

2024-10-08 Hamlet Net - SSTV

Announcements:

- Test Session Info
 - Kat and I worked the test session at BARCFest this weekend. Only had two candidates, but they both passed what they came for - one received their Technician license, and another upgraded from Tech to General.
 - Next VE session is Saturday, October 26th in the Clover Building at the Boulder County Fairgrounds, and starts at 10 am. It is an ARRL session, so there is a \$15 fee to test. For more info, and to pre-register, see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- We are still looking for volunteers for Santa on the Air - we can use elves who act as net control, as well as Santas. We've got a script for the elf, and a list of questions for Santa to keep the net going when Santa doesn't have anyone to talk to. No experience is necessary. You can even participate over Echolink as well.
- Also in October, on October 12th during the farmer's market, Chuck will be present to talk about communications during emergencies.
- There are a bunch of state QSO contests going on this weekend, making it great time to try to make some contacts. The activities are in Nevada, Arizona, Pennsylvania, and South Dakota.
- Amazon Prime Days are going on right now. I saw a couple of Youtube videos that talked about ham radio products on sale. I watched one, but sounds like he may have been from outside the country, as a few of the items he mentioned did not appear to be on sale when I looked them up. The videos are:
 - BEST Ham Radio Amazon Prime BIG DAY Deals!: <https://www.youtube.com/watch?v=rPwpARHsYG8>
 - Amazon Prime Big Deals Day: https://www.youtube.com/watch?v=e1Hko5SC_NQ
 - One interesting item is a Quansheng UV-K5 radio. The thing that interests me is that there is some customized firmware that you can download to the radio. The radio is only \$22 on the Prime Sale, so might be a good opportunity to pick one up.
- The International Space Station is currently transmitting Slow-Scan TV (SSTV) signals
 - The activity was started on Oct 8 around about 14:15-16:00 UTC

- It will remain transmitting until Oct 11 about 07:25 UTC at which time it will be shut down to accommodate school contacts for that day
- It will be reactivated Oct 11 about 14:50 and continue operation until Oct 14 about 14:20 UTC.
- This long activation will provide plenty of opportunities for reception of the signals as it passes over the US.
- The transmissions are occurring on 145.800 MHz using the PD120 mode
- We have some volunteer opportunities available where you can help out LARC:
 - Photographer / videographer - record team activities and upload to web site / YouTube
 - Newsletter Editor - put together the monthly Splatter newsletter
 - ~~Social media manager - have one~~
 - Event Coordinator
- You can start earning your 2024 membership or future renewal by acting as NCS for at least 5 nets this year. You can run either this Tuesday night net or the Thursday night net (or both). We have scripts available for both, so all you need is a good connection into the repeater, and somewhere to keep track of names and call signs as people check in. If you're going to be on the net anyway, why not save some dough at the same time! There are four free memberships available for 2023, so don't wait to get started!
- Chuck has set a goal for the Club of running at least one activity a month. This can be a hands-on construction activity, an operating activity like Field Day, a fox hunt, or a special event station. The goal is to get people together to have fun with amateur radio! We have multiple locations at our disposal, as well as lots of Club equipment, so if you have an idea for something you think others hams would like to do, please let us know, and if you're willing to run it, even better!
- The Club is also looking for presentation topics for 2024. If you have any ideas, or better yet, would like to present, please let Chuck know and we'll get you on the schedule!
- All club activities are open to anyone - members and non-members. If you have questions, ask them on a net or **send email to elmer@w0eno.org**

Presenter: Bryan, AF0W

Topic: Slow Scan TV (SSTV)

- One interest of mine is sending pictures via amateur radio. This can be accomplished via something called Slow-Scan TV, or SSTV.
- Even though the word "television" is in the name, this mode is really not useful for sending video - it's way too slow.
- There are different protocols used for SSTV, each with different capabilities, but the overall image transmission time varies between 8 seconds and 2 minutes, depending on which one is used
- SSTV can be referred to as "narrowband television" - while analog broadcast television requires at least a 6 MHz wide channel, SSTV's analog signal can be transmitted in 3 kHz - roughly corresponding to SSB signal width.
- **PLAY SSTV SIGNAL** - <https://www.youtube.com/watch?v=Sfft9U8scBc&t=4s>
- While SSTV is used on HF, it's also prevalent on 2m and 70cm, where FM modulation is typically used.
- The audio signals used for SSTV can pass through repeaters and even EchoLink!
- SSTV used to require fairly expensive equipment, such as a \$1300 scan converter, but is now literally available in the palm of your hand on your smartphone!
- SSTV is not something new - it began way back in 1958 with a group of amateurs interested in sending images over HF
- Originally, SSTV only supported black, white, and greyscale images. Images were displayed using very-long-persistence phosphor screens similar to those used for radar at that time.
- Early color SSTV was achieved by transmitting an image three times - once each with a red, green, and blue filter in front of the TV camera. On the receiving end, an amateur would take three long-exposure pictures of the screen again using red, green, and blue filters in front of the lens to "reassemble" the picture.
- A progression allowed by solid state memory was to send each scan line three times, which allowed the received picture to be displayed one line at a time in full color.
 - a. The Martin, Scottie, and Wrasse modes are all minor variations on this method
- Later improvements included sending luminance (or brightness) and chrominance (or color) signals instead of RGB components and including information on the mode being used in the vertical sync signal, called the vertical interval signal, or VIS

- a. This signal contains 7 data bits that can encode the specific mode used by the transmitter
- b. This additional functionality was added while preserving backwards compatibility with the older systems
- The PD120 mode being used by the ISS was developed in 1997 to provide a high-resolution image for HF work with a faster frame rate while supporting a 640 by 496 image
 - a. The 120 in the name corresponds to the roughly 2 minute frame transmission time

Where to Find It

- As with voice, there are "calling frequencies" for SSTV on different bands
 - For 70cm, that frequency is 430.950 MHz.
 - 2 meters uses 145.500 and 145.600 MHz for FM, and 144.550 MHz for SSB
 - Another popular SSTV band is 20 meters at 14.230 and 14.233 MHz

SSTV QSOs

- Just because you are transmitting images does not relieve you of the FCC's identification rules - "every 10 and at the end"
 - With SSTV, you can include your callsign within your image to satisfy this requirement
 - I've also heard CW used at the end of a transmission to identify it
 - I suppose there would be nothing wrong with transmitting your callsign using voice
- You can actually have a QSO over SSTV
 - You would first send an image containing your "CQ <callsign>" message
 - Someone wishing to make a QSO would reply with their callsign and a signal report
 - You would reply with your signal report and a 73, log the contact and repeat

SSTV Signal Reports

- Signal reports are a bit different than on voice

- There are two main systems in use - RS (or RSV) and P
- RSV
 - Similar to the RST sign report
 - The "V" component refers to the quality of the received image on a scale from 1 to 5, with 1 representing "Barely perceptible" and 5 representing "Excellent"
- P
 - The P scale was developed to overcome some limitations of the RSV signal report
 - For example - SSTV images frequently arrive with noise lines. While the image is technically imperfect, many hams would report a V of 5 for images with noise in them
 - It is difficult to "picture" what a received image looks like with a RSV signal report - for example, what does a "575" image look like?
 - In this system, the P values represent the following:
 - P5: "broadcast quality"
 - P4: typical quality with slight or minimal noise
 - P3: usable but somewhat noisy
 - P2: barely usable with lots of noise
 - P1: barely see the text
 - P0: unusable

Current Day

- Nowadays, we can use software running on a computer, phone, or tablet to receive and transmit SSTV signals
- It is possible to "acoustically couple" your radio to the decoding device and get a good picture - just hold your radio's speaker near your device's microphone - no fancy cabling is required
- If you are in a noisy environment, you can of course use a cable and interface to connect your radio and computer - generally this connects the audio input and output of your radio to your computer's sound card or other audio interface

- Using a connection device has the added benefit of being able to control the push-to-talk feature of your radio from the transmitting software - otherwise, you have to either use VOX, or voice-operated switch for transmit, or manually hold down the PTT when you transmit
- When transmitting, you are able to select the SSTV mode to be used
- When receiving, you can usually either select the mode or set the software to auto-detect the mode using that vertical interval signal
- You could also use a USB SDR stick or even the Echolink client to receive an SSTV signal and then use a "virtual audio cable" program to connect the audio output from that application to the SSTV software
- There are no special requirements for the radio or antenna system to utilize SSTV
- There was a device dedicated to SSTV reception and transmission - the VC-H1 Visual Communicator from Kenwood
 - a. This device contained a video camera, small LCD screen and an image scan converter
 - b. It still required a radio - it supported a cable with the typical Kenwood two plug configuration such as found on Kenwood and Baofeng HTs
 - c. I've purchased a couple of these devices, but have yet to really try them out
 - d. Nowadays, a cell phone can perform all these operations, and will have a better camera and larger display

Receiving Signals from the ISS

- So back to the ISS SSTV activity I mentioned
- The transmissions are occurring on 145.800 MHz using the PD120 mode
 - a. You can use any 2m FM HT - even the venerable Baofeng
- While you don't need a special antenna, having a directional antenna will help with receiving a good signal
 - a. The antennas on the ISS are ground plane type antennas for 2m and 70cm
 - b. One could just say that the antennas are vertically polarized. However, the ISS superstructure has gotten so big that it does actually block or reflect the signal between the ISS and the ground station. So ARISS recommends that a circular polarized beam be used as the polarity changes throughout the pass.

- c. If you use the rubber duck antenna that comes with your HT (or another similar antenna), you should point the antenna down toward the ground perpendicular to the elevation of the ISS - that way the signal will hit the broad side of your antenna
- The biggest issue you'll face is knowing where and when to point your antenna
 - a. There are many web sites and applications that track the ISS and other satellites
 - b. <https://www.n2yo.com/> is a good one to start with
 - c. With any such program, make sure it predicting the pass based on your local position
 - d. Also, pay attention to the timezone - some report in UTC, others in your local timezone
 - e. The tracking application will report information including the start of the pass (AOS - acquisition of signal), max altitude, and end of pass (LOS - loss of signal) with an azimuth and elevation for each
 - f. If the max altitude isn't over 10 to 15 degrees, then you probably will not be able to receive a good signal during that pass - the higher the elevation, the better
- Software
- Windows: MMSSTV
- Android: Robot36 decoder, and SSTV
- iPhone: BlackCat systems

Summary

- SSTV is an example of a protocol developed by amateurs - one of the great features of Amateur Radio is that we can do this without any sort of

Questions:

- **The question for the week is:** Have you ever tried SSTV, or does this sound like something that would interest you?
- **In my case,** I've used SSTV for demonstrations in our licensing classes, and also for receiving images from the ISS. Another novel use was on a fox hunt, but I'll let Chuck talk about that, since it was his idea.

More Info:

- Boulder Amateur TV Club:
<https://barcw0dk.wordpress.com/boulder-amateur-tv-club/>
- Slow-Scan TV - It Isn't Expensive Anymore:
<https://www.arrl.org/files/file/Technology/tis/info/pdf/19320.pdf>
- The PD-120 Mode: <https://www.classicsstv.com/pd120.php>
- Classic SSTV: <https://www.classicsstv.com/>
- MMSSTV: <https://hamsoft.ca/pages/mmsstv.php>
- ARRL SSTV: <https://www.arrl.org/sstv-slow-scan-television>
- SSTV on Wikipedia: https://en.wikipedia.org/wiki/Slow-scan_television
- VB CABLE Virtual Audio Device: <https://vb-audio.com/Cable/>
- SSTV Handbook: <https://www.sstv-handbook.com/>
- SSTV Reports Using the P Scale:
https://www.wa9tt.com/CQ_magazine/CQ_P_reporting_article.pdf
- Kenwood VC-H1 Visual Communicator:
<https://www.kenwood.com/i/products/info/amateur/vch1.html>

Notes:

- If you have ideas for net topics or general meeting topics / presenters, please let us know! Tell us on a net, or send email to k0itp@w0eno.org

Email to elmer@w0eno.org

1. K0DBL - Don - Mead
2. K0ITP - Chuck - Firestone
3. WA0JJC - Bob - Boulder
4. AF0W - Bryan - Longmont
5. KF0QMP - Aki - Longmont
6. W0PPC - Steve - Lyons (Echolink from AK)

End: 7:55pm