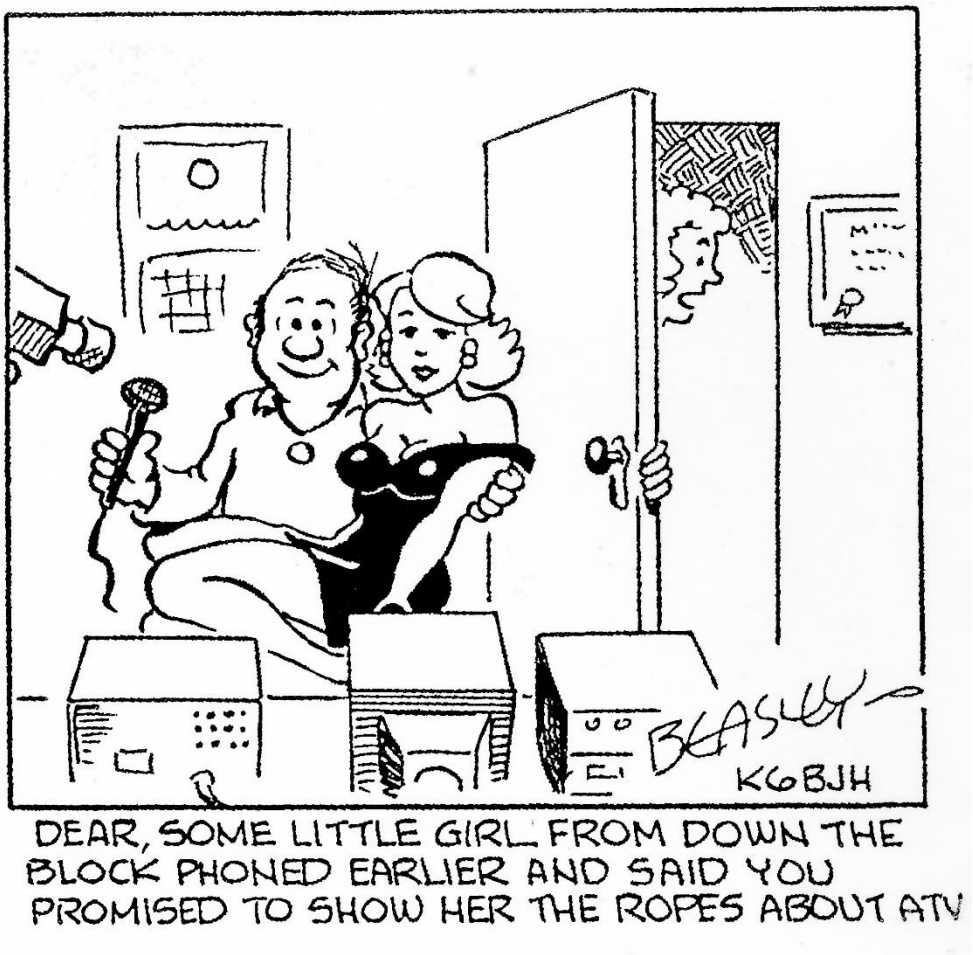
ATCO NEWSLETTER

VOLUME 40 NUMBER 2 **April 2023**

The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" published quarterly (January, April, July, October)

ATCO SPOTLIGHT TOPIC



ACTIVITIES ... from my Workbench

Hurray!!!!!! It's springtime again. Warm weather, trees in bloom, no more snow and….**OH NO!** The grass is growing too! Well, at least now I can work on my antennas and tower… Hold it, the wife just informed me that now the water will not freeze while washing windows. There goes my excuse! What a bummer!

Not much happened during this past winter. Some hamshack cleanup did occur and, oh yes, I finally repaired my roto-tiller last week. Funny about that. I took it to the basement last fall with the intention of repairing it during the winter when I had time. **Wrong!** I tripped over it the other day so I decided to fix it now because it was in the way. All the stalling was not warranted because the engine jam I had was due to a small stone that got wedged in the fan blades of the flywheel. I found it when I removed the engine cover. WOW, that was easy. (I still haven't roto-tilled the garden yet)

The ATCO bulletin board is back on the air from my house. Dale, WB8CJW, had been hosting the repeater from his place and when he passed, I inherited it. However, Dale had a "special" way of software creation so it took me a month or so to figure out what he did. I finally figured out which computer parallel port he used to turn on and off the DATV transmitter to send the 1288 MHz signal to the repeater from his house. Fortunately, I have a spare Dell computer which is the exact same model as Dale had. I cloned the hard drive and kept Dale's computer running with the cloned drive. The intention now is to use the spare computer to duplicate Dale's software and use it as a secondary bulletin board source. Roger, WB8DZW, took on the task of bringing the spare computer on line at his place. That way, both of us will "feed" the bulletin board with current info. Work is ongoing on this.

The next item on the list of things to do is to automate the repeater activation after weekly power interruptions for their UPS check process. The management at the repeater site tests their AC power backup system by shutting off AC power and cycling their generators each Monday for about 15 minutes. That resets the ATV controller. Dale used to manually re-program it each week and was always in the shack on Monday mornings so that was no problem. Now, it's up to me and I've already forgotten about it twice. So now I've got a small UPS unit on order from Amazon to keep AC power on the controller during those times. We should have something in place in the next week or so.

Don't forget our upcoming Spring Event! We need you to be there more than ever now because our membership is decreasing. See my announcement on the next page and please say YES or NO to whether you will be there.

That's about it for now.
…WA8RMC

ATCO SPRING EVENT!

Our Spring Event will start again after a 2 year absence. **<u>This announcement is important so I list it FIRST in case you don't read past this point!</u>** Attendance has been diminishing in recent years so we need to have you show your support. Encourage others to join us too in the hopes of "enlisting" newcomers to our hobby. **Please let me know if you plan to attend so I can prepare the food menu. Last Fall we had only 9 people say they would come and I was assuming there would be about 20. Therefore, I decided to cancel. I would have had a lot of food left over so please reply to the Email accompanying this Newsletter with a simple YES or NO if you plan to attend. Thank you.**

We used to have the Spring / Fall Events at the ABB cafeteria but now that their personnel changed, that facility is no longer available so the search is on. A few choices became available but the meeting room in the Genoa Township Hall was the best since the Westerville Library meeting room originally scheduled was taken for Library official business. The Genoa room is large and holds up to 100 people but we have to provide an overhead projector and screen. We will also be responsible for setting up and removing the tables and chairs so I will need a couple of volunteers to help.

ATCO

2023 SPRING EVENT

Sunday May 7, 2023

1:00 PM Lunch/meeting

GENOA TOWNSHIP HALL

(Same hall used for CORC meetings)

5111 S Old 3C Rd, Westerville, OH 43082

FOR MORE DETAILS, CONTACT

ART - WA8RMC 614-891-9273

LUNCH PROVIDED - DOOR PRIZES -

BRING A FRIEND AND SEE OLD BUDDIES

Possible MINI HAMFEST - SHOW AND TELL

We will start the meeting with a buffet lunch and all the "fixins" so come hungry! After that we'll have a presentation which will be something special.

We will have the Chief Meteorologist at TV channel 6/28 Marshall McPeek give a special presentation to us about weather events and general happenings at the TV studio with an accompanying PowerPoint presentation. I've seen his work before so I know you will be impressed.

At the presentation conclusion we will have a special drawing for (2) Microcenter gift cards then a short general meeting. Finally, we'll have a drawing for door prizes. I'm sure no one will go home without one. I have some items from Dale, WB8CJW, and other donated "treasures". In addition, there will be a couple of TV cameras available.

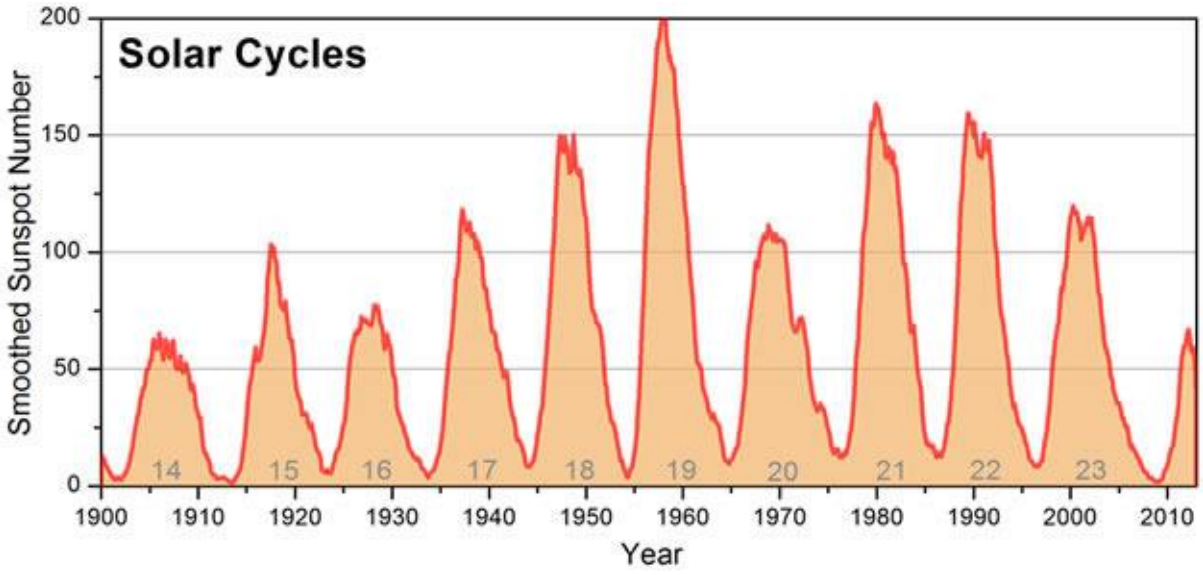
Finally, I plan to have a working prototype of my new "VersaTune" DATV DVB-S / DVB-T receiver for viewing. Work is slowly progressing with the software. In addition, some hardware items are still not available for production. So, it now looks like it'll be mid to late summer this year before we're ready for production.
Hope to see you at the Spring Event!
…WA8RMC

SOLAR MAXIMUM SUNSPOTS ARE GETTING CLOSER

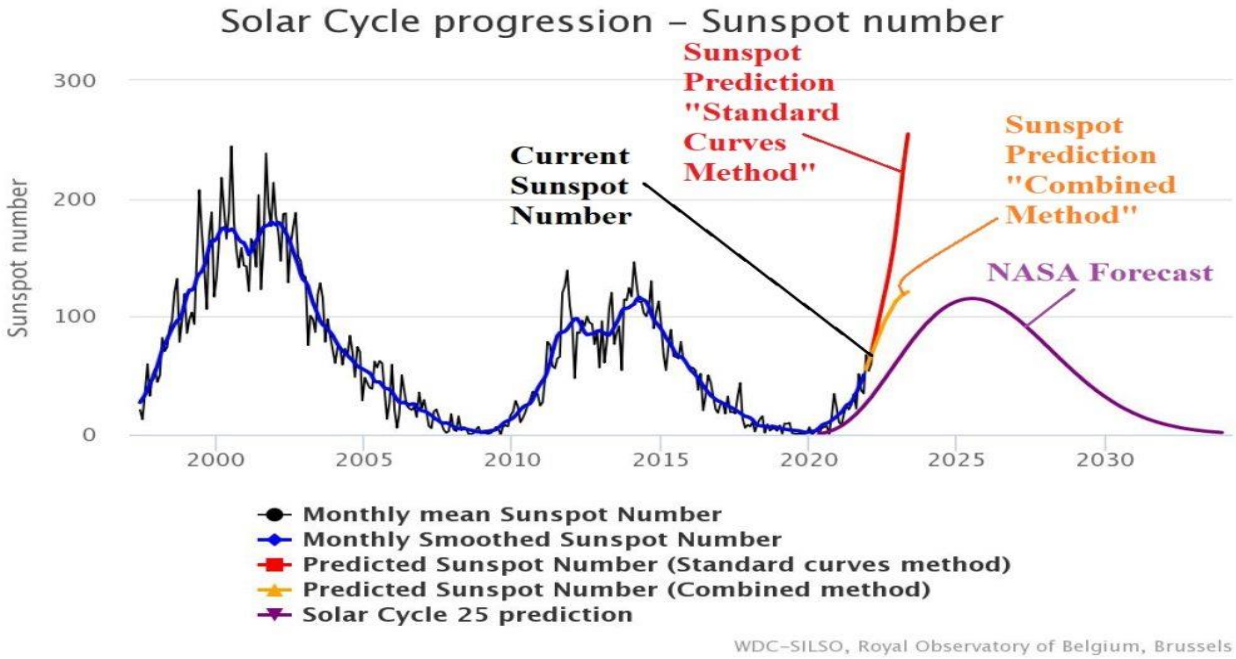
Be prepared Guys! The next solor cycle is coming and it's promised to be a great one. Yes, these kinds of things happen with ATV also. So, get your gear in order with new antennas up and working. The best ATV should begin next year so don't say I didn't caution you about it. Start building NOW! …WA8RMC

From Postscript Jan 23, 2023 Charts from WB8LCD.

What it *could* mean is that the next 4-5 years could be some of the best years EVER in the history of radio propagation. They say that "History repeats itself", and in this instance it could be very dramatic since the history of radio barely goes back over 100 years. In the context of history, that's not a very long time.



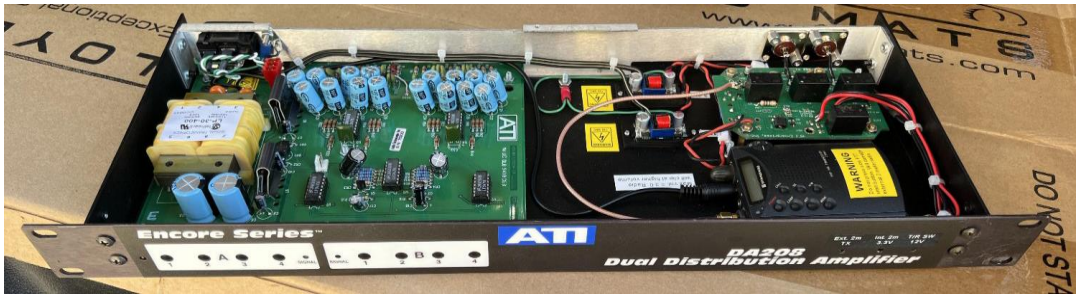
Solar Cycle 25 should peak somewhere around the middle of 2025.



If you take Tad Cook's recent sunspot number of approximately 175 and plot it on the above chart, you'll see it very close to the RED line. Only time will tell where it finishes out, but from my perspective, it's looking pretty good!

DAYTON ATV NEWS

DARA ATV Repeater Control Receiver and Audio Distribution Upgrade Now Complete



Integrated audio distribution amplifier and dedicated control receiver with the cover removed

On Nov. 23rd 2022 ATV net, K8FIX (Bruce) and I discussed in detail the integration project that he took on. This build involved an upgrade to the control receiver and audio distribution subsystem that was in dire need of redesigning at the ATV repeater site. Also, the ATV Repeater system schematic that Bruce has been working on is 99 percent complete. It will be distributed once it is ready for prime time.

Recap: During the ATV repeater schematic layout CAD drawing project, K8FIX and I decided to go ahead and rework the audio distribution system within the ATV repeater as this system was in dire need of re-designing. The system provides DTMF tones to three separate DTMF decoders, along with voice audio channels for the separate ATV repeater transmitters at the site. The in-place audio distribution system had no adjustments for setting audio output levels and also all of the input lines were running in parallel on a single speaker output line from the 2-meter control receiver. Miraculously, this "hodge podge" of audio control wiring somehow worked flawlessly, but it was far removed from any good engineering practice. To that end, I sourced an audio distribution amplifier manufactured by ATI. The DA-208 was designed to allow for two audio inputs with a pair of four each adjustable audio outputs.

After opening the chassis, I noted that there was a lot of spare room within the enclosure. The empty space within the chassis could be used to house a separate repeater project we had in mind. This other project at hand was directly related to ATV repeater control issues. We have had issues with club personnel using the 2-meter control transceiver for various reasons while inside the repeater room, and on occasion, the 2-meter control transceiver would not be returned to the ATV repeater control frequency (144.340). On other occasions, power bumps would also sometimes cause the transceiver to switch to the NOAA weather radio receiver frequency. My solution was to recommend the integration of a dedicated 2-meter ATV repeater control receiver inside of the audio distribution amplifier chassis, so the protected control receiver would not be subject to inadvertent frequency changes. Additionally, I opted to obtain a pass-through RF sensing T/R switch inside the audio distribution chassis so the existing 2-meter transceiver could be used by club personnel while working in the ATV repeater room.

After I acquired the needed components, Bruce Kobe, K8FIX volunteered to fully configure the dedicated receiver, power supplies and RF sensing T/R switching circuit. Bruce also made 3D printed brackets for the receiver, supplies and LED panel lights, and he added RF connectors to the back of the distribution amplifier. After we installed the distribution amplifier at the site, a burn-in period indicated the system worked as planned. For club members using the 2-meter transceiver within the repeater room, this has allowed for continued usage of the 2-meter transceiver with no worries regarding the receiver's required return to the ATV repeater receiver control frequency.
…73 de Dave, AH2AR

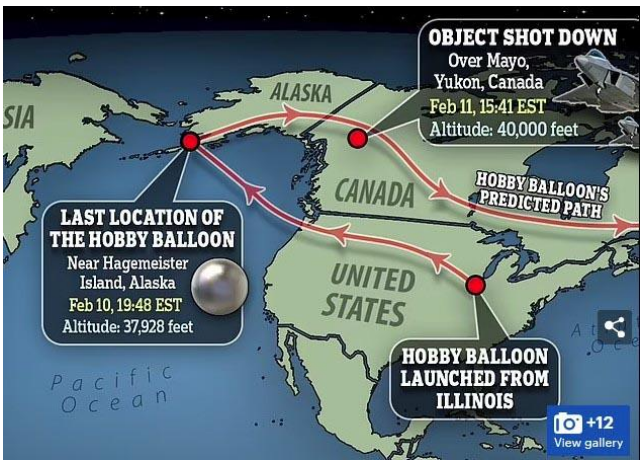
MORE DAYTON ATV NEWS

DARA ATV Repeater 1258 MHz Amplifier/Driver/FM Exciter Repaired & Back on Air

Recap: The integrated chassis consisting of a ComTech FM exciter, a Mitsubishi RA18H1213G RF Module, and a W6PQL dual transistor amplifier (two XRF-286's) stopped functioning about three weeks ago after five years of operation. Troubleshooting indicated a hard failure of the RF Module/driver. I replaced the RF module and two fans, a front panel LED and a power strip. While I R&R'ed the chassis, K8FIX, Bruce volunteered to create a cut-out in the lid of the chassis for an exhaust fan. The plan was to add an active air exhaust for additional chassis cooling. Bruce used a mini-mill with a fly cutter to cut the new exhaust port. He also installed four studs that aligns with 4 screw holes on the muffin fan. This approach had three purposes: The fan is placed externally, on top of the chassis over the exhaust port and prevents vibration from moving the fan. Also, the placement of the fan externally allows for the chassis to clear the other equipment in the rack when the unit is pulled out or placed back in after servicing. Lastly, the external fans also allow for their replacement without having to take the unit off line and make them a breeze (no pun intended) to swap out. This additional ventilation has brought down the internal ambient temperature of the system, indicated by the temperature monitor on the front of the chassis. I suspect the eventual RF module failure was likely due to thermal stress and this additional modification should extend the life of the components.

…73 de Dave, AH2AR

F-22 MAY HAVE SHOT DOWN HAM RADIO BALLOON OVER CANADA



- By Ryan Whitwam on February 17, 2023 at 4:50 pm

The recent hyper-focus on the Chinese "spy balloon" that drifted over the US has everyone gazing skyward. While they were looking, the US Air Force spotted a few more suspicious objects, including one that it and Canadian forces shot down over Yukon last week. Despite the rush to declare alien contact, the truth is probably much closer to home. A new report suggests the object was a simple **ham radio balloon** deployed by enthusiasts in Illinois last year.

Neither the US nor Canadian governments have confirmed the origin of the balloon, but the White House has noted that it does not appear to be related to the Chinese balloon downed off the east coast. According to aerospace fanatic Ian Kluft, a balloon known as K9YO-15 would have been in about the right place to be the mystery object. This balloon was launched by the Northern Illinois Bottlecap Balloon Brigade (NIBBB) in October 2022 and has since circled the globe seven times.

The NIBBB has issued a statement, noting that it cannot confirm that the object shot down by an F-22 was its balloon. However, K9YO-15 was last known to be over Alaska, and the group has been unable to contact it. The Air Force described the object as a small metallic sphere with a payload hanging below it. That could match a lot of small hobbyist balloons, including K9YO-15.

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NOTE: All those hobby balloons are tracked on this website. **Https://amateur.sondehub.org**
They transmit on 20 meters using WSPR or APRS. I guess the government doesn't pay attention to such things. Could save the taxpayers millions of dollars in ammunition not shooting down hobby balloons.

- Kerry N6IZW

W8LT - A HISTORY OF AMATEUR RADIO AT OHIO STATE UNIVERSITY

Here's something I'll bet you didn't know about The Ohio State University. They used to have an ATV group with their Ham Radio Club in the south-east bell tower at the horseshoe football stadium. They also hosted the ATCO WR8ATV web page for us for in the late 1990's….WA8RMC

W8LT is the call sign for the Amateur Radio and RF Club at The Ohio State University (OSU). The university club has a long history, and archive records indicate that 1926 was the year it officially became a club, likely making it the oldest one on campus. W8LT is just 3 years shy of celebrating its 100th anniversary.

In the early 1920s, the call sign started out as 8LT, until the Radio Act of 1927 added a "W" to all radio call signs. Then, W8LT had been closely associated with WOSU Radio, the university's non-commercial station, which began as WEAO in June 1922. The 2 stations were believed to have shared a small building near campus until the mid-1950s.

In 1957, both stations were moved to small military-style Quonset huts. From July 1961 to January 1963, the club was unable to find a location anywhere on campus, so all of their equipment was put into storage in club member Bill Hale's, K8JIX, basement and brought out only for ARRL Field Day each June.

Eventually, W8LT found a new home in the bell tower at Ohio Stadium, a room directly below where the bell rings after every home-game win. That location allowed a 500-foot-long wire antenna to be stretched from the tower to a nearby smokestack at OSU's power station. The result was a very powerful signal that could be heard clearly on stations around the world. When Ohio Stadium was renovated, W8LT moved again, this time to Bevis Hall, where it remains today near the location of the old military - style Quonset huts.

Today, the club continues to grow with 15 active members, including students, staff, and alumni. Faculty Advisor Larry Feth, K8HTC, said that the club takes every opportunity to recruit new members and offers license testing sessions. More information is available on the W8LT website and on their Facebook page. W8LT is an ARRL Affiliated Club and participates in the ARRL Collegiate Amateur Radio Program.

BALLOON 70 cm DATV CALCULATIONS

The question asked -- "Is a DATV transmitter running 150 mW sufficient to get a digital TV signal back to earth from a high altitude balloon at 100,000 ft (about 19 miles) ?" I discuss propagation in my application note, AN-33a, "TV Propagation". There most of the emphasis is on terrestrial (i.e., over the surface of the earth) propagation. For a balloon situation, it is different. Well, the first assumption I will make is that for this situation, we will come close to having a true "Free Space" RF path, free from terrestrial interferences, such as multi-path, etc. So, let's start with the equations given on page 2 of AN-33a. --- reproduced here.

After determining our radio horizon, the next issue to contend with is RF Path Loss. Path loss is the natural phenomena of radiating a certain amount of power but this power, again due to spherical geometry, gets spread equally over an ever-expanding globe as it propagates away from the source. Thus, the power density in watts/m2 gets much smaller the further we get from the source. The formula for free space path loss based upon this geometry alone is: Free Space RF Path Loss(dB) = 20 * log10 (f in MHz) + 20 *log10(D in Miles) + 36.6dB.

Note in this equation the frequency dependency, for example, going from 70cm to 23cm bands we suffer about a 10 dB hit in path loss. A few quick calculations will give you an appreciation of the importance of path loss. As an example, for the 70cm band (430 MHz) we get: 0.1 mile => 69dB, 1 mile => 89dB, 10 miles => 109dB, etc. To determine the best-case situation for a particular rf path we need to include all of the major rf components. Calculations are done easiest in dB with power levels expressed in dBm and antenna gains expressed in dBi. To determine the power input into the distant receiver, we need to know: Rcvr Pwr(dBm) = Trans Pwr (dBm) - Trans

Cable Loss (dB) + Trans Ant Gain (dBi) -RF Path Loss (dB) + Rcvr Ant Gain (dBi) - Rcvr Cable Loss (dB) So, let's run some calculations for your balloon situation.

Let's make the following assumptions:
Frequency (70cm) = 435 MHz, Altitude, distance D = 20 miles,
Transmitter DVB-T average power = 150 mW = +21.8 dBm
Transmit Antenna Gain = 0 dBi, Transmit coax cable loss = -0.5 dB
Receive Antenna Gain = +11 dBi (assume using short, 6 element Yagi Antenna)
Receive coax cable loss = -1 dB
Free Space RF Path Loss = 20* log(435) + 20*log(20) + 36.6 = -115.4 dB
Received Power = +21.8dBm - 0.5dB +0dBi -115.4dB + 11dBi -1dB = -84.1 dBm
Now, going down-range from 20 miles directly overhead to 200 miles distant, this adds an additional -20 dB of path loss, dropping our optimum received power to -104 dBm. Video from the initial launch phase should be a piece of cake -- but from further down-range questionable. So, how much power do we really need at our receiver? I have over the years run a lot of sensitivity tests on ATV receivers. Both old AM-TV, VUSB-TV, FM-TV and more recently digital DVB-T. With any of them, I would be able to receive a -84 dBm signal. Granted the analog signals would not be perfect, but contain "snow". Digital would be P5.

I refer you to my application note, AN-29, "DVB-T Receiver Sensitivity Measurements". In particular look at the summary tables on page 3. All of the sensitivity numbers were measured in a lab, closed circuit (i.e., in coax), perfect environment. This would be the equivalent of your free space, balloon rf path.

We have run actual rf propagation field tests to confirm the coverage area of our Boulder, CO DATV repeater. We actually measured the received signal strength in dBm. The repeater was transmitting DVB-T, 6 MHz band-width, QPSK with the "normal" parameters of 5/6 FEC, 1080P. It was our experience, that the weakest terrestrial signal we were able to receive out in the field was typically about -90 to -92 dBm. The receiver used did include a pre-amp. Under those conditions, the lab measurement of the same receiver showed a sensitivity of -95 dBm and -99 dBm with the pre-amp. The difference we attributed to real-world environment complete with RFI & multi-path always present.

So, what can you do to further improve matters, beyond increasing the Tx power? Most all are on the receiver side.

1. The first obvious one is to use a good low noise, pre-amp along with your receiver.
2. You could mount the pre-amp directly at the receive antenna. This would eliminate the receive coax cable loss from the equation.
3. You could use a higher gain Yagi antenna. The draw-back to this would be a narrower beam width of the antenna which would make pointing more difficult. For a balloon, you obviously will need both Azimuth and Elevation control of the antenna pointing.
4. You could use a diversity reception receiver with a second antenna. The diversity receiver automatically selects the best signal. This would greatly enhance your probability for success. If you used cross polarized dual antennas, it would compensate for the variable polarization as the balloon antenna swirls around. Hi-Des does make a diversity, DVB-T receiver for the 70 cm band. It is their model HV-122. It sells for $329. (Note: do not buy the 122A, nor the 122-2.4G models as their sensitivity on 70cm band is very poor).
5. Some improvements can be made to lower the required receive signal strength by changing the DVB-T digital parameters. See my app. note, AN-39c. If you stayed with a 6 MHz band-width, you could use the "poor channel" parameters of 720P and 1/2 FEC. By using an even narrower band-width of 2 MHz with 480i and 3/4 FEC, you can buy even more dBm reduction.
6. Redundant Receivers and Antennas -- To help ensure success, having multiple receiving stations is strongly encouraged. Everyone knows the infamous "Dr. Murphy" always shows up to enforce "Murphy's Law". Transmit Antenna? I assumed 0dBi gain for this antenna. This is a big unknown area as to what antenna you plan to use on the balloon itself. Whatever your choice, you will need to rerun the calculations using its gain.

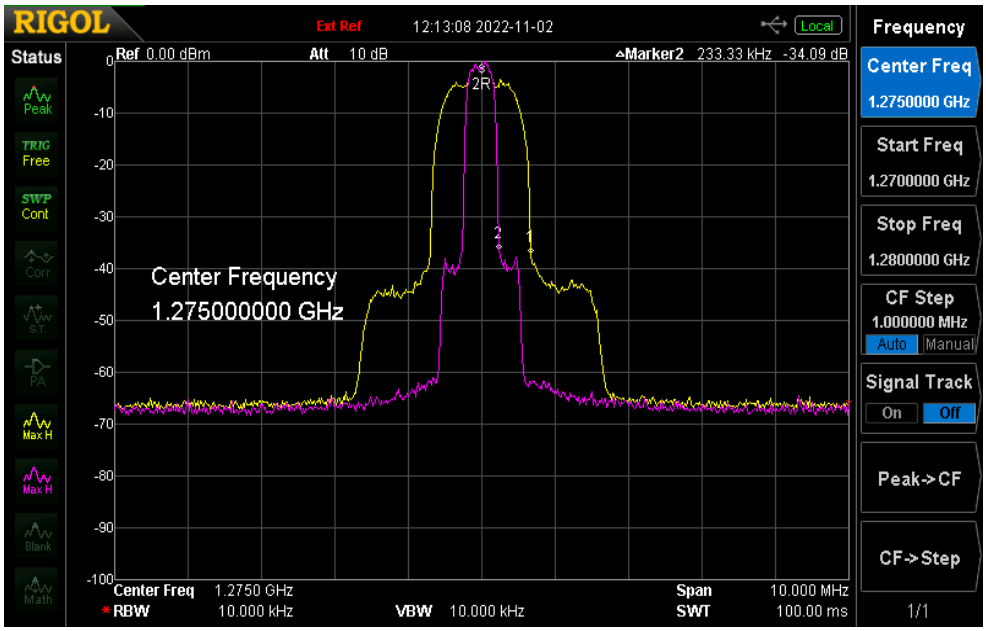
…Jim Andrews, KH6HTV 4 Feb 2023

DVB-S SYMBOL RATE VS. BANDWIDTH

I found this while scanning through past articles. It's a good symbol rate to bandwidth comparison and validates that bandwidth is ~ 1.4 times the symbol rate.

Take note of the shoulders on each side which represents the spectral re-growth generated by amplifier non-linearity. It is important to keep these shoulders as low as possible because it is "lost energy" and does not contribute to the received signal quality. As the amplifier is driven harder, the shoulders move closer to the peak signal. As a rule of thumb, if they get to within 15 dB of peak signal, the receiver loses signal lock. So, don't drive that power amp too hard. If you look at the Tx signal with a wattmeter, increase drive till you see the output stop as drive is increased. Then back it off a little and stay there…WA8RMC

Clive compares symbol rate vs bandwidth as follows,
"To answer your question about DVB-S2 occupied bandwidth, please see the attached spectrum analyzer plot. Both plots are separate signals taken from the output of my transmitter via a -30dB coupler at 1275MHz. The span is 1MHz/div and the markers on the HF side are approximately -35dBc (peak). The yellow trace is a at 1000kS/s and the - 35dBc point is +666kHz. The purple trace is at 333kS/s and is -35dBc at around +233kHz. It's not quite symmetrical but that's not unusual to see. 333kS/s uses 467kHz and 1MS/s 1.37MHz, **so 1.35 to 1.4 times the symbol rate gives a good approximation**. The shoulders are 39dB down or better. The Tx is a Pluto SDR followed by a Mitsubishi RA18H1213G power module giving about 4W rms output. The Pluto is fed with F1EJP's DATV-Easy 2.08 software encoder using H.265".
…73, Clive, G3GJA, Hull, England



ARISS ANNOUNCEMENTS AT HAMCATION 2023

HamTV is scheduled to fly to the ISS on the April Cignus NG-19 ISS resupply mission. Installation is planned for May.

(New schedule: late May launch)

Source: Amateur Radio on the International Space Station (ARISS) slide from HamCation 2023 conference.
https://zeroretries.substack.com/p/zero-retries-0087

Time to start building your ground stations to receive DVB-S.
By Steve Stroh N8GNJ

Digital [Fast Scan] Amateur Television (DATV) is returning to the International Space Station (ISS) in 2023!

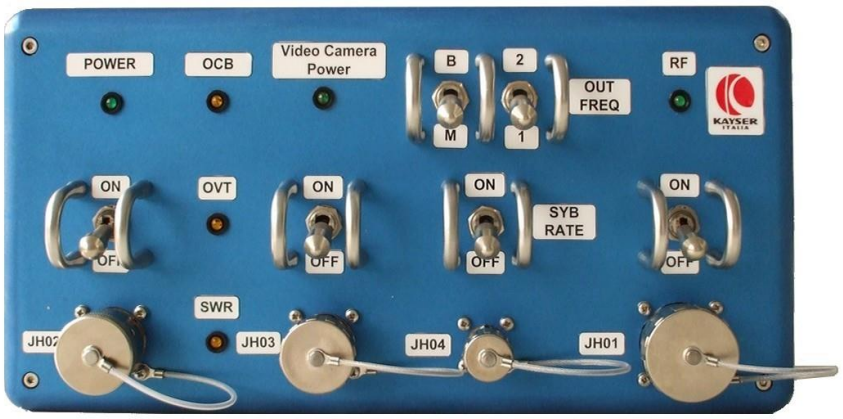
I'm a fan of the **Amateur Radio on the International Space Station (ARISS)** program, both personally, and from a Zero Retries Interesting perspective. When explaining Amateur Radio to a techie (or non-techie), mentioning that there is an Amateur Radio station… actually *two Amateur Radio stations*, on the ISS is a proud boast.

Thus, I thought these ARISS announcements from HamCation 2023 were notable:

Image courtesy of Amateur Radio on the International Space Station (ARISS)

The most immediate Zero Retries Interesting item was that ("fast scan") television transmissions from the ISS will resume in 2023:

HAMVIDEO RE-FLIGHT DETAILS



The unit at right is the repaired HamVideo transmitter module ready to be flown back to the ISS on a Cignus rocket now targeted to launch at the end of this May. The original schedule was mid-April but other NASA priorities prevail.
As you may remember, this transmitter was installed in the ISS Columbus module in ~2016 and was used for many ISS to earth communication sessions with school students until an electronic failure halted operation. After determining the failure was not repairable within the ISS, it was returned to earth in a Space-X return mission. A terrestrial inspection determined that the defective item was an FPGA programmable IC. It was replaced which made the transmitter operational again. However, a software error in the original transmitter allowed only a blank video screen to be transmitted. It was "fixed" with special software in the ground station receivers but that was "messy". Now, back on earth, they had the opportunity to fix the software in the ISS transmitter so standard receivers could be used. The scary part is that the repairs might cause the whole unit to require re-certification which would take 6 months or more. Fortunately, that was not required, only an operational check to make sure there were no RF interference issues with other ISS equipment.

So much for the main HamVideo transmitter but the ID Generator that I designed for use with HanVideo is another story. Because this item is a newly designed part, it must undergo a complete analysis and safety check. Therefore, it was decided to ship the HamVideo transmitter as soon as possible and upload the ID Generator later when it has been flight certified. I have high confidence the unit will pass as I conducted an anechoic chamber pre-certification test here in Columbus, Ohio to make sure it will pass NASA's radiated RF tests. Another reason to upload the HamVideo as early as possible was because an older camera with only NTSC video capabilities is being kept in the ISS until the ID generator is available. The new cameras NASA is beginning to use are $6000 units with "HDMI only" outputs. The ID Generator is required to convert the camera HDMI output to NTSC composite video for the HamVideo transmitter. In addition to the ID generator HDMI to composite video conversion, I added a special message scrolling banner at the bottom of the screen so it will be known that the message is "live" and not frozen. I'm keeping the message content a secret so I'll know if someone actually was able to see it.

A picture of the ID Generator is shown above. The labeling was not complete at the time I took this picture so the inscriptions are absent. NASA had not yet approved the actual wording yet. YES, THEY MUST APPROVE EVERYTHING!!! The connectors on the ID Generator cable have protective covers installed in the photo but will be removed and plugged into the HamVideo unit JH01 and JH04 connectors in operation.
When the completed system is available for communication, the following parameters will be used.

ISS transmit frequency: 2395 MHz
RF Mode: DVB-S (the same used for commercial worldwide satellite broadcast)
Symbol rate: 1.3MegSymbols / second
Forward Error Correction (FEC): ½
Antenna polarization: circular left hand
After the DATV capability is restored, I believe it'll become very popular with many USA school contacts.
…WA8RMC

NEXT-GENERATION SILICON BATTERY MATERIALS BOOST EV RANGE

OK, now for a non-ham article. I've got to throw in one of these occasionally to keep your interest. Sorry…

Maybe I WILL buy an electric car next time if I can get a 500-mile range and re-fuel in 10 minutes, why not??? There HAS to be a catch. Maybe the battery will cost $10,000. Ahhh, I think I know! they don't mention battery life so I'll bet it will only last a year before replacement is needed! …WA8RMC

By: Nidhi Goyal | April 13th, 2023
After years of development, a new class of long-range EV batteries is heading to production to replace Chinese graphite with US silicon-based batteries.

Longer range and faster charging
Powered by new silicon-based electrodes, these batteries hold more energy, are lighter, and charge more quickly. The future release will decrease the charging time to as low as 10 minutes, the standard time taken to refill a gas tank. These batteries could help boost the range of EVs considerably.

Sila Nanotechnologies, a Silicon Valley-based battery materials company announced this month that it has started producing its innovative silicon anode batteries at a factory in Moses Lake, Washington.

The new material is called "Titan Silicon"
The German luxury automaker Mercedes announced a strategic partnership with Sila last year. The Sila anode is set to feature in the all-electric Mercedes-Benz G-Class, expected to be available by 2026.

Lower CO2 footprint vs. graphite
Based on silicon, an abundant element, Titan Silicon generates 50-75% less CO2 per kWh than graphite during production.

Currently, over 90% of graphite is processed in China. Titan Silicon Solutions are manufactured in the U.S. Sila says it will begin mass production in the second half of 2024 and will also manufacture enough batteries to power one million vehicles over the next five years.

MONTHLY SATURDAY MORNING BREAKFAST SCHEDULE

We are re-starting the monthly breakfast schedule. Join us if you can.

Attention all ATVers,

Saturday May 13 will be the next monthly 8:00 AM breakfast get-together. All are invited. The place is rotated among the popular restaurants in the area.

May 13	Denny's	3019 Olentangy Rd	Columbus 43202	1-614-721-3676	(Cancelled)
June 10	Bob Evans	841 N State St.	Westerville 43082	1-614-882-3778	
July 08	Sunny Street cafe	4733 Reed Rd	Columbus 43220	1-614-732-4479	
August 12	I Hop	7130 Sawmill Rd	Columbus 43235	1-614-766-7990	
September 09	Scramblers	3939 Britton Parkway	Hilliard 43026	1-614-771-1944	
October 14	Bob Evans	960 E Dublin Granville Rd	Columbus 43229	1-614-888-1234	

…Art Towslee WA8RMC

OHIO REVISED CODE SECTION 4511.204 DRIVING WHILE TEXTING.

Effective: April 4, 2023 Legislation: Senate Bill 288

It's not ATV related but important none-the-less. We as Ham operators are exempt from the "driving while texting" newly enacted law but that doesn't permit us to drive in a reckless manner. It's OK to hold a microphone while in motion but drive with care and don't abuse your privilege!! A snipped portion of the law is below.

(A) No person shall operate a motor vehicle, trackless trolley, or streetcar on any street, highway, or property open to the public for vehicular traffic while using, holding, or physically supporting with any part of the person's body an electronic wireless communications device.
(B) Division (A) of this section does not apply to any of the following:
(1) A person using an electronic wireless communications device to make contact, for emergency purposes, with a law enforcement agency, hospital or health care provider, fire department, or other similar emergency agency or entity;
(2) A person driving a public safety vehicle while using an electronic wireless communications device in the course of the person's duties;

----SNIP-----

An "electronic wireless communications device" does not include a two-way radio transmitter or receiver used by a person who is licensed by the federal communications commission to participate in the amateur radio service.

"VersaTune" DVB-S / DVB-T RECEIVER UPDATE

We are working on a new dual mode DATV receiver to be available by mid-summer 2023. This receiver is designed primarily for digital Amateur Television reception operation as a stand-alone complete scanning receiver / DATV repeater controller. It can be used as a simple self-contained receiver for individual use or as the receive portion of an Amateur Television repeater. It can be programmed to scan up to 7 separate frequency selections from up to 5 selected RF sources.

…WA8RMC

USA ATV REPEATER DIRECTORY June 2022

NOTES:

1. All repeaters are NTSC, VUSB-TV, 6 MHz channel, unless otherwise noted. Some repeaters are using non-standard, lower sideband instead of upper sideband. The frequency listed is the video carrier frequency.
2. Digital TV lists center frequency. 6 MHz channel, unless otherwise noted. dt = DVB-T, ds = DVB-S, da = ATSC
3. For full details, go to the listed web site, or send an e-mail to the contact person
4. Some ATV groups also post repeater info on www.qrz.com under their call sign

Location	Call Sign	Output	Input(s)	Modes	Web Site & Contact for info
ARIZONA					note: AZ is linked to W6ATN in S. CA & NV www.atn-tv.org
Phoenix, White Tank	W7ATN	1253.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
Mesa	W7ATN	1289.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
Tucson, Mt. Lemmon	W7ATN	1277.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	wb9kmo@gmail.com kwjacob@icsaero.com
N.E. AZ & NM Green's Peak	W7ATN	1289.25	434.0	VUSB	wb9kmo@gmail.com kwjacob@icsaero.com
CALIFORNIA					W6ATN rptrs linked to AZ & NV
Orange Santiago Peak	W6ATN	1253.25 5910 fm	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, central Mt. Wilson	W6ATN	1265.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Los Angeles, north Oat Mtn.	W6ATN	919.25 3380 fm	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Jobs Peak	W6ATN	1253.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
San Bernardino Snow Peak	W6ATN	1242 / 4 dt	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wa6svt@gmail.com
Santa Barbara	WB9KMO	1289.25	434.0, 434 / 2 dt 2441.5 fm	VUSB, FM DVB-T	www.atn-tv.org wb9kmo@gmail.com linked with W6ATN
San Diego	KD6ILO	423 dt 1243 dt 1268 ds	441 dt 1286 ds 5885 fm	DVB-T, DVB-S, FM	kd6ilo@yahoo.com also AREDN mesh
San Jose	W6SVA	427.25	910 fm, 1255 fm	VUSB, FM	www.k6ben.com :w2nyc@pacbell.net
Clayton	W6CX	1244.5 ds	1292.5, 1273, 915 ds, & 1273 fm	DVB-S, FM	www.mdarc.org info@mdarc.org
Palomar	W6NWG	1241.25	915 fm 2441.5 fm	VUSB, FM soon be DVB-S	w6nwg@palomararc.org mountain.michelle@gmail.com
COLORADO					
Boulder	W0BTV	423 / 6 dt or 421.25 5905 FM	1243 / 6 dt 441 / 6 dt 439.25	DVB-T, VUSB, FM	www.kh6htv.com kh6htv@arrl.net
Pueblo	W0PHC	423 / 6 dt	441 / 6 dt	DVB-T	billn@billnicoll.com www.puebloradio.org
DELAWARE					
Wilmigton	KC3AM	423 / 6 dt	439.25 AM, LSB	DVB-T AM	KC3AM@verizon.net qrz.com
FLORIDA					
Cape Coral	W1RP	421.25	439.25	VUSB	paul@cardlink.com
Cocoa Beach	K4ATV	427.2	439.25	VUSB	www.lisats.org
Panama City	KV4ATV	434.0	919.25	?	kv4atv@gmail.com
S.W. Idaho	WI7ATV	1257 fm	426.25	VUSB, FM	ka7anm@yahoo.com under construction
IOWA					
Davenport	W0BXR	421.25	439.25	VUSB	http://www.arcsupport.com/drac/

Location	Call Sign	Output	Input(s)	Modes	Web Site & Contact for info
KANSAS					
Wichita	KA0TV	421.25	439.25	VUSB	k0wws@arrl.net
KENTUCKY					
Bowling Green	KY4TV	421.25 423.0	439.25 1280 fm	VUSB FM DVB-T 2MHz	w4htb@ieee.org www.qrz.com www.atn-tv.org
LOUISIANA					
New Orleans	WD0GIV	421.25	439.25	VUSB	wd0giv@att.net
MARYLAND					
Laurel	W3BAB	421.25	434.0	VUSB	www.qsl.net/w3bab
Towson	W3BAB	1291 fm	434	VUSB, FM	www.qsl.net/w3bab
Baltimore	W3WCQ	439.25 911.25	426.25 1253.25	VUSB	http://bratsatv.org/ brats@bratsatv.org
MICHIGAN					
Jackson	KC8LMI	923.25	439.25, AM LSB	VUSB	KC8LMI@hotmail.com
Grand Rapids	K8DMR	421.25	439.25	VUSB	ron_fredricks@att.net
Flushing	KC8KCG	1253.25	439.25 AM LSB	AM	kf8ui@mscginc.org
Flint	KC8KGZ	1253.25	439.25	VUSB	www.mscginc.org kf8ui@mscginc.org
MINNESOTA					
Wabasha	KD0HWX	421.25	439.25	VUSB	jonmcpete@yahoo.com
MISSOURI					
St. Louis	W0ATN	426 / 4 dt	440 / 4 dt	DVB-T	k0pfx@arrl.net
NEBRASKA					
Omaha	WB0CMC	421.25	434.0	VUSB	wb0cmc@cox.net
NEVADA					
Las Vegas	N7ZEV	1253.25 912 fm	434.0, 434.0 / 2 dt 2441 fm	VUSB, FM DVB-T	frank.n7zev@gmail.com linked to W6ATN S. CA & AZ
NEW JERSEY					
Vernon	W2VER	5885 fm	5665 fm	FM	jaythienel@yahoo.com
OHIO					
Columbus	WR8ATV	423 / 2 dt 427.25 1258 fm 1268 ds 2397 mesh 10350 fm	439 / 2 dt 439.25 AM LSB 1288 fm 1288 ds 10450 fm	VUSB AM FM DVB-T DVB-S MESH	www.ATCO.tv gkenmorris@gmail.com towslee1@ee.net
Dayton	W8BI	421.25 428 / 2 dt 1258 fm	439.25, 439 / 2 dt 1280 fm	VUSB, FM DVB-T	www.w8bi.org dpel@aaahawk.com
Van Wert	W8FY	434.0	923.25	VUSB	ka8zge@w8fy.org
OREGON					
Portland	W7AMQ	1257 fm	426.25	FM, VUSB	belles73@comcast.net
Portland	WB2QHS	426.0	910 fm	VUSB, FM	emellnik@emavideo.com
PENNSYLVANIA					
Delaware County	KC3AM	421.25	439.25 AM, LSB	VUSB, AM	KC3AM@verizon.net
PUERTO RICO					
Aguas Buenas	KP4IA	426.25	439.25, 1252 fm	VUSB, FM	kp4ia@yahoo.com
WASHINGTON					
Seattle	WW7ATS	1253.25	434.0	VUSB	https://www.qsl.net/ww7ats/ ww7ats@gmail.com qrz.com

Revision Notes:
Aug. 2019 --(1) corrected data for Kentucky (2) changed call sign for Boulder, CO Sept. 2019 - -added Pueblo, CO
Oct. 2019 --added San Diego, CA Feb. 2020 -- changed K6BEN to W6SVA, CA --added KC8KGZ, MI Mar. 2020 -- added Davenport, IA
May 2020 --corrected typos Jan. 2021 -- updated Boulder, CO repeater info June 2021 -- found 20 more ATV repeaters listed on www.repeaterbook.com -- attempted to contact all of their trustees to confirm them. Most are obsolete listings and are no longer on the air. Added only two -- Cocoa Beach, FL, Wichita, KS,

LOCAL HAMFEST SCHEDULE

This section is reserved for upcoming Hamfests. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here; notify me so it can be corrected. This list will be amended, as further information becomes available. To see additional details for each Hamfest, Control Click on the blue title and the magic of the Internet will give you the details complete with a map! To search the ARRL Hamfest database for more details, CTL click ARRLWeb: Hamfest and Convention Calendar …WA8RMC.

04/22/2023 - Tusco Amateur Radio Club Hamfest, Electronics, and Computer Show

Location: Dover, OH
Type: ARRL Hamfest
Sponsor: Tusco Amateur Radio Club W8ZX
Website: http://www.w8zx.net

04/30/2023 - Athens Hamfest

Location: Athens, OH
Type: ARRL Hamfest
Sponsor: Athens County Amateur Radio Association
Website: http://www.ac-ara.org/

05/07/2023 - Lucas County Amateur Radio Emerge

Location: Toledo, OH
Type: ARRL Hamfest
Sponsor: Lucas County Amateur Radio Emergency Service
Website: http://swap.lucasares.org

05/13/2023 - 05/17/2023 - RV Radio Network

Location: Berlin, Ohio, OH
Type: ARRL Convention

05/19/2023 - 05/21/2023

Dayton Hamvention, ARRL Great Lakes Division Co

Location: Xenia, OH
Type: ARRL Convention
Sponsor: Dayton Amateur Radio Association
Website: http://Hamvention.org

05/27/2023 - Scioto Valley Amateur Radio Club Hamfest

Location: Piketon, OH
Type: ARRL Hamfest
Sponsor: Scioto Valley Amateur Radio Club

07/08/2023 - Mansfield Trunkfest

Location: Mansfield, OH
Type: ARRL Hamfest
Sponsor: Intercity Amateur Radio Club
Website: http://iarc.club

07/15/2023 - NOARSFEST

Location: Elyria, OH
Type: ARRL Hamfest
Sponsor: Northern Ohio Amateur Radio Society

07/16/2023 - Van Wert Hamfest

Location: Van Wert, OH
Type: ARRL Hamfest
Sponsor: Van Wert Amateur Radio Club
Website: http://w8fy.org

08/05/2023 - 2023 Columbus Hamfest

Location: Grove City, OH
Type: ARRL Hamfest
Sponsor: Aladdin Shrine Audio Unit
Website: http://www.columbushamfest.com

08/12/2023 - Cincinnati Hamfest℠

Location: Owensville , OH
Type: ARRL Hamfest
Sponsor: Milford ARC

WEDNESDAY NITE ZOOM NET

Every Tuesday night @ 8:00PM WA8RMC **used to** host a net for ATV topic discussion. However, in order to consolidate the two nets, ATCO on Tue. and the DARA on Wed. we'd like to have only one net on Wednesday, same time at 8 PM. We'll rotate the net control host duty so you won't be bored with just me. All are invited as we get check-ins from all around the USA and sometimes from international participants. We normally have 12-20 check-ins.

To join ZOOM for the first time, simply type **https://zoom.us/join** then download, install the .exe program and run it. ZOOM will start. Click on **join**, enter the **9670918666 meeting ID** then the **191593 password.** Use video or just audio if you don't have a camera.

ATCO TREASURER REPORT - de N8NT

OPENING BALANCE (01/20/23)……	$ 6075.68
Receipts (dues)……...	$ 60.00
WB8CJW bid sale donations……	$ 95.00
PayPal fee.……..…….….	$ (3.36)
Bulletin Board computer hard drive cloning……..	$ (92.69)
CLOSING BALANCE (04/21/23) …….	$ 6134.63

ATCO REPEATER TECHNICAL DATA SUMMARY

Location: Downtown Columbus, Ohio
Coordinates: 39 degrees 57 minutes 47 seconds (latitude) 82 degrees 59 minutes 58 seconds (longitude)
Elevation: 630 feet above the average street level of 760 feet ASL (1390 feet above sea level)

TV Transmitters: 423.00 MHz DVB-T, 10 W cont. FEC=7/8, Guard=1/32, Const=QPSK, FFT=2K, BW=2MHz, PMT=4095, PCR=256, Video=256, audio=257
427.25 MHz Analog VSB AM, 50 watts average 100 watts sync tip (cable channel 58)
1258 MHz 40 watts FM analog
1268 MHz DVB-S QPSK 20W cont. SR=3.125MS, FEC=3/4, PMT=32, Video=162, Teletext=304, PCR=133, Audio=88, Service =5004)
Two video channels in this output: Channel 1 is fed from all receivers. Channel 2 is fed from 439.25 analog receiver only.
2397 MHz Mesh Net transceiver 600mw output (channel 1 minus 2). ID is WR8ATV-2
10.350 GHz: 1watt continuous analog FM

Link transmitter: 446.350 MHz: 5 watts NBFM 5 kHz audio. This is an output used for control signals and to repeat the 147.48 MHz and 449.975 MHz input.

Identification: 423, 427, 1258, 1268 MHz, 10.350 GHz transmitters video ID every 10 min. with active video and information bulletin board every 30 min.
423 MHz digital, 1268 MHz digital & 10.350 GHz analog - Continuous transmission of ATCO & WR8ATV with no input signal present.

Transmit antennas: 423.00 MHz - Single slot rib cage horizontally polarized 3 dBd gain "omni"
427.25 MHz - Dual slot horizontally polarized 7 dBd gain "omni" major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni
1268 MHz - Diamond vertically polarized 12 dBd gain omni
2397 MHz - Ubiquiti dual polarity omni 13dBi gain slot for channel 1 minus 2 MESH Rx/Tx operation
2397 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (Used for experimental Mesh operation)
10.350 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Receivers: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
439.000 MHz - DVB-T QPSK, 2MHz BW. Receiver will auto configure for FEC's. (Input here = output on all TV transmitters)
439.250 MHz - A5 NTSC video with FM subcarrier audio, **lower sideband**. (Input here = output on all TV transmitters & also direct to 1268 MHz DVB-S output channel 2.)
449.975 MHz - F1 audio input aux touch tone control. 131.8 Hz PL tone. (Input here = output on 446.350).
1288.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1288.00 MHz - DVB-S QPSK SR=4.167MS, fec=7/8. PIDs: PMT=133, PCR=33, Video=33, Audio=49 (Input here=output on all Trans.)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters) (inactive at this time because of MESH on 2397)
10.450 GHz - F5 video analog NTSC. (Input here = output on all TV transmitters)

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (Shared with 446.350 MHz link output transmitter)
439.00/439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west (Shared with 439 digital & 439.25 analog receivers)
1288.00 MHz - Diamond vertically polarized 12 dBd gain omni (shared with analog and DVB-S receivers)
2398.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni (inactive at this time because MESH is on 2397)
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Auto mode Input control:

Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
00*	turn transmitters **on** (enter manual mode-keeps transmitters on till 00# sequence is pressed)
00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
264	Select Channel 4 Doppler radar. (Stays on for 5 minutes) Select # to shut down before timeout.
004	Select 10.450 GHz receiver. **(Always exit by selecting 001)**
001	Select 2398 MHz receiver then 00# for auto scan to continue

Manual mode Functions:

00* then 1 for Ch. 1	Select 439.25 analog /439 digital receiver (if video present on digital, it is selected. Otherwise, analog)
00* then 2 for Ch. 2	Select 1288 digital receiver
00* then 3 for Ch. 3	Select 1288 analog receiver
00* then 4 for Ch. 4	Select 2398 receiver
00* then 5 for Ch. 5	Select video ID (17 identification screens)

01* or 01#	Channel 1 439.25 MHz analog/439 digital rcvr. scan enable (01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 1288 MHz digital receiver scan enable
03* or 03#	Channel 3 1288 MHz analog receiver scan enable
04* or 04#	Channel 4 2398 MHz scan enable

A1* or A1#	Manual mode select for 439.25 receiver audio
A2* or A2#	Manual mode select for 1288 digital receiver audio
A3* or A3#	Manual mode select for 1288 analog receiver audio
A4* or A4#	Manual mode select for 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	No function at this time
C2* or C2#	No function at this time

ATCO MEMBERS as of April 2023

Call	Name	Address	City	St	Zip
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703
AH2AR	Dave Pelaez	1348 Leaf Tree Lane	Vandalia	OH	45377
W8ARE	Terry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964
K9BIF	Charlie Short	415 West Pike Street	Goshen	IN	46527-0554
VK3BFG	Peter Cossins	14 Coleman Road	Melbourne	Au	03152
N9BNN	Michael Glass	6836 N. Caldwell Rd	Lebanon	IN	46052
N8COO	C Mark Cring	8774 Jersey Mill Rd	Alexandria	OH	43001
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026
KB8EMD	Larry Baker	4330 Chippewa Trail	Jamestown	OH	45335-1210
WB4IR	Bob Holden	7725 Tressa Circle	Powell	TN	37849
WA8HFK,KC8HIP	Frank & Pat Amore	P.O. Box 2252	Helendale	CA	92342-2252
W8KHP	Allen Vinegar	2043 Treetop Lane	Hebron	Ky	41048
WA8KKN	Chuck Wood	5322 Spruce Lane	Westerville	OH	43082-9005
WB9KMO	Rod Fritz	8334 E. Culver Street	Mesa	AZ	85207
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660
N8NT	Bob Tournoux	135 Barrett Hill Road	Center Rutland	Vt	05736
W8NX, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015
WU8O	Tom Walter	15704 St Rt 161 W	Plain City	OH	43064
KB8OFF	Jess Nicely	1888 Woods Drive	Beavercreek	OH	45432
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201-2636
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021
KB8RVI	Dave Jenkins	100 Miller Ave Apt. 108	Ashville	OH	43103
WA8RR	Richard Robbins	10483 Cambridge Place	Powell	OH	43065
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904
W8RXX, KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101
WA8UZP	James Reed	818 Northwest Blvd	Columbus	OH	43212
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011
AC8XP,KE8GTT,KE8HPA	Troy,Seamus Bonte	5210 Smothers Road	Westerville	OH	43081
AC8YE	Larry Howell	4080 Dill Road	Centerburg	OH	43011-9771
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064
KD8YYP	Anna Reed	818 Northwest Blvd	Columbus	OH	43212
WB8YTZ	Joe Coffman	233 S. Hamilton Rd	Gahanna	OH	43230-3347
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229
W8ZCF	Farrell Winder	6686 Hitching Post Ln.	Cincinnati	OH	45230
N8ZM	Tom Holmes	1055 Wilderness Bluff	Tipp City	OH	45371

ATCO CLUB OFFICERS

President: Art Towslee WA8RMC
V. President: Ken Morris W8RUT
Treasurer: Bob Tournoux N8NT
Secretary: Mark Cring N8COO
Corporate trustees: Same as officers

Repeater trustees: Art Towslee WA8RMC
Ken Morris W8RUT
Statutory agent: Stan Diggs AA8XA
Newsletter editor: Art Towslee WA8RMC

NEW MEMBER(S)

Let's welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood them with information. New members are our group's lifeblood so it's important we aggressively recruit new faces.
No new members this time.

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are $10 per person. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this Newsletter quarterly in January, April, July and October. It is sent to each member without additional cost. All Newsletters are sent via Email unless the member does not have an internet connection. Dues payments are as of the date paid and will expire on the same month/year on the due date year.

Your support of ATCO is welcomed and encouraged.

Membership expiration notices will be sent out weekly via Email starting 30 days prior to expiration date.
NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received if after the due date. If before the due date then it is due one year from the due date.

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
HOME PHONE _____
NAME_____
INTERNET Email ADDRESS_____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS_____
_____
_____

ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ MONEY ORDER ○
Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux 135 Barrett Hill Road, Center Rutland, Vermont 05736.
Or, if you prefer, pay dues via the Internet with your credit card. Go to www.atco.tv log in, click on **Members** then **Pay Dues** and fill out the details. Credit card payment is made through "PayPal" but you DO NOT need to join PayPal to send the dues. Simply DO NOT fill out the password details and there will be no "PayPal" involvement.

ATCO Newsletter
c/o Art Towslee -WA8RMC
438 Maplebrooke Dr. West
Westerville, Ohio 43082

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF MEMBERSHIP IS EXPIRED.