TAPR PS

President's Corner

As I have been a TAPR member for some time and this is my first year as TAPR President, this is a good time to introduce myself to the TAPR membership.

I grew-up in the Missouri Ozarks in a rural community. I was first introduced to Ham Radio in the late 1960's and early 1970's as a Boy Scout earning my Radio Merit badge. I also mail ordered radio kits and successful completed them. At that time, applying for any licensed require a 300-mile one-way trip to the Kansas City office of the FCC. I did not take the test in High School.

Once I got to College at the University of Missouri in Columbia Missouri, I joined the college Ham Radio club. The FCC had started a program for local clubs to offer the Novice test. I became a Novice in 1975. While a club member, I met a fellow ham engineering student that had written a Fortran program to calculate the lengths of the elements for a dipole on each of the Ham bands.

In college, my other interests included forestry, woodworking, folk music. I finished a BS in Forestry and a Masters degree in Forestry in which I built computer models to predict tree growth. I then landed a job in southwest Oregon collecting data and built more forest growth models. I then went on to earn a PhD in Quantitative Silviculture working on growth models of forests at the University of Washington. This lead to an opportunity to work in forestry in Italy

and then another job in Finland teaching and modeling forests.

I then was hired by the University of Missouri to teach Quantitative Forestry and I worked the rest of my career here in Missouri. In my time in Washington, Europe and Missouri, I became an avid Linux user using Sun Microsystem computers in the 1980's-1990's. In Missouri, I became interested in Radio Control Airplanes and RC Sailboats. I then came to the local Ham Radio club and re-took the FCC tests, Technician, General and Extra License.

Several members of the CMRA (Central Missouri Radio Association) made the annual trip to the Dayton Hamvention. In 2006, I met Scotty Cowling working on the HPSDR radio project. I liked the project and started to particapate on a weekly basis.

Through these contacts, I became active in the project collecting a couple of sets of all the component boards. I also became the website manager for the openHPSDR.org website, and the host moderator for the openHPSDR teamspeak week telecon (voice only) This allows the developers of the radio a place to discuss ideas.This continued until 2017 when the development on these radio was tapering off. I also wrote a version of the openHPSDR programmer to load code into the FPGA on the openHPSDR radio. I presented this work at the 2017 TAPR DCC in St. Louis, Missouri.

In the 2019 TAPR DCC in Detroit, I joined TAPR board and the Tangerine project and ran the website and telecon weekly for this project first as a voice only and then as Zoom session. This design was to provide new hardware for the 2023 and 2024 eclipses. The design could potentially work well but Covid, licensing and manufacturing issues stopped the project.

In 2023, I meet with Phil Karn, Rob Robinet, Dave Witten, John Ackermann and Nathaniel Frissel about using a simple USB device and a Software Defined Radio that work completely in Linux to replace the stalled Tangerine radio project. It worked incredibly well for the 2023 and 2024 eclipses and the the associated solar flares in 2024.

This is how I got here as the TAPR President. I am enthusiastic about where we are now and the potential projects in our future.

73,

Dave Larsen, KV0S

###

Our Hamvention Plans

Hamvention is nearly here and TAPR will be present in full-force! The biggest ham radio convention of the year runs from May 16 to May 18 at the Greene County Fairgrounds in Xenia, Ohio and TAPR has plans to fill your Hamvention weekend.

TAPR Booths

TAPR's booths will be in Building 5 where we will show what we have been up to lately. You can visit our booths 9 AM to 5 PM on Friday and Saturday and 9 AM to 1 PM on Sunday.

TAPR Forum

Friday 9:15 AM, Greene County Fairgrounds, Forum Room 1: Dave Larsen, KV0S, will moderate the forum and discuss the development of the ka9q-radio, ka9q-web and wsprdaemon collaboration. Paul Elliott, WB6CXC, will discuss sdr accessories and the wsprsonde multi-channel TX server..

TAPR/AMSAT Banquet

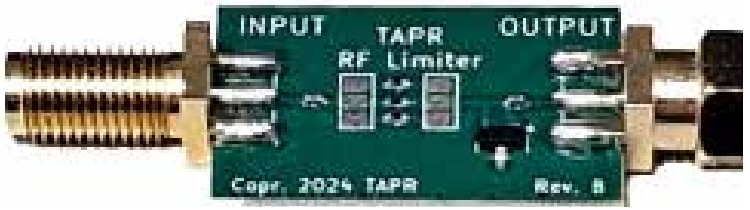
Plans for the 17th annual AMSAT/TAPR Banquet on Friday, May 16. Phil Karn, KA9Q, will be the banquet speaker. Check the TAPR (www.tapr.org) or AMSAT (www.amsat.org) websites for updates and ticket information.

The Gang

The folks behind the scenes at TAPR will be at Hamvention, so you will have an opportunity to say "Hello" and have an eyeball QSO with the TAPR gang.

###

What's New in Our Store



The latest addition to the TAPR store is the RF Limiter for $20, which consists of Schottky diodes with current limiting resistor.

###

Board & Officer Changes

At TAPR's Annual Membership Meeting on October 26, George Byrkit, K9TRV, was elected to the TAPR Board of Directors for the fifth time, while Paul Elliott, WB6CXC, and David Mc Gaw, N1HAC, were elected to the Board for the first time.

At TAPR's Annual Board Meeting on November 23, Dave Larsen, KV0S, was elected president, John Ackermann, N8UR, was elected vice president, Stana Horzepa, WA1LOU, was elected secretary, and Tom Holmes, N8ZM was elected treasurer.

Previously, Scotty Cowling, WA2DFI stepped down as president and vice president Dave Larsen, KV0S, assumed the presidency for the remainder of Scotty's term. Also, the Board of Directors appointed Paul Elliott, WB6CXC, to serve the remainder of Scotty's term as a director.

Subsequently, Tom Holmes, N8ZM, stepped down as treasurer and that position remains vacant.

###

TAPR Wear Available

Personalized Land's End clothing with the TAPR logo and your name and call sign are now available from the TAPR Store at

http://business.landsend.com/store/tapr/

Select from the Men's or Women's catalog. (To make shopping easier, there are "TAPR Recommended Shirts" in the Men's catalog including two styles of polo shirts, each available with or without pockets.)

The logo is available in three colors -- red, blue and white. The name/call sign monogram thread will match the logo color. (We recommend that you use the white logo with dark colored shirts.)

Prices are very reasonable and processing time is 5-7 days.

###

Using the ka9q-radio in Radio Science

By Dave Larsen, KV0S

In 2023, members of TAPR and HamSci were debated how to prepare for the 2023-2024 solar eclipses. In 2017, we had started a new radio hardware solution for monitoring these solar events. However, with production delays and 3rd party licensing issues, it was becoming apparent that a hardware solution would not be completed on time.

Phil Karn, KA9Q, a long-time TAPR member had been presenting a personal project, the ka9q-radio, at several DCC Conferences (2018-2023). He had retired from his corporate job and volunteered to teach local high school and junior college to help engineering students learn to integrate components into a satellite launch package. Initial suggestions included launching a cubesat, however, the timeline for developing and launching a cubesat is much longer than the time these students had available, typically two years.

Phil realized that the factors that extended the time frame were beyond the control of the students. He suggested the use of helium balloons as a surrogate. A balloon launch and payload require tasks that are similar to a space launch, just with a shorter time frame.

Phil had two personal biases. He wanted a Linux based system, because he had been using Unix and Linux operating systems for several decades. And that the code be written in C programming language. Phil started with the funcube dongle as a receiver radio, produced by AMSAT-UK and the Radio Communications Foundation (RCF), both not-for-profit organizations. To improve availability, for the students, Phil added drivers for the rtl-sdr, the airspyR2 and the airspyHF+. All of these radios are USB2 interface radios with limited frequency bandwidth.

Phil, with his industrial work experience, was very familiar with Linux system tools and multi-cast networking. As part of the engineer class for students, Phil wanted to demonstrate the use of these tools to the students. The code was also designed to utilize the capabilities of the host computer from Raspberry Pis to more powerful Linux computers.

The use of systemd tools allowed the radio to be built in parts that run independent programs. These programs are started and maintained with the systemd commands. This allows the radio to survive a computer reboot. The main radio executable for ka9q-radio is called radiod or radio daemon. Only one instance of radiod is generally used for one physical USB radio device. If the USB radio devices have serial numbers, you can run more that radiod instances on a single computer. The usual case is one radiod per computer as most SDR receivers cannot report a serial number. However, it is becoming more common in newer radio firmware.

In usual cases, one computer runs one radiod connected to one physical radio.

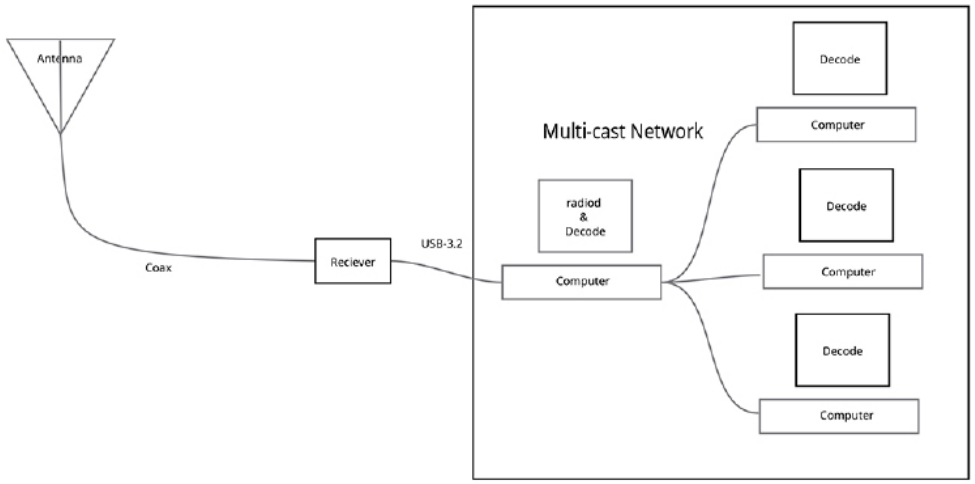
The next big concept is the use of Multicast. Multicast can make the ka9q-radio very convenient, but it can create problems with your network system if improperly configured. Multicast allows you to make a group of computers to create many read-only shared data streams. This means a data stream on one computer can be decoded on another computer or the same computer, dependent that the CPU cycles are available.

All of these tools have been around for many years and are common in many commercial network configurations. Unfortunately, many consumer grade network switches allow all packets through and do not allow filtering of the packets. This is done to increase ease of setup on simple configurations. The simple solution on home switches is to set up another switch to isolate the Multicast packets to a radio subnet. The volume of radiod data packet can easily flood the available bandwidth.

The ka9q-radio is a receive-only system. For many hams, this seems like a step back 50 years ago, but there are several reasons for this design decision. It makes it much easier to keep RFI out of the receiver. These radios are designed to monitor and the current design can be used to listen to hundreds of frequencies, all at the same time. The radio can monitor, record, decode and forward to database all in real time. It does require a dedicated computer, but in general, these radios are less expensive than those most of us use on our desktops.

With this tool, Phil wrote code to decode and upload APRS packets for the APRS system. Also decode and upload APRS packets to decode the bearing azimuth and elevation to track active balloon flights. There are also tools to decode wspr, ft8, ft4, AX.25, Coherent demodulation of AM, DSB, BPSK; calibration on WWV/WWVH/CHU carrier and NBFM and noncoherent PM.

The antenna, the physical usb radio and computer running radiod can be at one locale and the data steams can be sent



elsewhere for decoding. For example, Phil in a live talk at the Hamvention SDR Forum took a signal from KFS radio site in central California and played it live in Ohio during his presentation of this radio system.

There are issues you need to understand with this kind of radio. The radio usually runs contiguously and all signals can be recorded and saved. The radiod processes the bandwidth available from the receiver, which can consumes quite a lot of the computers resources to accomplish this real time. Once decoded, the data can be sliced to hundreds of signals that can be further processed. These decode packets can be very efficiently shared with other computers.

Many of the uses of this type of receiver need to have time calibration. About half of the receivers can accept timing signals from a GPS. This allows the stored data to be analyzed with signals from other stations.

From the current existing set of receivers, we are collecting an amazing dataset for a group of citizen scientist. When I first started, I was thrilled to receive a signal from the other side of the world. Now monitoring multiple frequencies and multiple modulation protocols, I receive signals from every continent daily including the Arctic and Antarctic continent.

I plan to provide additional articles describing uses of this radio software.

ka9q-radio is not tolerant to local transmitter. If you want to include transmitting, you will have the best results if you separate the physical sites of the receiver and transmitter.

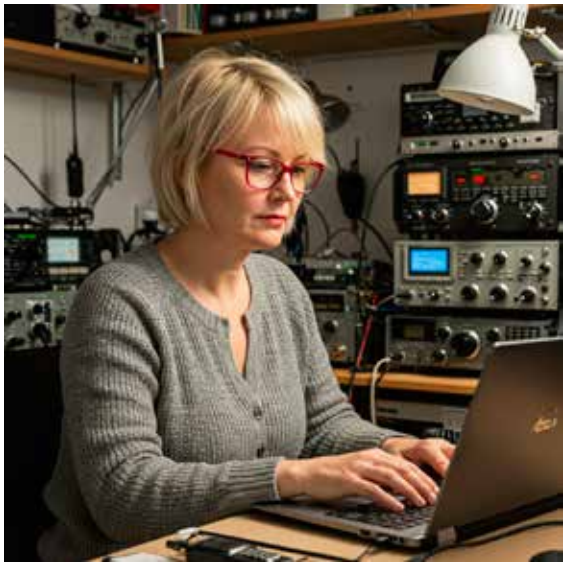
ka9q-radio C code is available and opensource (https://github.com/ka9q/ka9q-radio). It can interact with other software such as wsprdaemon (http://wsprdaemon.org/ software to process wspr, ft-8 and ft-4 receive, WWV) or ka9q-web (https://github.com/fventuri/ka9q-web) a demonstration program that allows a web interface to ka9q-radio.

If you want to discuss the uses of ka9q-radio, the TAPR-HamSci weekly zoom is a place you can go (https://hamsci.org/get-involved), look for the TAPR-Hamsci links. Many of the authors and active users attend this discussion of the current issues with the radio system.

As with many parts of ham radio and science, no matter what you know, there are always new things to learn.

###

Write Here!



Your *PSR* editor is working on the next issue of *PSR* and hopes to find a few good writers, particularly ham radio operators working on the digital side of our hobby, who would like to write about their activities and have them published here in *PSR*.

You don't have to be Hiram Percy Maxim to contribute to *PSR* and you don't have to use *Microsoft Word* to compose your thoughts.

Your *PSR* editor can handle just about any text and graphic format, so don't be afraid to submit whatever you have to stanzepa@sbcglobal.net – she can handle it!

The deadline for the next issue of *PSR* is July 15, so write early and write often.

###

On the Net

By Mark Thompson, WB9QZB

Facebook

As you may know, TAPR has a Facebook page, www.facebook.com/TAPRDigitalHam.

However, I also created a TAPR Facebook Group, www.facebook.com/groups/TAPRDigital/.

If you have a Facebook account, "Like" the TAPR Facebook page and join the TAPR Facebook Group.

If you join the group click on the Events link and indicate you're Going to the events.

On Twitter, Too

Access the TAPR Twitter account at www.twitter.com/taprdigital.

Also on YouTube

TAPR now has its own channel on YouTube: the TAPR Digital Videos Channel: www.youtube.com/user/TAPRDigitalVideo.

At this time, there are a slew of videos on our channel including many from the TAPR-ARRL Digital Communications Conference (DCC) that you may view at no cost, so have at it!

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TAPR Office Hours: Monday to Friday, 9 AM to 5 PM Eastern Time

Submission Guidelines

TAPR is always interested in receiving information and articles for publication. If you have an idea for an article you would like to see, or you or someone you know is doing something that would interest TAPR, please contact the editor (stanzepa@sbcglobal.net) so that your work can be shared with the Amateur Radio community. If you feel uncomfortable or otherwise unable to write an article yourself, please contact the editor for assistance. Preferred format for articles is plain ASCII text (OpenOffice or *Microsoft Word* is acceptable). Preferred graphic formats are PS/EPS/TIFF (diagrams, black and white photographs), or TIFF/JPEG/GIF (color photographs). Please submit graphics at a minimum of 300 DPI.

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Secretary: Stana Horzepa, WA1LOU, wa1lou@tapr.org
Treasurer: vacant

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PSR Advertising Rates

Full Page Ad for 1 issue: $100, 4 issues: $350
Half Page Ad for 1 issue: $75, 4 issues: $250

Membership Application

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Join or renew online at https://tapr.org/product/tapr-membership

Benefits of a TAPR Membership:

- *Subscription to the quarterly PSR*
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TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.