

**Boulder Amateur  
Television Club  
TV Repeater's  
REPEATER  
March, 2020**



BATVC web site: [www.kh6htv.com](http://www.kh6htv.com)

ATN web site:  
[www.amateurtelevisionnetwork.org](http://www.amateurtelevisionnetwork.org)

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**ATN-ARIZONA on 3 & 5GHz:** You may have heard that the FCC has released a couple of dockets that could change our frequency allocations on the 3 GHz and 5 GHz ham bands. The comment period for the 3 GHz docket is now closed. I submitted comments on behalf of ATN-AZ with a lot of help from others, notably Mike Collis WA6SVT. There have been about 300 other comments filed, including those from ATN (National), ATN-CA, AREDN, Arizona Mesh Organization (AMO), other ATN chapters, the ARRL, and many other ham groups and hams plus a bunch of companies and individuals that oppose us. You can read all of their comments on the FCC.GOV website. This bout with the FCC is an uphill battle and we could lose the whole 3 GHz band. It's not likely we'll keep it all but we hope to retain at least half of our allocation or space that is relocated somewhere else that is useful to us.

Rod Fritz, WB9KMO, ATN-AZ Vice President

editor's note: To see the comments to the FCC, go to [www.fcc.gov/ecfs/](http://www.fcc.gov/ecfs/) and enter 19-348 in top box "Search Full Text" --- or direct to:

[https://www.fcc.gov/ecfs/search/filings?proceedings\\_name=19-348&q=19%5C-348&sort=date\\_disseminated,DESC](https://www.fcc.gov/ecfs/search/filings?proceedings_name=19-348&q=19%5C-348&sort=date_disseminated,DESC)

**Commercial, Big Gun, filings** are from: T-Mobile, Nokia, Boeing, A T & T, NBC, Lockheed Martin, plus many others, including: Dyanmic Spectrum Alliance, Cometicative Carriers Assoc, CTIA, Wireless Internet Service Providers Assoc, Dynetics, 5G Americas, Federated Wireless, CommScope, Computing Technology Industry Assoc, Piper Networks, Wireless Innovation Forum, Open Research Institute, Utilities Technology Council, Dynetics, and Southern Company Services.

Filings from Colorado, include from John Maxwell & Doug Sharp on behalf of Rocky Mtn. Ham Radio.

**BREAKING NEWS -- FCC Approves Plan to Pay Satellite  
Companies to Give Up C-BAND Airwaves !**

edited from www.bloomberg.com (2/28/20)

U.S. regulators approved today, a plan to pay Intelsat SA and other satellite providers to give up airwaves so they can be redeployed for the fast 5G mobile networks being rolled out. The FCC on a 3-2 vote Friday (2/28) approved Chairman Ajit Pai's plan for as much as \$9.7 billion to clear the frequencies, with the money coming from bidders expected to include large telephone companies such as Verizon Communications Inc. The frequencies in question are in the 3.7 - 4.2 GHz area of spectrum, known as the C-band. Intelsat and SES dominate that patch of airwaves, which are considered well-suited for 5G networks. Proponents say the frequencies are needed to help the U.S. beat China in the race to 5G, the next-generation of wireless technology that promises to transform everything from robotic surgery to autonomous vehicles. This part of the spectrum offers an ideal mix of coverage and capacity to carry the emerging 5G wireless technology that promises data speeds 100 times faster than those of recent years. Until now, the C-band has been used by satellite providers to beam programs down to TV and radio stations around the country.

*Editor's note: The handwriting is on the wall ! Don't expect the ARRL and hams to survive this onslaught of BIG MONEY \$\$\$ for our microwave bands.*

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*Note: The following was recently supplied to ATN and the ARRL for use in their filings with the FCC supporting continuing use of the 5.8GHz band by radio amateurs.*

## **ARES Use of Amateur Television on UHF & Microwave Bands for Public Safety**

**Jim Andrews, KH6HTV  
W0BTV, ATV Repeater trustee**

The Boulder County ARES (BCARES) has been providing Amateur TeleVision, ATV coverage for our Sheriff, Police & Fire depts. since 1989. It has been the #1 communication service they consistently request from BCARES, far more than HF & VHF voice and packet radio. BCARES's ATV has covered many various emergencies and public events. They have included: forest fires, floods, political demonstrations, university student riots, war protests, huge crowd gatherings such as Halloween, etc. Starting in 1997, a smaller subset of BCARES members also are trained volunteers with the Sheriff's dept. SWAT team. They respond on all paged SWAT call-outs and are exposed to much more dangerous situations. They provide live video feeds to the SWAT commander in the mobile command post. BCARES also often participates in mutual training with the various served agencies.

**Forest Fires:** These two articles from QST and CQ magazines are great summaries. They are available from my web site: <https://kh6htv.com/>

"Boulder Hams Fight Forest Fires With Video", Jim Andrews, KH6HTV, QST, May, 2011, pp. 76-77 <https://kh6htv.files.wordpress.com/2020/02/qst-may-2011.pdf>

"Colorado ARES Raise the Bar on Amateurs' Wildfire EmComm Response: Amateur TV Plays Vital Role" Richard Fisher, KI6SN, CQ, Sept. 201, pp. 13-18.  
<https://kh6htv.files.wordpress.com/2020/02/cq-sept-2012.pdf>

They document Boulder's biggest ever forest fire in Sept. 2010. 6,000+ acres of forest burned. Lost 160 homes, BCARES was credited by the Sheriff with saving 1/2 dozen homes because of video.

**General ARES-ATV:** These two additional items from my web site are also more general coverage of using ATV for ARES and public safety. I have pulled from them some relevant photos and attached at the rear to this memo. I have also gone back to old VHS/DVD recordings of BCARES ATV activities in the 1990s and grabbed a few images. These images from old analog, NTSC, VHS, videos are certainly not up to our present day hi-def., 1080P, digital video capabilities.

"Add Television To Your ARES Tool Kit", Jim Andrews, KH6HTV, Application Note, AN-9, Oct. 2011, 5 pages  
<https://kh6htv.files.wordpress.com/2014/10/an-9-ares-tool-kit.pdf>

"ATV & Public Safety", Jim Andrews, KH6HTV, talk presented at 2013, ARRL Dayton ham radio convention. collection of power point slides  
<https://kh6htv.files.wordpress.com/2013/05/atvpublicsafetyrev1.pdf>

**High Definition, Digital TV:** It should be noted that BCARES has since 2014, upgraded all it's ATV gear now over to DATV. Government funding was provided to enable this. The European broadcast, digital TV standard, DVB-T, is being used.

**Frequency Bands used by BCARES for ATV:** Our ATV repeater is a cross-band repeater on the 23cm and 70cm bands. It covers the eastern, flat prairie portion of Boulder County. It does not cover the mountainous, western half of the county with mountains rising up to 14,000 ft. BCARES also uses the higher microwave bands, including: 2.4, 3.5, 5.8 & 10 GHz bands to establish temporary, point-to-point, microwave links for our high definition, DVB-T, digital video. These allow remote sites to be tied into our ATV repeater. BCARES has a complete radio/TV station in the Boulder County, 911 & Emergency Operations Center (EOC) for receiving these remote TV pictures. BCARES also has two portable, multi-channel ATV receivers for deployment to remote locations for use in the Police / Sheriff Incident Command Vehicles. These provide "live feed" video to the incident commander.

**BCARES-ATV PHOTOS:**



1991 War Protest March



1999 Univ. of Colorado student riot



1999 Tear gassing of rioters



1999 Riot squad chasing rioters





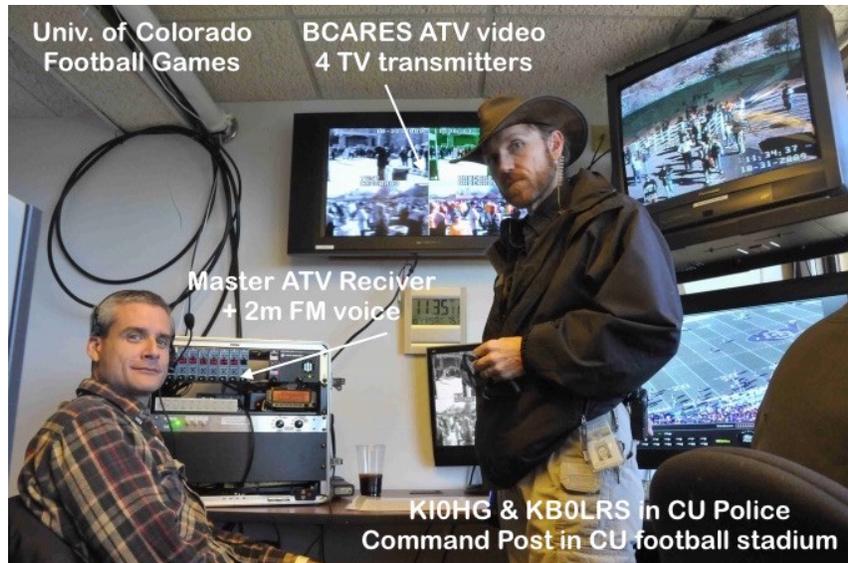
1998 Capture of Bank Robber in Left Hand Canyon by Boulder Sheriff SWAT team "live" on scene video by BCARES-SWAT video team.



2002 -- Night vision TV camera images from Forest Fire on ridge line just above the city of Boulder. Image on the right shows fire fighters walking up the steep hillside to the fire.



2012 -- Forest Fire -- view inside the Boulder EOC



BCARES has been working with the University of Colorado Police dept. since 1995 to provide surveillance of large crowds, for public safety, at major CU events, including: football games, political rallies, campus visits by major political dignitaries, etc.

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Don, N0YE's new 2.4 GHz RF Power Amplifier

**2.4 GHz EXPERIMENTS:** Recently, Don, N0YE, and Jim, KH6HTV, conducted some more DVB-T, rf propagation experiments on the 2.4GHz band with disappointing, very marginal results. The frequency used was 2393MHz (6MHz BW). Hams have the exclusive 10 MHz from 2390-2400MHz. Above it is the unlicensed "Wi-Fi Wild West". Don was operating from his home QTH on the high Shannahn ridge on the south side of town. From there Don has a fantastic view to the north, all the way to the Wyoming border. Jim was set up portable at the Boulder 911/EOC with a line of sight path to Don. Don was running a puny +13dBm of power and Jim was unable to receive his signal over the 7.4km path. Don did receive Jim's +22dBm signal, but only with a 6dB margin.

Three or four years ago, Jim had salvaged a commercial 2.6 GHz TV transmitter. Bill, K0RZ, had come across some surplus ShowTime MDDS analog, TV transmitters. He gave one to Jim, KH6HTV. Jim gutted it and saved only the actual rf power amplifier. See the above photo. It was intended for service in the MDDS band of 2.5-2.7GHz. It

still worked at 2.4 GHz, but with lower output power. At 2.4 GHz, it's gain was 55dB. The max. rf output power was 5 watts. For DVB-T service, setting the spectrum shoulders to -30dB, the rf output power was 3/4 watt (rms) (+29dBm).

Because Don has a much better QTH location for our microwave experiments, Jim has given this transmitter to Don to use with his tower mounted antenna farm. Now boosting Don's rf power by 16dB, we hope he can shout over all the Wi-Fi garbage !

### **AMATEUR TELEVISION NETWORK -- ATN Apparel**

"Members of the BATVC group can purchase our AWESOME ATN apparel, such as our blue ATN polos, white ATN polos, and our famous ATN satin jackets. You can let your group know the type, sizes, name / call sign, and quantity and you can forward the list to Mike, WA6SVT. We can get the shirts printed and embroidered with their name and call on the items."  
73 de Roland, KC6JPG

**Future Newsletters:** If you have contributions for future newsletters, please send them to me. We also encourage you to forward this newsletter on to other ham friends in your clubs.