/6, 10/27, 11/10 & 11/17.

If you can help BCARES for either the rock concerts and / or the football games, please contact Matt Holiday, K0DVB, the BCARES video coordinator. His e-mail is: matt4etc@mac.com

REPEATER STREAMING: For the past year +, Don, N0YE, has been doing streaming on the internet of the Thursday afternoon ATV nets. His streams have been done from his home QTH using the program VLC. To view them, you need to also use VLC on your home PC and connect directly to Don's URL. (contact Don for the URL).

Recently, I signed us up to also do streaming from the British Amateur Television Club's (BATC) dedicated streaming server in the U.K. This streaming service is viewable on most devices, including PCs, tablets, mobile phones, etc. using most conventional browsers, such as Goggles Chrome, Explorer, Firefox, etc. It does however, require that you have installed Adobe Flash player on your device and also have it activated on the browser. The link to our stream is: <https://batc.org.uk/live/kh6htvtvr> While our repeater is outputting hi-definition, the stream is in 480P, 16:9 format. I am using the "combo" receiver to monitor the output of our repeater. I am using the composite video from the receiver going to an HP laptop computer via a composite to USB dongle converter. On the HP, I am running the program vMix to receive the video, add a PIP with ID, and stream it out to the BATC at 1Mbps. At this point in time, I am running the stream on a 24/7 basis.

Don, N0YE, is soliciting feedback from users on their relative experiences of receiving the two types of streaming, from his VLC URL and from BATC. Please send your comments to Don at: don80303@gmail.com

TV Rptr @ NCAR: The TV repeater has finally found a new, permanent, home. Since January, it has been transmitting from NCAR. Thanks go out to Don, N0YE, for pushing this and making it happen. Due to a lack of space on the NCAR tower, we were only able to install our Diamond X-6000 (2m/70cm/23cm) receive antenna at the base of the tower. There was no space available for our 70cm transmit antenna. Fortunately, the Boulder Amateur Radio Club (BARC) was willing to let us share rack space in the radio room and also their 70cm antenna which they use for their 448.90 MHz FM voice repeater. Don was able to build an antenna combiner network which allows our TV transmitter on 423MHz to share the same antenna with BARC's 70cm repeater.

From NCAR, the repeater has a commanding view out over the eastern prairie of Colorado. NCAR's elevation is 6,100 ft. plus the antenna's height is 120 ft higher on the top of the NCAR south tower. For FCC and CCARC reporting our height above average terrain (HAAT) was a - 194 ft. This negative number was due to the shielding effect of the Flatiron mountains directly behind NCAR to the west. To the east, over the prairies, our effective HAAT is really about + 1000 ft.



We are running essentially QRP power. After our inter-digital channel filter, our RF output power in DVB-T service is only about 5 watts (+37dBm). Our ERP is about 50 Watts. Even with this low power, we have fantastic coverage up and down the Front Range of Colorado. The above 70cm transmitter coverage map was computed using the free, on-line, program, Radio Mobile. It assumes the receiving base station is using a simple, 6 element, 11dBi, yaggi antenna at a height of 30ft. If that station were to use a 10 watt, DVB-T transmitter on 70cm, the coverage into the repeater would be about the same. The green shaded area is for strong signal strength > -80dBm. The yellow shaded areas are for weak signals in the range -90dBm to -80dBm. The coverage area to the north extends all the way to the Wyoming border. To the north-east out past Greeley. On the east, the coverage extends out to the Denver International Airport (DIA). To the south almost to Castle Rock. We still need to run coverage tests with 30ft. yaggis to confirm these predictions. Mobile field tests run last year, confirmed the mobile coverage maps, which predicted coverage out almost to Greeley.

HAM SHACK VISITS: I would like to start a regular part of this newsletter to be a visit to each of our Boulder ATV ham's shacks. Thus, to start it off, I will show you around my own ham shack. This will be an example of what I would like to do for all of you.

JIM - KH6HTV Aloha from my summer time, Boulder ham shack. In the photo is the Hawaiian greeting "Shaka". I am a retired EE "snow-bird". When the snow flies here in Colorado - I fly to Maui, Hawaii for the winter.

I have been experimenting with ham TV since the mid 70s along with Joe, AD0I. My main ham interest is ATV and more recently DTV with DVB-T. I also enjoy shooting videos of Janet's and my many vacation trips. I air these videos on our TV repeater. I also work HF. I prefer the digital mode BPSK-31.



This is my operating desk for ham radio, etc. The HF station consists of a Yaesu FTdx-3000 and a Heath SB-220 linear amp. I have a Dell all-in-one PC sitting next to the HF rig and it is dedicated to run the HF digital modes of BPSK-31, RTTY, FT-8, and SSTV. My main computer is an Apple MacBook Pro laptop with an extra monitor. Also on the desk is an HP PC laptop dedicated to streaming the TV repeater to BATC. The TV monitor in the center rear is monitoring 24/7 the TV repeater's output. Also on the desk is an ICOM IC-2100, 2 meter, FM transceiver.



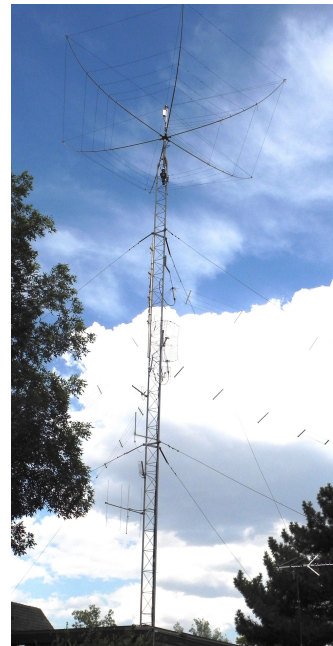
This is my electronics test bench. It contains a lot of analog TV test gear which I no longer use with DTV. The key test instrument is the Rigol spectrum analyzer.



These are my various TV transmitters. I use the Hi-Des HV-100EH (upper right) as my DVB-T modulator for 70cm, 33cm & 23cm. Sitting on top of it is a Hi-Des HV-110

receiver monitoring 24/7 Ch 60 (441MHz). This receiver along with the HV-100 modulator and the model 23-11A, 23cm, RF Power Amplifier (top center) comprise the TV repeater's remote 70cm to 23cm remote receiver/translator. Below the 23-11A, is my 23cm FM-TV modulator. The tan box below it is my 10 W, 70cm VUSB-TV transmitter. The bare aluminum box contains the up/down converter for 23cm DVB-T. The large rack mount unit on the bottom is a salvaged ShowTime, 2.4GHz TV transmitter which I am using as an RF power amp. for 13cm DVB-T.

This is my antenna tower. It is very hard to take a good photo of antennas -- lots of sky and not much hardware. The tower is Rohn 25 and is 50ft. tall. On top of it is my DX Engineering hex beam for 20/17/15/12 & 10m bands along with a Yaesu rotator. Dan Norman, N0HF, installed it for me. I installed all of the other nine antennas on the tower myself. I have antennas for all bands 3.5 MHz thru 5 GHz (except 220MHz & 3GHz) on the tower. For 2m, I have a 3 element yaggi. For 70cm, I have a 4 element, colinear, DB-Products DB-411 plus a 6 element, KLM yaggi. For 23cm, I have a 3 ft. Directive Eng. loop yaggi. For 2.4 & 5.8GHz, I have BBQ grill dish antennas. For HF, in addition to the hex beam, I have a pair of home-brew, fan dipoles (80/40/30m) and (20/17/15/10m). There is also a 2.4GHz mesh node vertical antenna for Don, N0YE's, mesh network.



ACTIVE ATV BOULDER HAMS: The following list is of those Boulder area hams that are currently active in ATV, either transmitting or as viewers:

CALL	Name	Location	CALL	Name	Location
KH6HTV	Jim Andrews	SE of Boulder	Receive Only		
N0YE	Don Nelson	S Boulder	K0ANS	Lew Warshawsky	Longmont
WA2YUN	Colin Bradley	S Boulder	KV5Y	Ken Rawlings	Englewood
K0HEH	Jack Quinn	C Boulder	W3DIF	Mike Derr	Broomfield
WB2DVS	Pete Goldman	E Boulder	K0RZ	Bill McCaa	Louisville
KC0PYX	Larry Nelson	N Boulder	N0FZB	Mike Laage	E of Boulder
AB0MY	Bill Eberle	N Boulder			
AD0U	Joe Woods	N Boulder	Sheriff's SWAT Video Team		
K0IHx	Roger Salaman	SE of Boulder	K0ARK	Allen Bishop	
KD0PDZ	Naomi Salaman	SE of Boulder	KB0LRS	Mark Huff	
N0RUX	George Kretke	NE of Boulder	KI0HG	Dave Sharpe	
KB0NAS	Doshia Kretke	NE of Boulder	K0DVB	Matt Holiday	
KE0OJO	Zach Salaman	Mead	KA0QPT	Scott Whitehead	
AA6TV	Don Apte	Broomfield			
WQ0TQG	Steve Maddy	Sugarloaf Mtn			
K0DVB	Matt Holiday	Frederick			