Amateur Television Journal

August, 2025
2ed edition, issue #192

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

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

Ham TV again from the International Space Station !

News Bulletin from 29 July --- Following years of work by the ARISS team, the HamTV module has been successfully reinstalled and is now active. You can see live video from the ISS as received by a chain of stations at: ***https://live.ariss.org/hamtv/***

HAMTV is the name of the Digital Amateur Television (DATV) transmitter on board the Columbus module of the International Space Station (ISS). It transmits Digital video and audio in MPEG-2 format using the DVB-S protocol in the 13 cm band.

The original HamTV unit was installed on the ISS in 2013 and commissioned in April 2014 and was used for a number of ARISS school contacts in 2016 - 2018.

The unit failed in 2019, and was brought back to earth for repair. It was returned to the ISS on the SpaceX SpX-30 flight on March 21st 2024. Unfortunately a lengthy "topology reassessment" was then required due to space issues in the Columbus module.

For more information and details on how to receive the ISS DATV signal, see the BATC web site: ***https://wiki.batc.org.uk/HAMTV_from_the_ISS***

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Tower Cam View from WA0TQG's QTH on Sugar Loaf Mountain, Boulder, Colorado

Steve's tower camera image as seen on the Boulder W0BTV DVB-T repeater. Steve has to relay his signals to/from W0BTV via his own personal 23cm/70cm repeater located at the QTH of Jack, K0HEH in Boulder near the CU campus. Green mountain shields Steve from direct access to W0BTV. The antennas seen in the photo and the camera are on the top of his 50 ft. tower. Steve presently has DVB-T capability on all bands up to 13 cm and is working on adding 5 and 3 cm bands. Plans are underway to soon run DX distance tests on the 23 cm band with N0YE and KH6HTV as rovers to check out Steve's coverage area. ***Radio Mobile*** computer rf propagation program predicts Steve's 23 cm signal should reach out 144 km (90 miles) to the Pawnee Grasslands in north-east Colorado.

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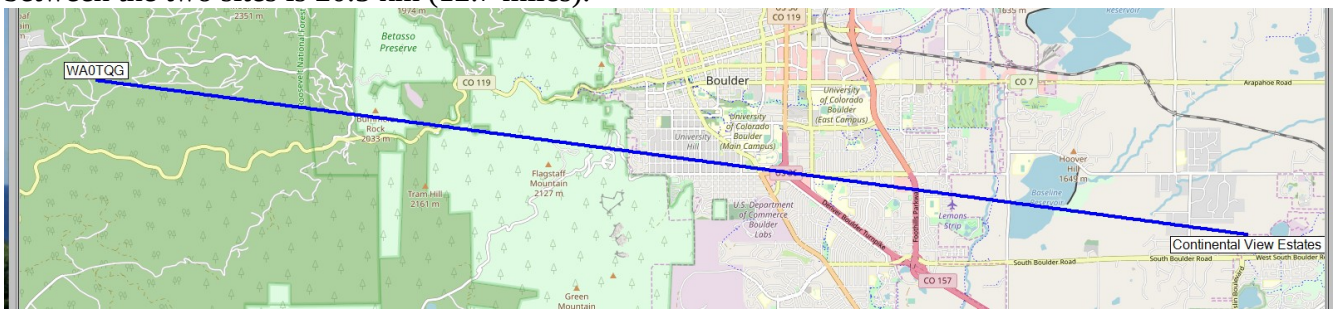
23 cm transmission (Aug 6th)

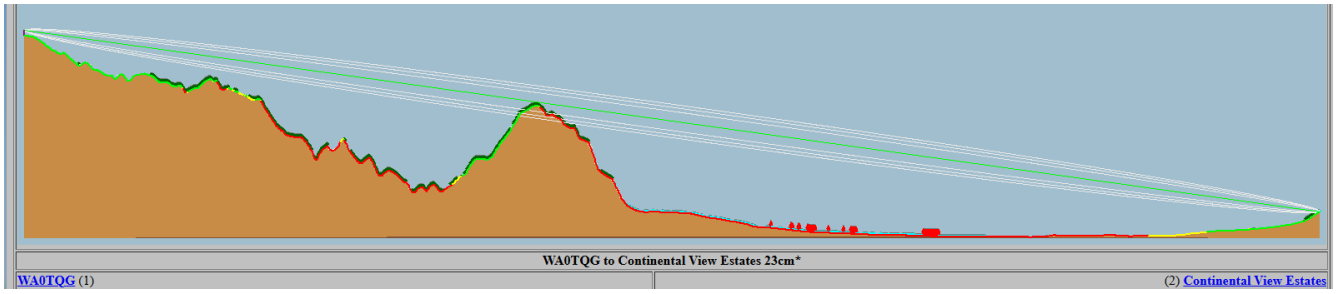
13 cm transmission (Aug 9th)

BATVC Mounts Effort to Obtain "Worked All Bands"

Some members of the Boulder ATV Club (BATVC) are attempting to achieve the lofty goal of **"Worked All ATV Bands"** These are to be simplex, two way contacts, not using our W0BTV ATV repeater. For us this means all seven FCC authorized bands from 70 cm through 3 cms. (70, 33, 23, 13, 9, 5 & 3cm) While the folks in Europe can use the lower VHF bands for ATV also, we here in the USA are restricted to UHF and higher bands, starting at the 70 cm (420-450MHz) band.

One of the participants is Steve, WA0TQG. The photo on the previous page shows the great view of the eastern prairie of Colorado from Steve's 50 ft. tower. At present, he has full DVB-T capability to send and receive on the 70, 33, 23 and 13 cm bands from his home QTH. (40° 0' 54" x 105° 24' 04", DN70ha) So our first attempts at achieving Worked All Bands are starting with making simplex DATV contacts with Steve. The first two attempts were from a new location we found called Continental View Estates. (39° 59' 26" x 105° 09' 47", DM79kx) This is on the northern end of Davidson Mesa, south-east of the city of Boulder on city of Boulder open space land. The distance between the two sites is 20.5 km (12.7 miles).





Radio Mobile's RF path profile showed that we have a clear line-of-sight path between the two sites, but just barely with the signals passing over Bummer's Rock and Flagstaff mountain.

On August 6th, Steve and Jim, KH6HTV, had success using DVB-T (6 MHz BW) on the 23 cm band (1243 MHz). Steve transmitted a 5 watt signal with a 16 dBi yagi antenna. Jim transmitted a 2 watt signal using a 12 dBi patch antenna. Jim received Steve's perfect P5/Q5 signal at -79dBm with 17 dB s/n. Steve does not have an S meter, nor s/n meter on his receiver. So Jim used a step attenuator on his transmitter drive power to lower his rf power until the signal at Steve's froze. We found Steve had a 17 dB margin at his qth.

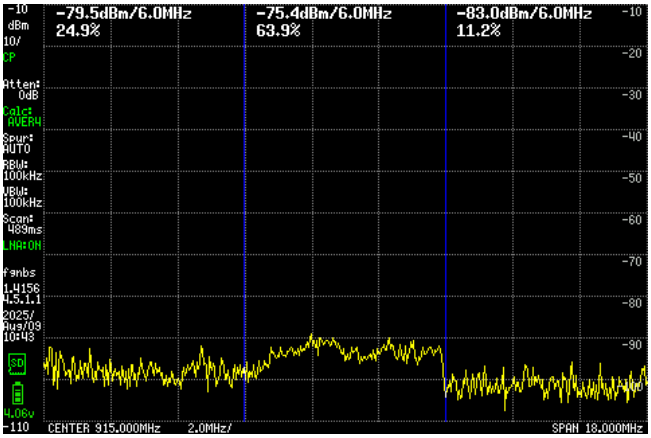
On August 9th, Jim, KH6HTV, and Don, N0YE, returned to the Continental View site to try again making DATV contacts with Steve, WA0TQG. This time the attempts were on the 33 cm (915 MHz)

and 13 cm (2393 MHz) bands. These are very RFI prone bands due to their being shared with FCC part 15 and ISM users (Wi-Fi,etc.). We knew ahead of time, these were going to be more difficult bands. The results proved out our fears. While Steve is in a relatively RFI quiet mountain area, the other site looked directly over the noisy city of Boulder.

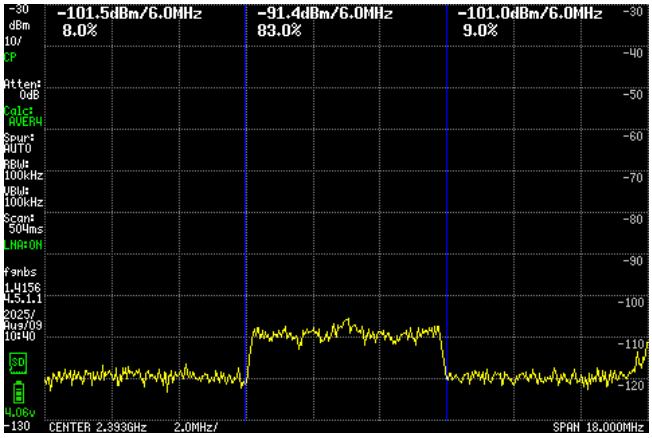
On 915 MHz, Steve had a 3 watt transmitter and 15 dBi yagi. Jim had a 3 watt transmitter and 12 dBi yagi. On 2393 MHz, Steve had a 4 watt transmitter and 17 dBi yagi. Jim had a 2 watt transmitter and 17 dBi yagi.

We used the most aggressive possible digital parameters to maximize our chances of success. We ran 720P resolution with H.264 video encoding at 3.5 Mbps. Audio was MPEG-2 encoding at 96kbps. RF was QPSK modulation, 8K FFT, 1/16 guard interval with 1/2 code rate (Forward Error Correction). With these parameters and using good low noise pre-amps, our digital threshold sensitivity of our receivers on both bands was of the order of -101 dBm with 5 dB s/n. This value was measured in a perfect closed circuit bench top test.

At 915 MHz, Jim was unable to receive any signal from Steve, while Steve received Jim and Don's signal, but only with a 3 dB margin for P5 and 5 dB for total loss of signal. On 2393, things were a bit better. Steve received Jim and Don's signal perfectly P5/Q5 with a 20 dB margin. However, for the other direction, Steve's signal was clobbered with enough RFI to cause continual freeze framing, even though the signal stength measured -91dBm with peaks to 14 dB s/n. So the conclusion was, no valid two way DATV contacts could be claimed for either 33 or 13 cm on this outing.



WA0TQG's signal at 915 MHz



WA0TQG's signal at 2393 MHz

So, with the poor reception of Steve's signal, Don and Jim then decided to pull out their Tiny SA-Ultra spectrum analyzer and see what RFI they might find. The two plots above show what they saw. Both are sweeps across 18 MHz with the analyzer setup to measure the total power in three, 6 MHz wide channels. On both 33 and 13 cm bands, Steve's DVB-T signal was visible on the analyzer, but the background noise level was quite high. With no antenna attached, the SA measured about -102dBm in each 6 MHz wide channel. On 33 cm, the ambient noise level was seen to be about -80 dBm. On 13 cm, the ambient noise level was essentially the same as the threshold of the SA at -102 dBm.

73 de Jim, KH6HTV, Boulder, Colorado

900 MHz is a Junk Band !

We hams have been given authorization from the FCC to use a large number of radio frequency bands. They start at a very low frequency of 135 kHz (2.2km) and go up to 250 GHz, plus all frequencies above 275 GHz. Unfortunately, we have to share some of these bands with the general public with FCC part 15 and ISM devices. The most impacted bands are 900 MHz (33 cm), 2.4 GHz (13 cm) and 5.8 GHz (5 cm). For more reading on this subject, check out what the ARRL has to say

https://www.arrl.org/part-15-radio-frequency-devices

While typically any one single FCC part 15 device is not a big RFI source, what really hurts our use of these bands is the composite RFI ambient environment of thousands of these devices all radiating in the same chunk of spectrum. It is especially bad in urban environments.

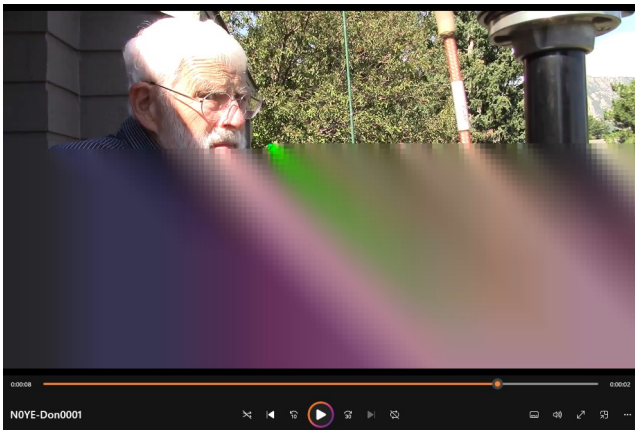
0.9 km clear line of sight RF path NOYE to KH6HTV

Our recent efforts to do "Worked All Bands with DATV" vividly demonstrated the issue of part 15 RFI for DATV, especially on the 33 cm, 900 MHz band. Still wanting to make a simplex two way contact on the 33 cm band, Don and Jim decided to try it again, but at a very short distance of only 0.9 km with a true visual line-of-sight path between transmitters. Don set up his gear on his back deck. Don lives on a ridge line with a great view to the north over the city of Boulder. Immediately below him is a a city park. Jim parked his car with his gear in it on Knox Dr. on the far side of the park.

Don's camera looking at Jim's Saab on Knox Dr

Don was running a +16dBm transmitter into a home-brew, 10 element yagi antenna. Jim was running a 3 watt (35dBm) transmitter into a commercial, 7 element yagi antenna. The received signal strengths were very strong. Don received Jim's signal at -45 dBm with 20 dB s/n. Perfect P5/Q5 with no RFI. Jim received Don's signal at -61 dBm with 17 dB s/n, --- BUT with lots of RFI causing lots of freeze framing. Don's -61dBm signal was 40 dB above the threshold sensitivity of the receiver used, yet it was still being clobbered by the ambient RFI on the 33 cm band.

intermittant good picture from Don



typical RFI freeze frame on Don's signal

So what is the 33cm band good for ? It is useful to do a one time attempt at Worked All Bands. Beyond that it is a total waste of time for us BATVC ATV hams.

73 de Jim, KH6HTV, Boulder, Colorado

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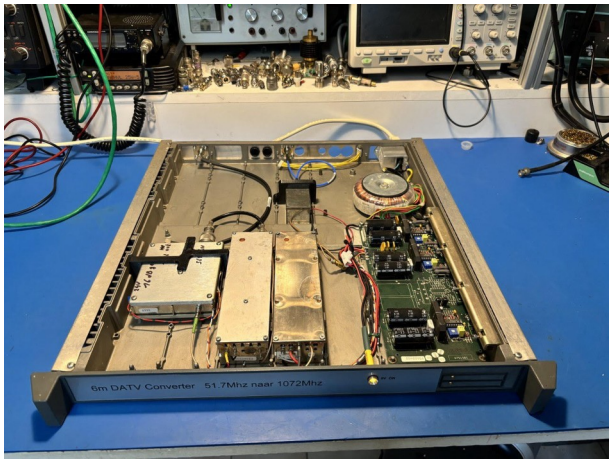
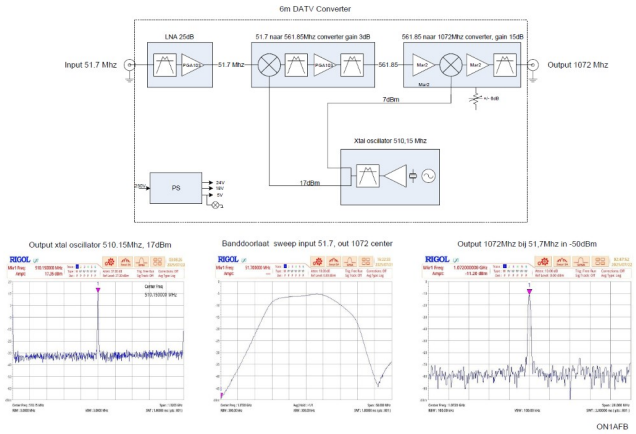
ATV News from Netherland & Belgium

Frans Van de Velde, ON4VVV

In both the Netherlands and Belgium, the summer holidays run from the beginning of July to the end of August, but for a number of ON stations, myself included, it is already over. This year I did not go to my traditional destination Calabria in southern Italy, but I stayed in Zeeland (NL) on the Oosterschelde, where I can also practice my second hobby: recreational diving. So, no radio or ATV for me for the entire month, but I did regularly check out our new ATV stream via VLC at "srt://srt.on0tvo.be:10000" as well as via the DX-SPOT of the BATC. Apart from the ATV round (*i.e. nets*) on Wednesday evening by ON5KR, there was, as expected, depressingly little activity.





6 Meters: Starting next week we (ON5KR and myself) will fly back in with charged batteries to activate the inputs that are not yet active. Guido ON1AFB has spent the past few months building a beautiful and professional 6 meter upconverter for us. This will be connected to an OCTAGON satellite receiver with a fixed SR of 250 kHz. Thank you very much Guido, this will certainly promote the D-ATV activity on 6m.

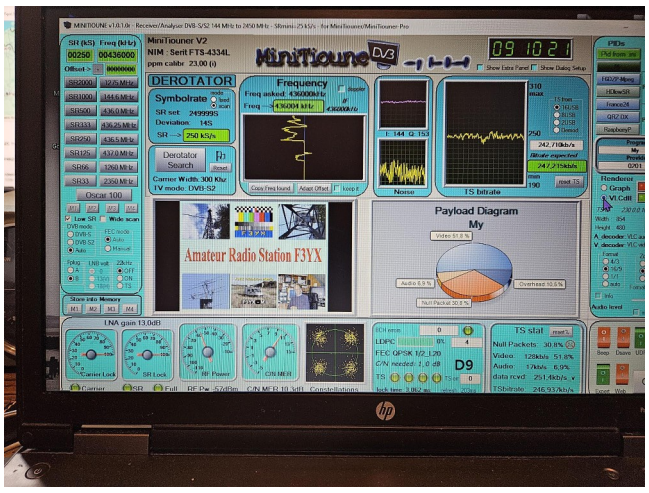
In the meantime, I've received a 6 m halo loop (folded dipole) antenna that, after tuning and a few modifications, will be ready for use at the repeater site. This antenna is dirt cheap, relatively small, and will fit perfectly on any radio amateur's mast.

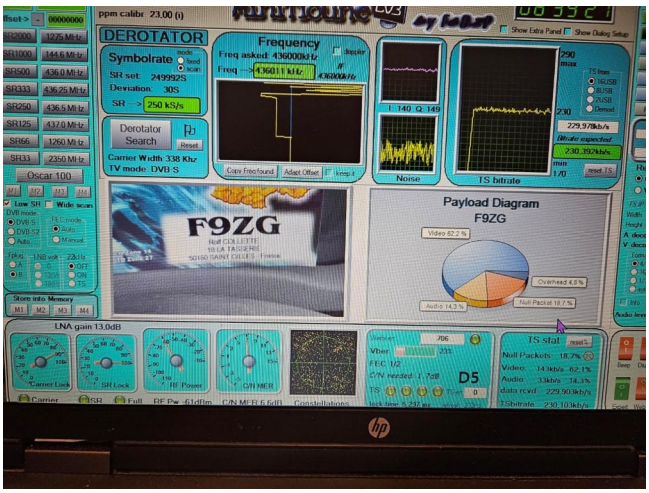
This 6 m D-ATV input will remain permanently active even after the "sporadic E" season. This way, it will function similarly to a WEB SDR, allowing you to watch from anywhere in the world via our ON0TVO "srt" stream, regardless of whether your signal is available.

Of course one should not randomly try to work DX, every now and then check ***http://dxalert.pe1itr.com/dxspots-latest-datv50.htm*** or ***https://hf.dxview.org/*** which will show you exactly when the conditions are favorable, then try to make an appointment via the DX-SPOT or one of the ZELLO ATV channels and “bingo”.

The sporadic E season is traditionally active from May to August, peaking at the end of June. However, even outside this period, beautiful openings can occur, even in winter. The phenomenon is caused by sporadic and completely unpredictable local concentrations of ionized air in the E layer, which reflect radio waves at frequencies of 10m, 6m, or even 2m back to Earth, primarily during the day and occasionally at night.

Attempts to connect with SV1EBS Stavros and SV1COA Yoannis on 6 m near Athens were mainly unsuccessful because we couldn't be in our shack simultaneously at the right time for the "Es" conditions. However, I'm convinced that with a little patience and luck, this should be possible in the near future.

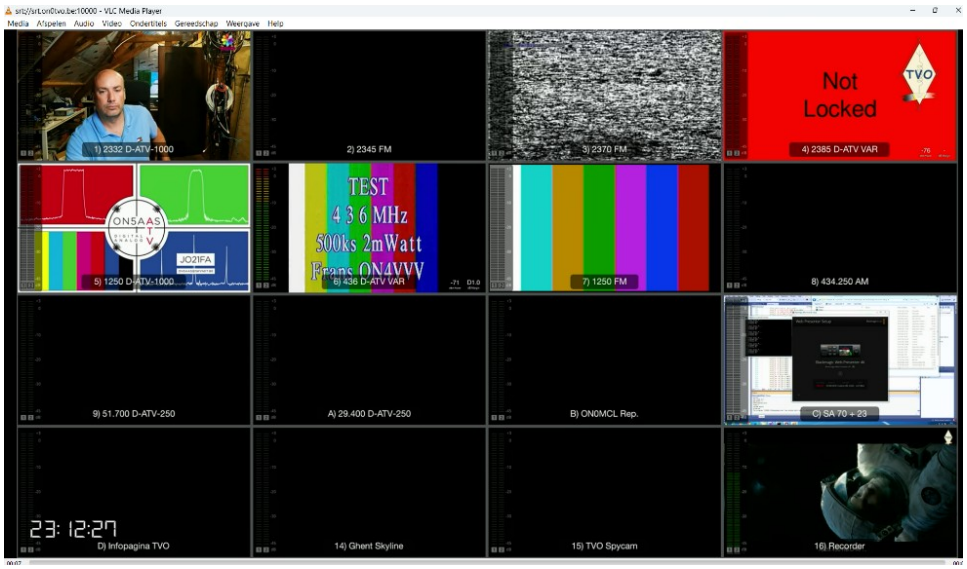




BAND CONDITIONS: During June, there were frequently excellent conditions on 70 cm due to temperature inversions. Thanks to a tip from Jeff, F5RZC, I was able to make some excellent two-way contacts in D-ATV 250 kHz with F9ZG over a distance of 416 km and with F3XY over 291 km. Both stations came in very strongly with a D5 and a D9, respectively.

ATV CONTESTS: On August 16th and 17th, VERON is hosting another narrow-band D-ATV contest. The frequency bands to be used are 6 m, 2 m, and 70 cm, with a maximum SR of 333 ks on 6 m and 125 ks on 2 m. Unfortunately, I'll be abroad that entire weekend and therefore unable to participate. As a reminder the start is Saturday at 12 o'clock GMT or 2pm local CET (summer) time to end Sunday afternoon at 8pm CET. I'm extending a warm invitation to participate, even if only to make some local contacts. Please also submit your log afterward, no matter how small.

EXPERIMENTS WITH D-ATV ON 10 Meters (continued): Given our good experience with the results on 6 m via reflections on the ionosphere, we also plan to make a permanent input on 10 m (29.4 MHz), which will mean that for long distance connections we will no longer be solely dependent on the sporadic E phenomena. I'm now fully prepared for D-ATV experiments on 29.4 MHz. All that's left is to find some local counterparts to try out. Please send me an email to ON4VVV@UBA.BE .



ON0TVO, our East Flemish ATV Repeater: A few months ago, a new output was added on 3 cm. The transmitter is currently operating as a test on approximately 10280 MHz with an SR of 4000 ks and in 8-PSK, i.e., full HD. This new output is much stronger than the (now defective) analog output on 10180 MHz. The new mosaic looks like this above photo.

You can watch the stream with VLC player: ***srt:// srt.on0tvo.be:10000***

The inputs at 2385 and 436 MHz are equipped with a variable SR and this will also be provided for the 1250 MHz input as soon as we can get hold of a Minituner somewhere. NOT LOCKED only means that the RX does not see any signal coming in, in which case you will need to be patient during a TX test (max 30 sec), as the receiver is busy scanning the various preset SR's. One of the first things we'll do is activate the FM inputs for 2345 MHz so the noise becomes visible. I'll also try to do the same on 1250 MHz. A receiver is also ready for the 70 cm AM input; dust off your old AM transmitter. Furthermore, the 6 m input and reception of the Mechelen ON0MCL repeater will also be activated with priority. Via the DTMF letter "D," you will also have access to an information page with, among other things, all the DTMF codes to be used. Operation is still on 144.5625 MHz, but now via short DTMF tones of approximately 200 to 300 milliseconds. These DTMF codes are displayed at the bottom of the screen for each input. When an entered DTMF code is received and recognized, it appears as confirmation at the bottom center of the screen. Please note that soon the 6 cm D-ATV will be switched from DVB-S to S2 and from H.262 to H.264, so you may need a different receiver to receive these.

IARU & 23cm: As a result of the IARU recommendations, the 23 cm band will undoubtedly be reassigned. There's still plenty of room for D-ATV between 1240 and 1258 MHz, and I suspect our entrance will have to move to 1255, 1256, or 1257 MHz. This will also depend on whether I can get the bandpass filters adjusted.

ATV Round (Net): attention to adjustment of start time. For a few weeks now, the ATV round has been starting at 8:30 PM instead of 8:00 PM. Every Wednesday evening at 8:30 PM, we meet on 144.5625MHz for a small round. If you have or want information on an ATV-related topic, or if you'd like to try something out, this is the perfect time to get in touch. If you're too far away to reach us via 2m, you can also reach us on the Zello channel "ATV Belgium" or join us via the ON0TVO chat on the BATC. ***https://batc.org.uk/live/onl12658***

73's, Frans, ON4VVV, Massemen-Wetteren, Belgium

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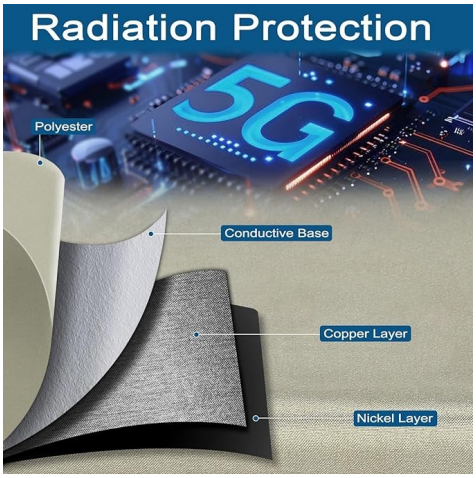
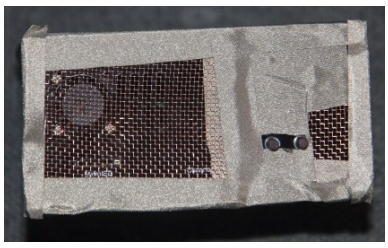
ATV Repeater Update & Suggestions from Nevada

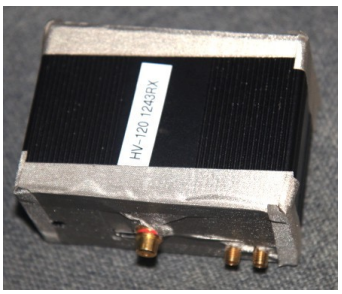
Jim, W6US, Sparks/Reno Nevada has written to us with more updates on his DATV repeater project progress. Plus he has some good suggestions of new products for his fellow ATVers.

Faraday Fabric: During some of my testing, I noticed that I had a -90 dBm received signal into my home Hi-Des HV110 DVB-T receiver... Beautiful picture, but really low signal. Then I realized that I did not have an antenna connected to the receiver, and it was picking up the signal through the plastic endplates... I was looking at cutting some copper sheets I had to make a Faraday cage, but I learned about the cloth/tape materials which are a whole lot easier to work with.



It all started with the local club meeting this month.... It was held in the parking lot of Chameleon Antenna. and they were showing off their products... They had some fabric roll out radials/counterpoises and I asked about them and was told that they were using 'Faraday cloth'... Came home and Googled it and found all sorts of material available on Amazon...Ordered some Faraday tape and some fine mesh copper screen...





I taped up my Hi-Des HV120 receiver with the screen over the fan, the channel display and the red/green LED RX indicator, I use the tape to cover the rest of the front and back with cutouts for the connectors. See the pictures.... I tried it but was still getting some bad desense but it did not hang the amp PTT ... The PTT line hang was a frustrating RFI issue previously.

BPF: Today I finally got my 23 cm bandpass filter out of China and with it inline between the triplexer and the LNA, the system works perfectly with the antenna right next to the repeater shelf in my shop.... worst possible RFI case...

The 23cm bandpass filter came from eBay, ***https://www.ebay.com/itm/126069627100*** , and it works... It does come out of China, and took several weeks to get here--there may be tariffs added... The combination of the filtering in the triplexer, this filter, and shielding the HV120 receiver made the system work using just the single Diamond NR2000N tri-band, mobile antenna and 15 watts transmitter output power on the 70 cm side.

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Trucking ATV-RFI Feed-Back:

Jim --- On your truck interference segment. The FCC screwed up years ago and started allowing TV use on the ham bands by non hams. I have a website on the first company to do this,

https://reconroboticsexposed.com/ 73 de Richard, WD0GIV, Metairie, LA

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W0BTV Details:

Inputs: 23 cm Primary (CCARC co-ordinated) + 70 cm & 3 cm secondary all digital using European Broadcast TV standard, DVB-T with standard 6 MHz wide TV channels. Frequencies listed are the center frequency of the TV channel.
23 cm = 1243 MHz (primary), 70 cm = 441 MHz & 3 cm = 10.380 GHz
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz with 6 MHz BW, DVB-T
Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51d Technical details in AN-53d. Available at: *https://kh6htv.com/application-notes/*

W0BTV ATV Net:

We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time (22:00 UTC). The net typically runs for 1 to 1 1/2 hours. ATV nets are streamed live using the British Amateur TV Club's server, via: ***https://batc.org.uk/live/*** Select ***ab0my or n0ye***. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz *(-600 kHz, 100 Hz PL tone required to access*).

Newsletter Details: This newsletter was started in 2018 and originally published under the title "*Boulder Amateur Television Club - TV Repeater's REPEATER*" Starting with issue #166, July, 2024, we have changed the title to "*Amateur Television Journal.*" This reflects the fact that it has grown from being simply a local club's newsletter to become the "de-facto" ATV newsletter for the USA and overseas hams. This is a free ATV newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 800+, both in the USA and overseas. 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/

ATV HAM ADS -- *Free advertising space is offered here to ATV hams, ham clubs or ARES groups. List here amateur radio & TV gear*

For Sale - or - Want to Buy

2025 Zero Retries Digital Conference
ZRDC

Saturday, September 13, 2025

Edward Hansen Conference Center
Everett, Washington

This one-day conference will feature and showcase technological innovations in Amateur Radio that is usually covered in Zero Retries newsletter. Presentations demonstrations and panel discussion topics to be included but not limited to:

- IP 400 Networking Project
- M17 Digital Voice/Data system (including demo with an M17 repeater)
- MMDVM-TNC data system (including demonstration of MMDVM-TNC via repeater)
- ARDEN, HanWAN and other Amateur Radio microwave

Ticket sales for ZRDC will be available shortly. Follow www.zeroreties.org/p/conference for the latest information and ticket sales.

For more info - https://www.zeroretries.org/p/conference

To register - https://lp.constantcontactpages.com/ev/reg/7852x9m