

# Boulder Amateur Television Club TV Repeater's REPEATER

August, 2023  
issue #138



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

ATN web site: [www.atn-tv.com](http://www.atn-tv.com)



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Burt, N7CS



Bob, K9PQ

## WWATS give talk on ATV to Micro-Hams

On July 18th, the Western Washington Amateur Television Society (WWATS) gave a talk on ATV/DATV to members of the MicroSoft ham club, Micro-HAMS. Both groups serve the amateur community in the Puget Sound area (Seattle). Bob Helling, K9PQ and Burt Guillot, N7CS, gave the presentation. It was complete with power-point slides, plus a live demo of several types of ATV gear, including the new Icom IC-905 microwave transceiver. The program covered: Who and What is WWATS, a high level overview of Analog and Digital Modes, the current state of the WWATS-ATV repeater and activity, a little more in-depth talk on Digital Mode Options and Trade-Offs, analog FM (Icom IC-905), a demonstration of both Analog and Digital Hardware - point to point ATV transmission.

Bob Helling, K9PQ, is the president of WWATS. He has been a ham since 1985 and is a lifetime member of ARRL. He has operated primarily in EmComm for Seattle ACS and ATV for the last 20 years.

Burt Guillot (N7CS) has been an amateur extra radio operator since 2019, and is a lifetime member of the ARRL, AMSAT, and the Snohomish County Hams Club. He is a Board Member for the Western Washington Amateur Television Society (WWATS), an ARRL VE, and member of Snohomish County ACS and Marysville ACS. Burt is currently retired (Amazon).

To find out more about WWATS, check out their web site, <https://www.qsl.net/ww7ats/> They host an analog, AM-TV, NTSC repeater with input of 434 MHz and output on 1253.25 MHz which transmits from a commercial broadcast site on Cougar mountain with good coverage of the greater Seattle area. To find out more about Micro-Hams, check out their web site, <https://www.microhams.com/> and also their You-Tube site, <https://www.youtube.com/channel/UCcuTgZcwgZDiGAMImUJKfJA/videos>



*Cumbre Del Sol - Near Teulada*

## **EG5-DATV Story of a Journey (and more ! )**

**Lorenzo, IU1BOT**

It all began with an idea from Philip, IZ5TEP who said to me, "What do we do, go to Spain for the contest?" Now you must know that Philip often jokes but that time the tone was different, he was really convinced to leave and go to Spain for all the setups, from 29 MHz up to 10 GHz and what better people to ask than Raf, IW1QEF, and yours truly.

So between one evaluation and another we chose the option that would later actually turn out to be the final one. Raf's famous camper, all loaded and decked out for the big event ! Months of preparation followed including the ferry to be taken to Civitavecchia, the equipment to be brought (strictly redundant) and all the logistics regarding campers and people present. The initial idea was to involve

Carlotta, my "25", who then unfortunately due to work commitments could not come and so we put our knowledge to good use.... and taaac! We are reminded of Francesco, IT9HZM, who immediately accepted our invitation to participate in this all-crazy ATV DX-pedition.

Days pass and the fateful departure date arrives, good Raf, IW1QEF, retrieves his camper in the the Chiavarese hinterland and picks me up in the company of Francesco, HZM. All together we head to Viareggio to pick up Filippo and to load all the rest of the equipment. We had already sniffed something, but arriving at TEP's place we find ourselves in front of a setup to be the envy of the biggest EME operators. Hi ! Once everything is loaded, we move towards Civitavecchia to catch our ferry.

The ship trip goes by quite fast and we are always more impatient to start transmitting. We arrive at 7pm at the port of Barcelona and we immediately find a fellow amateur radio-catalanat waiting for us. The legendary, Benjamin, EA3XU, whom we will never stop thanking for the incredible welcome. After the usual greetings, we head to the resturant where we meet the president of the section URE ( Union of Spanish Radio Amateurs ), Barcelona section, Ricard, EA3IAO. After a wonderful Catalan-style dinner, we all say our goodbyes and take our leave. We are ready to spend the first night in the RV and leave the next day for Alicane, our first real purely radiant stop. On the way, at the height of Benidorm, we get a call from our dearest Luis, EA5DOM, with whom we eat the inevitable Paella. Meanwhile we plan the next activities. Also with him, we say goodbye with the certainty of seeing each other later in one of our next spots.

WE arrive at Urbanova beach ( south Alicante ) and immediately start setting up everthing we need. Surprise of surprises ! On 23cm band at 1296 MHz, we listen to IT9CIT's beacon in Alcamo, TP, from sea level !

All rejoicing, we waited for the team of Sicilian friends to arrive at the post in Capo Vaticano, but unfortunately when everything was ready the propagation was then too weak and we could not see each other on DATV. We only managed to listen to the above beacon, so we leave a little sad.

The next day, after making about 20 contacts on 14 MHz, we reactivate our microwaves, but unfortunately also that day the tropo was not on our side. So we decide to disassemble everything and move to the next spot. It is Cumbre Del Sol at 350 mslm, overlooking the sea.

Once we get to the summit, we get another very welcome visit from Pasqual, EA5CLH, another microwave friend who honors us with excellent wine and spens the whole afternoon with us. He helped setting up antennas and making QSOs. At the same time, we manage to connect on 10 GHz SSB, with our friend Luis, DOM, who is about 60 km away. After a disappointing afternoon, from the radiation point of view, we say goodbye to Pasqual and get ready for dinner, at which time Luis, EA5DOM, returns with more wine. ( Well, you can't help by thank them ! ) After an evening of technical conversations and banter, I decide around 11pm local time to turn on the radio on 28 MHz. We used the 3 element yagi which we used for DATV on 29 MHz aimed at Central America and SURPRISE ! New Zealand long way away on SSB via the Caribbean ! OK, it was not the intent of the expedition, however it was a nice contact anyway.

The next day, completely wiped out from the three days on the road, we decide to finally head to the campsite for some well deserved rest. Obviously we don't make it to the parking lot in time that we have already hoisted the 13 element yagi for 70 cm, obviously in the middle of the campsite ! After a relaxing afternoon/evening, we leave for bed. The next day, we set off for Coll De Rats, a 900 mslm mountain that should give us a glimmer of possibility for the Barcelona area, almost 400 km away!



Usual practice: we arrive, assemble, test and thanks to the teamwork. IZ5TEP at the RF part. IU1BOT (me) at scheduling and keeping Italia contacts on SSB. IT9HZM at OBS video software. IW1QEF at general logistics. We managed to pull out some unidirectional contacts on the 70 cm DATV band with EA3XU, EA3IGB, EB3FYO and EA3UM for a total of about 1600 km. A meager consolation, but still a great victory to have managed to pull something off despite the propagation that practically existed in those days !

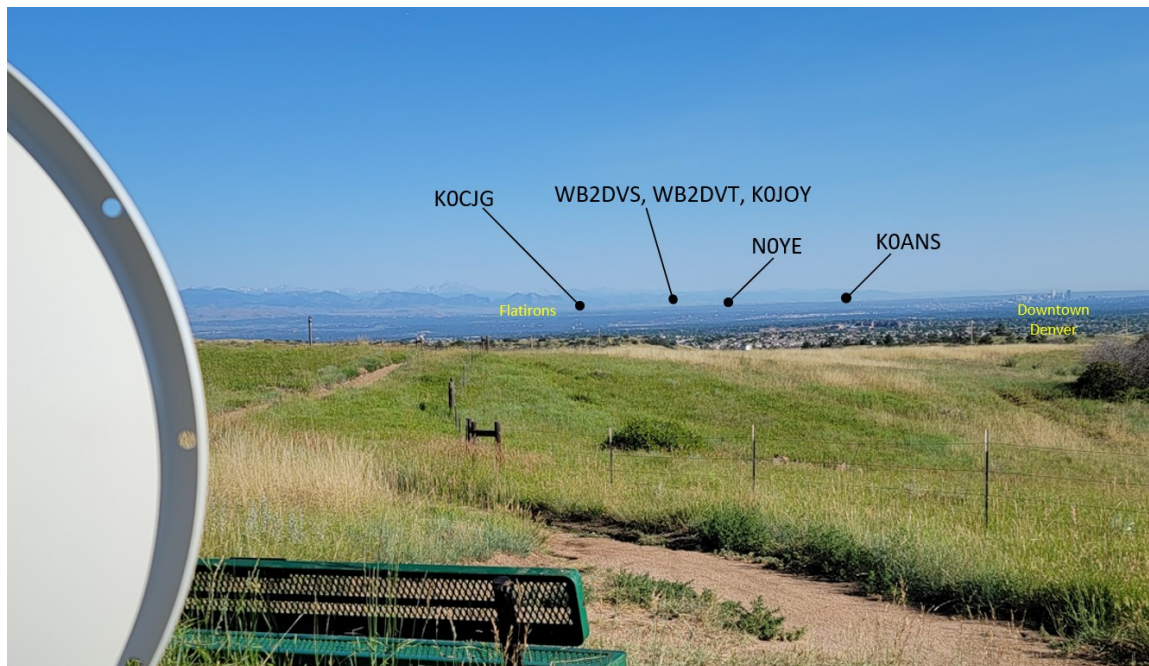
Back at the campsite, we began to assemble everything to do our live broadcast on NET Italy on QO100 which now takes place every Monday. This time, however, we broadcast practically only us because the things to be said were really a lot. (You can see on YouTube by searching EG5DATV)

The following days passed in rest in anticipation of our journey back to Barcelona where the trusty Benjamin, EA3XU, took us to the Barceloneta and the beach before catching the ferry back to Civitavecchia.

The bottom line is that despite the propagation not being on our side on this trip, it still allowed us to pull out interesting contacts on various bands. But, most importantly, to get to know and touch the incredible team of microwave enthusiasts in Spain. We were absolutely honored to have been welcomed so warmly by our colleagues in Spanish zones 3 and 5.

A dear 73 to all, from me and the entire EG5DATV team ( IW1QEF, IZ5TEP, IT9HZM ) - until the next DX-DATV-expedition which will probably be sooner than you think !!!

Lorenzo "Vash" Gianlorenzi, IU1BOT, Chiavari, Italia



WB5PJB's view from Daniel's Park, south of Denver

## Boulder, Colorado, 5.8 GHz, FM-TV, DX-Pedition

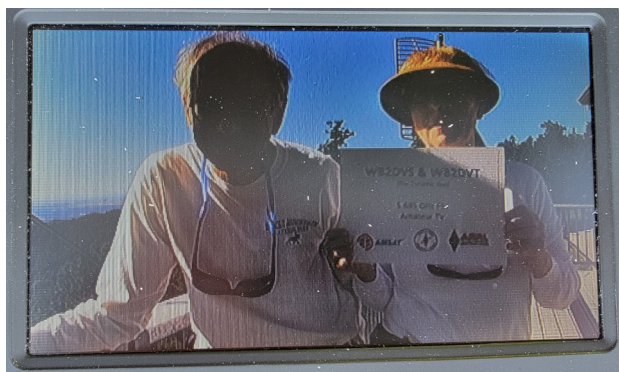
On Saturday, Don Nelson, N0YE, organized our first summer 2023, microwave ATV DX-pedition. He picked using the 5.8 GHz, 5 cm band using FM-TV as the most number of members have that equipment. The following members participated: Don, N0YE; Gary, WB5PJB; Lou, K0ANS; Chris, K0CJG; Bill, AB0MY; Pete, WB2DVS; Debbie, WB2DVT; & Ed, K0JOY. All went to separate, known good microwave locations, widely spaced apart. Pete & Debbie operated from Ed's ideal mountain top QTH with Ed. All were within Boulder County with the exception of Gary. Gary lives in Castle Rock, south of Denver. He operated



Pete & Debbie posing for the camera

from a nearby county park with a great view north as seen in the above photo. The most distant ATV QSO was between Gary and Lou at Rabbit mountain county park, north-west of Longmont. That distance was 88.4 km (54.9 miles). Gary's closest contact was still at 32 miles with Don. Don was set up west of Broomfield on CO-128 highway and McCaslin Blvd. Bill was at Legionaire's Hill. Chris was at NCAR.

Prior to the outing, Jim, KH6HTV, had prepared a detailed set of spread sheets with info about 20 possible microwave sites to be used. Site details included: latitude/longitude, address, elevation, access info, safety comments, etc. One table gave distances to all other sites. Another table gave compass bearings to all other sites. The last table gave Radio Mobile rf path predictions of anticipated signal strengths between all sites. For the rf path predictions, we used our typical station



*Pete & Debbie as seen by Gary, 76 km distance*

parameters of 5.685 GHz, 600 mW transmitter, +22 dBi dish antennas mounted on tripods at 5 ft. elevation, 0dB coax loss (assumed transmitter/receiver mounted directly to the dish antenna), and required signal strength of > -100dBm (P0-P1 picture). Every site could see several other sites, but no site was situated where it could see all sites. The distances between the various sites used on Saturday ranged from 8 km to 88 km.



*WB5PJB at Daniel's Park*



*N0YE at CO-128*



*K0CJG at NCAR*

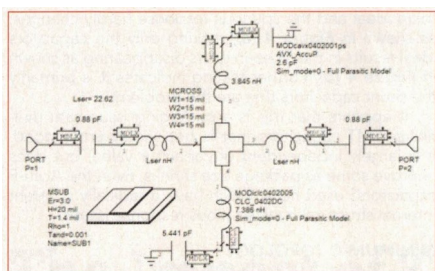


*AB0MY at Legionaire's Hill*

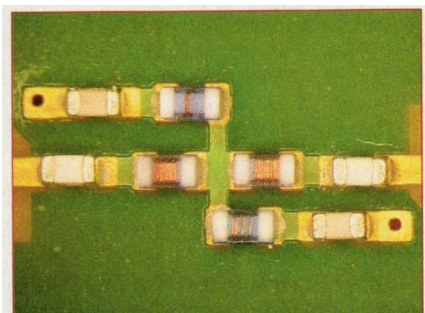
Everyone reported good reception of P4 to P5 pictures from most sites and no signal at all from sites that were predicted to be "No Go". Everyone took photos of their video monitor screens, but most photos submitted were of poor quality due to the intense sun glare even when they tried to use sun screens.

Most used the popular combo of the TS832 transmitter and RC832 receiver sold by Amazon for a low \$30. We have reported on these in previous issues of this newsletter. Some also used a 2 Watt, after-burner amplifier. The most common dish antenna used was the BBQ grill from L-Com, model HG4988-22EG. It has +22dBi gain. Don used two antennas, one for transmitt and one for receive. One was the L-Com, the other was a RadioWave model SP1-2/5, 0.3m, dual-band 2.4/5.8GHz. It has +23dBi gain on 5cm. Chris used a hand-me-down from Don which was a surplus dish with a home-brew feed. Gain = ? Gary had the highest gain antenna at +30dBi. He was using a Ubiquiti model RD5G30 It is called the airMAX Rocket Dish and had dual polarity feeds. It is 26" diameter. Rated for 5.1 to 5.9GHz at 30dBi with 5.8 degree (-3dB) beamwidth. (note: it is currently selling for \$109)

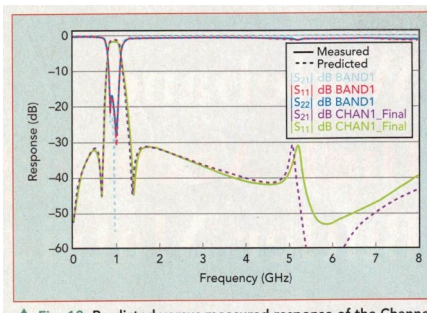
Now Don is posing the question --- "What do we do for an encore? What band and what mode next ?"



▲ Fig. 7 N = 3 Cauer-Chebyshev elliptic function filter with all inductors at the common junction.



▲ Fig. 11 Layout of the filter for Channel 1 of the preselector switched filter bank.



▲ Fig. 12 Predicted versus measured response of the Channel 1 filters.

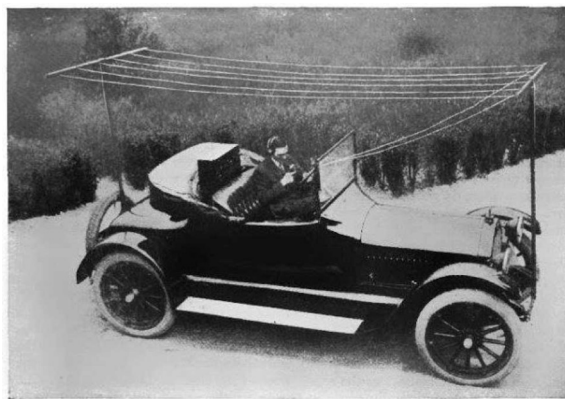
## KODGS Publishes in Microwave Journal

Our local, Boulder, Colorado, Filter Expert -- Dan Swanson, K0DGS, just had an invited paper published in the famous magazine, MICROWAVE JOURNAL ( [www.mwjjournal.com](http://www.mwjjournal.com) ). It appeared in the most recent, July, 2023 issue on pages 58-68. Dan's article was entitled "*The Impact of Topology and Parasitics on SMT Bandpass Filters.*" Dan shows how filters for the low GHz region can still be fabricated on pc boards using surface mount, discrete, L & C components. The thrust of Dan's article is for your filter design to be successful, you need to take into account the parasitic elements associated with each SMT component, plus model the pc pads and interconnects as transmission line elements. The example shown above from Dan's article is a 1 GHz Band-Pass Filter.

Dan has worked in the microwave industry now for over 40 years. He is a Fellow of the IEEE. He currently works as an independent consultant and teaches short course classes in filter design. His web

site is: ( [www.dgsboulder.com](http://www.dgsboulder.com) ) Dan's main ham radio interest is HF with his new Icom IC-7300 and a 40-10m, end-feed wire antenna with which he works the world. His ATV connection is having a bunch of ATV ham radio friends who he sees weekly along with many other hams for a local ham breakfast. Plus, Dan designed for us a really great 23 cm band-pass, band-notch filter for our W0BTV-ATV repeater. We desperately needed it to eliminate a very strong, in-band, FAA radar signal. We have written about Dan and this filter previously back in 2018 & 2020 in newsletter issues #6 & 32.

In a follow-on discussion in person with Dan at our weekly ham breakfast, I said that Dan's designs in the article still required some very accurate values of small value SMD capacitors and inductors. The conventional SMD inductors and capacitors that I purchase at places like Mouser and Digi-Key don't offer that kind of resolution. In particular I found it impossible to find any less than 1pF, except for a 0.5pF chip, and then with very loose tolerances. Dan said that he used SMD, thin film capacitors in the Accu-P series from Kyocera/AVX which were available in 0.05pF steps from 0.05pF up to 2pF, and 0.1pf steps then up to 4.7pF. They offer tolerances as tight as a phenomenal  $\pm 0.01\text{pF}$ . For inductors, he used Coilcraft which offered 0402 wirewound chip values from 2.8nH to 10nH in 0.1nH steps. Dan also said that for anything less than 1 or 2nH, he instead uses a printed line.



*1920's era Mobile Ham Radio -- also good  
for hanging up the wash to dry !*

## **ARRL Breaking News !**

The ARRL has just announced that effective the first of January, dues will be increased dramatically. Currently the annual dues are \$49/year which includes a subscription for QST magazine. On January first, the dues will go up \$10 to \$59/year, BUT they will no longer include receiving a hard copy of QST in the mail. For \$59, it will only be available on-line. If one stills want to receive the hard copy in the mail, the dues will be an extra \$25, or \$84 total/year. Thus the dues increase is really an additional \$35/year.

**W0BTV Details:** **Inputs:** 23 cm Primary (CCARC co-ordinated) + 70 cm secondary all digital using European Broadcast TV standard, DVB-T 23cm, 1243 MHz/6 MHz BW (primary), plus 70cm (secondary) on 439 MHz with 2 receivers of 6 & 2 MHz BW  
**Outputs:** 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz/6 MHz BW, DVB-T Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).



**Operational details in AN-51c    Technical details in AN-53c.    Available at:**  
<https://kh6htv.com/application-notes/>

**WOBTV 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. 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/> 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 is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 500+. 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/>*

**Newsletter Success Story:** We started this ATV newsletter in July, 2018 as the "Boulder TV Repeater's Repeater". At the time, it was strictly a local newsletter for the small handful of dedicated ATV hams in Boulder, Colorado. The original intent was to do a monthly newsletter. For a newsletter editor, success is when you no longer need to scratch around and write all the material yourself, but your readers start supplying you with material. Well, this newsletter has now grown to become the "de-facto", free, USA, ATV newsletter with over 500+ ATV ham readers. (??? in the USA, plus ??? overseas). These readers are now supplying news of their ATV group's local events and interesting technical, or operational articles.

So why are you receiving this newsletter so often, rather than just monthly ? My policy is if the newsletter becomes too big ( I receive one exchange ham newsletter with typically 125 pages of small print), that the reader will be intimidated and set it aside to maybe (often not) read it later. Thus, I limit the size of this newsletter to about a dozen pages in 12 point type, with lots of photos. I hope this makes for a quick, enjoyable read as soon as you receive it in your email in-basket. After finishing one newsletter, I immediately start on the next one, as available material comes in. When I reach the ≈12 page limit -- then time to send it out via e-mail. Thus, for July, 2023 (5th year) , we ended up with four editions, essentially on a weekly basis.

Thank you to all our ATV readers. An especially Big Thank You to those of you who are submitting material to share with other fellow ATV hams.

Jim, KH6HTV, Editor

## **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.***