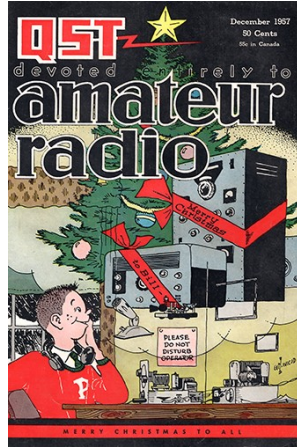# Boulder Amateur Television Club
TV Repeater's REPEATER

January, 2023
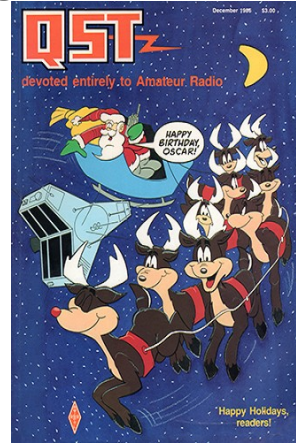**issue #119**

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

Boulder, Colorado -- ATV Repeater

W0BTV

Ch 57   423 MHz   DVB-T

ATN
The Amateur Television Network

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

1957   1986

SEASON's GREATINGS from the ARRL

Season's Greetings from the QTH of KH6HTV

KH6HTV's sub-harmonic Ruby says "Burr"
the outside temperature is only -11° F ! ! !

photo compliments of Allen, K0ARK

FOREST FIRE !

Boulder, Colorado

Live ATV Video Feed to Emergency Operations Center

Mon, Dec. 19th -- 2pm -- A structure fire started in Sunshine Canyon. It spread to the nearby forest.   Strong winds of 40 mph made fighting the fire difficult and also prevented the use of fire fighting aircraft. The nearby mountain sub-divisions were under evacuation orders from the Sheriff.

The OEM activated the Boulder ARES group (BCARES). They were requested to man the Red Cross evacuation shelter.

Allen, K0ARK, BCARES EC requested that BATVC provide video coverage for the EOC. Jim,KH6HTV, set up his TV camera on the back deck of his QTH out on the prarie. 15 miles away. Using the long, tele-photo zoom he was able to see the smoke plume, but not the actual fire.   He sent his video to the W0BTV repeater on 23cm.   The repeater then re-broadcast it on 70cm (423 MHz). Both Bill, AB0MY, and Don, N0YE, activated their receivers and sent the video over the internet to the BATC server in the

U.K.   Allen at the Boulder Emergency Operations Center (EOC) picked up the video from the BATC stream.

ATV for EOC in Ohio - Feedback: Jim -- Unfortunately, in Dayton we are really limited by terrain features and don't have the luxury of what would be deemed as practical line of sight coverage in any given random situation. Our repeater, being "only" on a 150ft tower can be expected to provide limited coverage, and must be always supplemented where coverage is sketchy by push-up masts and towers. As an example, whenever a random local ham wants to determine whether their QTH is within ATV repeater coverage, we conduct a live survey to see if a path exists. We have found in a number of instances, we can't guarantee that a practical link can be achieved in quite a few situations, and it's dependent upon the vagaries of the landscape, the heavy foliage, but more importantly, how high the ham wants to go with tower or pole installation. Consequently, the practicality of providing EOC ATV coverage within the MidWest, Southern states and most certainly within the NorthEast ends up being somewhat of a lesson in futility. I would imagine EOC forest fire coverage is where ATV shines, as that situation is a continuous threat within your topographical domain. It's fantastic that link coverage in the West allows for a variety of support scenarios, where terrain can be an asset instead of a hindrance. We need a mountain or two in the Dayton area! Keep up the good work! I have this feeling I am gonna get beat up over this comment….

Cheers, Dave, AH2AR, Dayton, Ohio

ATV Coverage Areas - Feedback: Dave your insight and comments are much appreciated. When our San Diego ATV society planned our network for both DATV and LPTV we did not want to place our network equipment widely but close enough to maintain, also limit our coverage within our county boundaries so as not to interfere with our ATN neighbors. We already knew where we wanted to cover by our memberships QTH coverage areas such as; Ramona, Poway, Vista, San Marcos, Rancho Bernardo, Oceanside And DelMar. Three sites only; Downtown San Diego, Oceanside and Ramona [the highest]. All have line-of-site, and those without use IPTV; modulators or VLC directly into the transmitter's IP network [IP in DVB-S2 RF out]. If there's an issue, there's always a way to solve it. We do get a signal also on Catalina Island [three members there, one on a sailboat.

Mario, KD6ILO, Oceanside, California

Editor's Note: Congratulations to Dr. Mario.   He just finished his dissertation and passed his final exam for his Ph.D. degree. He will now hold the D.C.Sc. - Degree of Doctor of Computer Science from the University of California - San Diego (UCSD), School of Engineering.   His dissertation was on "Ways of improving human-computer interaction by using artificial intelligence systems on mobile devices."

Digital Amateur Television (DATV)

MiniTiouner V2.0 - Build And Receiving DATV From QO-100

YouTube ATV Videos

"What Does It Take to get Involved in Digital Amateur Television" 31 minutes, Peter, VK3BFG   Peter's presentation at the "Tassie Ham Radio Conference and Expo" in Hobart, Tasmania last month.
https://www.youtube.com/watch?v=bdmyEEiYzi4
"MiniTiouner V 2.0 - Build and Receiving DATV From QO-100"   7 minutes, Matthew, M0DQW, TechMinds   https://www.youtube.com/watch?v=PKE5MSS4cZ0
(editor's thanks to Claudio, I2NDT)

More Digital TV Experiments on 29 MHz

Justin, G8YTZ, reports that he and Gareth, G4XAT, have been testing DVB-T on 10 meters. They found that "DVB-T with 250 kHz works very well, and proves it resilience to multi-path on HF frequencies."   Details   are   on   Justin's   posting   on groups.io/g/digitalatv/

I have finally got my Adalm-Pluto and upconverter to generate a 29Mhz DVB-T test signal using DATV Evpress.software.   It will generate a signal down to !00Khz bandwidth before it starts dropping out. Though I won't be generating any signals on air, I was able to confirm that my Knucker & upconverter will lock up and decode a DVB-T signal on 29.200 Mhz down to 140Khz bandwidth. Below that, it won't detect the signal. It does take a while to lock on the signal, but once locked it seems stable, at least with a locally generated signal in the shack. Now to wait for the band conditions to improve again from across the pond.
73 de John, K0ZAK, Reisterstown, Maryland

Dave, KC3AM, writes "I have one of the Airspy devices. Is that something that could work with these experiments?"

Dave -- The Airspy, with SDR Angel works well and does not need the SpyVerter for 29 MHz.

Make sure you read the GitHub readme on the SDR Angel DATV plug-in to understand how it works.   ---   73 de Justin, G8YTZ

The Airspy should work fine with SDR Angel. The hardest thing is getting all the settings correct in SDR Angel to make it work There is a video on YouTube (don't know the link offhand) showing how to set it up to decode DATV, though it is an older version of software. You should be able to copy all the settings for 29Mhz by looking at some of the pictures located at the BATC 29 Mhz ATV forum thread (https://forum.batc.org.uk/viewtopic.php?f=15&t=8183&start=80) to get you in the right ballpark. DVB-S only so far with SDR Angel. We are also trying DVB-T with the BARC Knucker receivers but no positive results yet.

I am also helping K3TAZ (Fred Merker) get the software set up at his location, so hopefully we will have multiple receivers in the area looking!

                                            73 de John, K0ZAK

What is AirSpy, etc ?: All of these different names are various SDR, software defined radios.

AirSpy -- SDR receivers have very high resolutions of 12 to 16 bits and versions for various frequency ranges.   (www.airspy.com)

MiniTiouner, Ryde & Knucker --- are SDR receivers for DATV from the BATC (www.batc.org.uk)

RTL-SDR --- very low cost, USB dongle receiver for DVB-T. (www.rtl-sdr.com)

Adalm-Pluto --- from Analog Devices is both an SDR receiver and also a transmitter capable of working from 325 to 3,800 MHz with up to 20 MHz band-width. 12 bit (https://wiki.analog.com/university/tools/pluto)

LIME --- from Lime MicroSystems is both an SDR receiver and also a transmitter capable of working from 100 kHz to 3.8 GHz. (www.limemicro.com)

BATC   CQ-TV

The latest winter issue of the British Amateur TV Club's slick, electronic magazine is now out.   It features the recent work on spanning the Atlantic ocean from the U.K. to North America with digital ATV on the 10 meter band.   There are lots of great articles in this issue.

Noel, G8GTZ, writes on *"29 MHz Trans-Atlantic DATV Experiments"* and gives a lot more details about this epic event.

Mike, G0MJW, has designed a pc board for a "Simple 144 MHz to 29 MHz Transverter" to Adalm-Pluto and Lime Mini SDRs to be used on the lower 10 meter band.

Justin, G8YTZ, writes about *"Beware the Inverted Spectrum with SDR Angel"*

Gareth, G4XAT" writes about his experiments with DVB-S on 10 meters and the equipment he used in his article *"It's DATV Jim, But Not As We Know It"*.

Charles, G4GUO has a very interesting, longer, technical paper on *"Sending High Speed Data Over HF Channels"*   He was active on the DATV-Express project as the principal software engineer.

Chris, PA3CRX, has a very informative article on *"Height and Position of your Antenna is Important ! "*.   His opening paragraph says ... "This time it's more about tropo and the phonomenon that I experience when I am making contacts while beaming over a lake, where the signal becomes weaker as the antenna is raised. It has also been reported by amateurs that are able to raise and lower their masts, the highest position does not always result in the strongest signal."

Richard, GI4DOH's article is *"A Prototype DATV Repeater"*.   It is about the ATV repeater he is developing.

Dave, G8GKQ, writes *"The Portsdown Newsletter"* about the latest developments and enhancements in the BATC's Portsdown

John, G0ATW, has a short article on a SSTV receiver to be used as a secondary input to the GB3GG ATV repeater.

Sjef, PE5PVB, writes on *"FM ATV Exciter for 23cm, 13cm or 6cm"*   This is about how to FM-TV modulate Analog Devices frequency synthesizer ICs.

Gareth, G4XAT, writes *"A Noise Source for my Portsdown 4"*.   The Portsdown includes the capability of making noise figure measurements, but requires a calibrated noise source.   They now are available to BATC members from Kevin, G3AAF.

The winter issue also contains several other news items, etc. including a promo for some new RSGB YouTube videos on ATV.
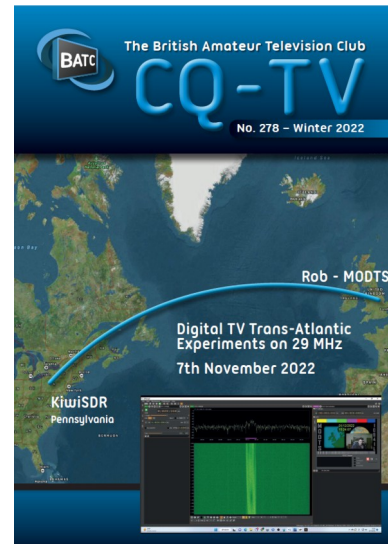
We encourage our ATV newsletter readers to also join the BATC.   Their membership dues are quite reasonable at only ₤8 / year for a cyber membership.   For full details about the BATC, go to their web site at: www.batc.org.uk   They also have an on-line store selling some of the specialized ATV gear they have developed, especially for DVB-S & DVB-T.   They also provide a streaming service for live video from ATV hams and ATV repeaters from around the world.

ARRL News: Rep. Lesko Introduces Bill to Replace Symbol Rate Limit with Bandwidth Limit

Congresswoman Debbie Lesko (AZ-08) introduced a bill in the U.S. House of Representatives (H.R. 9664) on December 21, 2022, to require that the Federal Communications Commission (FCC) replace the current HF digital symbol rate limit with a 2.8 kHz bandwidth limit.

Editor's Note: *Nice start, but we ATVers would like to see even wider bandwidths available on the highest HF band of 10 meters where we have a big band of 1.7 MHz.*

Jusin, GB3JV, in the U.K. has some relevant observations on this issue.   *"I find it surprising that you have these perscriptive limitations especially as the Amateur Radio hobby is about experimentation, perhaps the UK wording may be a better suggestion?"*

From the UK license the relevant sections are: Terms, conditions and limitations
1. Purpose
1(1) The Licensee shall ensure that the Radio Equipment is only used:
(a) for the purpose of self-training in radio communications, including conducting technical investigations; and
(b) as a leisure activity and not for commercial purposes of any kind.
1(2) The Licensee may use or permit the use of the Radio Equipment by a member of a User Service during any operation conducted by a User Service or during any exercise relating to such an operation in each case for the purpose of sending Messages on behalf of the User
Service.
1(3) The Licensee may use the Radio Equipment to assist with communications in times of disaster or national or international emergency.
7 Equipment
7(1) The Licensee shall ensure that:
(a) the emitted frequency of the apparatus comprised in the Radio Equipment is as stable and as free from Unwanted Emissions as the state of technical development for amateur radio apparatus reasonably permits;
(b) whatever class of emission is in use, the bandwidth occupied by the emission is such that not more than 1% of the mean power of the transmission falls outside the nominal modulated carrier bandwidth4.

Notes to the licence
(a) The bandwidths of emissions should be such as to ensure the most efficient utilisation of the spectrum. In general this requires that bandwidths be kept at the lowest values which technology and the nature of the service permit. Where bandwidth-expansion techniques are used, the minimum spectral power density consistent with efficient spectrum utilisation should be employed.

ARRL Handbook - Center Fold

The hardcover version of the NEW ARRL 2023 features a full color center-fold photo. Sorry, not the ARRL Playmate of the Year ! ! !   But it is our own ATVer, Skip, K1NKR.   The color center-fold, 16 page insert is all about the history of the ARRL Handbook, dating back to the first edition in 1926.   Skip is featured because over the years, he has been able to collect all 100 editions.

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New England ATV: Jay, N1WVQ, writes -- "There apparently is only one other ham on ATV in New England, Skip, K1NKR, & he's about an hour away, and there are hills in the way.   I am planning to purchase a DVB-T receiver as a starter for ATV. I

work as a 2-way radio tech & hope to eventually be able to get a few ATV & DATV repeaters going. I think that may help jump start things in the area. In the meantime, I may have a site close enough to K1NKR during my work day that I can see him. He wants more people on & I enjoy being on lesser-utilized modes & bands, so this could work!"

SDR Angel Issue:
Justin, GB3JV, has encountered an side-band issue with the SDR Angel receiver. He found that if the DVB-S signal's spectrum is inverted, Angel will not decode it.   ----   Steve G4NZV suggested this fix and it works.   "In the SDRangel Device select box press the 'X' then the IQ button to swap the IQ to QI [if you have an inverted spectrum]"

ICOM IC-905:
Icom's new microwave transceiver is now listed in the latest Ham Radio Outlet catalog.   However, it comes with a fine print footnote that it is not yet available for sale, pending FCC approval.   Their web site is however taking reservations for pre-orders (1st come, 1st served) for $35.   Price ? -- TBD
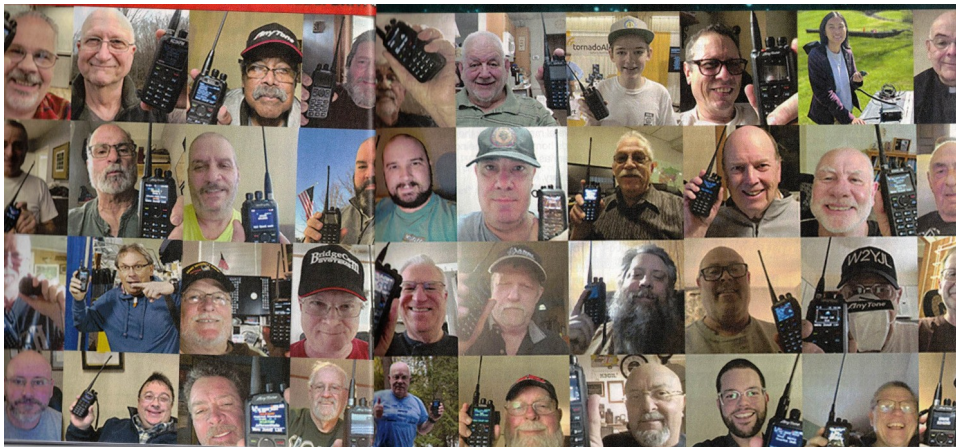
Who are Hams ?
--- Well, the ads from BridgeCom in QST pretty much tell the story.   Ham radio is dominated by old, gray haired (or bald) men.   Their two page wide advertising photo includes only one lady, one young boy, and 3 or 4 middle aged men.   The cover of the January, 2023 QST also amplifies this conclusion.   It is a group of ARRL volunteers, all old men with only one lady and one middle aged man.

Amateur Radio, Artificial Intelligence and the IoT Universe

Mario Badua Jr. KD6ILO
Ph.D.C.Sc. Computer Science & Engineering

1] Devices such as wireless sensors, software, actuators, computer devices live in the IoT Universe. They are attached to a particular object that operates through the internet, enabling the transfer of data among objects or people automatically without human intervention. *A.I. interaction or integration* is also part of the IoT universe.

IoT types are.
- Cellular networks which allow IoT devices to communicate.
- Local and Personal Area Networks (LAN/PAN) ...
- Low Power Wide Area Networks (LPWAN) ...
- Mesh Networks much like Amateur Radio's ***AREDN*** *Network (c) 2022*

2] Artificial Intelligence is also part of the seven layers of the IoT universe and becoming more integrated with today's technology more than ever and will become more active in our future everyday life. But sooner than latter it will also become more self-aware and will not also respond to your request but also suggest to you a more reasonable option or outcome in your decisions and learn from it. It will sense your voice levels, look into your eyes, and sense your mood. Amazon's Alexa and Google Voice are limited to certain sensors or responses. It is a great assistant as I've experienced firsthand in my five years of study and research in the field, and I still do.

3] User Interface - also termed as **UI** is nothing but a user-facing program that allows the user to monitor and manipulate data or a connected device.

4] The seven major components of IoT Systems
- Analytics
- Cloud
- Network Interconnections
- System Security
- Central Control Hardware
- Network Interconnections
- Artificial Intelligence

5] While **IoT** deals with devices interacting using the internet, ***A.I****. makes the devices learn* from their data and experience.

SDATV- San Diego Digital Amateur Television Society
IoT Systems and Network

6] Our Network are three-fold, RF over the air television, radio and IoT network wireless systems. We have sensors used to monitor our antenna mounted systems on our tower[s],

power systems [Solar, wind, generators and commercial]. The network repeater controllers which manage our transmit modulators and receivers to include the IPTV network of modulators both local and remote [two units in the Bay Area and Central California].

7] Artificial Intelligence lives and occupies our network since 2021 it controls, responses and monitors our three main sites and relays the information via Verizon 5G © 2022, AREDN MESH © 2022 SSID: SDATV and StarLink © 2022. Our AI is named, Joey after a silent key member.

8] The network systems monitoring data are sent to only key technical members that have access to the **AI** program interface. As what happened on December 21, 2022, at 9:15 am we receive a low power output on one of our 13.8 Vdc power supplies at our Ramona site which sent alarms also from one of our RF DVB-S2 modulators. The *AI oversite algorithm* found the low power data fault on its five-minute scan and sent the response command to switch to the backup no ride needed for a sixty-mile road round trip.

9] There are AI application software for those who do not have programing or coding background to custom make an AI tasker that will work for your systems or networks but would have to be run on a simulator platform under test conditions.

10] I (we) thank the Google Brain Team for their help with our AI [Joey] for their free open-source software library for machine learning and Artificial Intelligence.

*** In closing remember these sayings, "Work smart not harder", "Never revisit some problem twice",   "When in doubt check it twice "and "Always keep learning". ***

M. Badua Jr., KD6ILO
San Diego Digital Amateur Television Society
Since 2009

FEED-BACK

FM-ATV Feed-Back: Hi Jim -- You asked the following two questions:
#1 Do you have an interest in purchasing 23cm FM-TV equipment from me ?
#2 If so, are you willing to pay high prices, at least as high as previously advertised?
My response:
#1 - Not at the moment; however, it's possible there may be a resurgence of FM-ATV in the US and Japan whener the ICOM IC-905 receiver comes out (late 2023? 2024?). As you may recall, this is ICOM's new "SHF" rig that supports 2m/70cm, 1.2 GHz, 2.4 GHz, 5.6 GHz, and optionally 10 GHz with a built-in analog FM ATV mode. The rig is likely

to cost ~$3,000, and with that much money invested, customers are probably going to want to exercise all its features, including ATV. If there aren't any FM ATV repeaters around, people will probably just do point-to-point/simplex ATV.

#2 - If FM-ATV takes off, there may be a demand for high-quality gear to be installed at repeater sites. Generally high-quality gear demands high prices.

> 73, Burt Guillot, N7CS, Marysville, Washington

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MAX-2870 Feed-Back: Hi Jim --- Have you ever seen this board by "q5signal"? DigiLO http://q5signal.com/index.php?route=product/ product&product_id=104&search=digilo It seems interesting, but quite expensive ($195) and they don't mention the phase noise.

> best 73 de I2NDT, Claudio, Dalmine, Italia

Editor's Note: Who is Q5 Signal ?   Well googling it we find that they are a Florida firm saying they are "The source for Down East Microwave VHF/UHF transverters, amplifiers and accessories."   Their product offerings go from 50 MHz to 1296 MHz.   The do not include DEM's microwave products.

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W0BTV Details: **Inputs:** 439.25 MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243 MHz/6MHz BW, DVB-T
Outputs: Channel 57 ---   423 MHz/6MHz BW, DVB-T, or optional 421.25 MHz, analog VUSB-TV.   Also, secondary transmitter, 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/*

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.   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 about 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/

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.*

AMP SUPPLIER: OE7DBH new e-mail address   My email address expired on December 1st, 2022. So for anyone who still wants to contact me, only the new email address is valid: **9a6rzn@gmail.com**   73 de Darko Banko, Pians, Austria