Smoke Signals

Newsletter of Fullerton Radio Club

July 2022

President's Column July 2022

It's like fishing.

My last few years as a high school teacher, my school had a fairly active ham radio club. For a few years, it sort of became the "in" thing to do, among my Physics students. But often students would ask the legitimate question, why should I want a ham license? There once was a time, when extolling the virtues of having a ham license you could say "You can talk to people around the world." Of course, today the average person's response to this line of reasoning would be, "I can do that with my cell phone, (or Facetime, or Zoom, or Discord, or …)" When students would say this, my response was "Well, it's sort of like fishing." After all, the most efficient (and I would argue the cheapest) way to acquire a fish, is to go to the market and buy one. Yet, fishing is still a popular pastime. Obviously, there must be some point to fishing beyond acquiring fish (although that's important). I suppose the attraction is the challenge and experience of acquiring a fish using your own skills and equipment, without depending on the infrastructure of commercial fisheries, a supply chain and markets.

Last month I told you that I had a goal of doing a POTA (Parks on the Air) activation at each park we camp at this summer. So far, I have activated Bryce, Glacier, Waterton, Banff, Yoho, Jasper National Parks. Also Waterton-Glacier International Peace Park as well as Kicking Horse Pass and Yellowhead Pass National Historic Sites.

We are currently camping in a temperate rainforest at Pacific Rim National Park Reserve on the west coast of Vancouver Island. This is the westernmost point on our trip. Usually, the day I am planning to activate a park, I will look at the solar data, to see what the band conditions are likely to be like. This morning I was delighted to see that the Solar Flux Index was 165, about as good as I have seen this summer. The K-index was 1 - also as good as it gets. I did have the disadvantage of almost no cell reception, so I was not able to "spot" myself, providing a heads-up to POTA chasers where to find me.

I went through the now-familiar drill of unpacking the IC-7300 and battery, assembling the antenna, unrolling the coax, and deploying the counterpoise. With the favorable band conditions, I expected to make the required 10 contacts fairly quickly.

Not so quick, buddy! Two hours later, I had made *one* contact, out of the ten needed to "activate" the park.

Sometimes you eat fish for supper; sometimes you go to bed hungry.

73 and good fishing,

Bob - AD6QF

Postscript - Today I made 17 contacts and successfully activated Pacific Rim National Park and Clayoquat Sound International Biosphere Reserve.

July FRC Meeting

This month we'll have an exceptional ZOOM meeting with special topic and speaker.

Wednesday July 20, 2022: 7:00 PM

Wildfires and Fire Watch Activities in Orange County

Speaker and bio: This month our speaker is Orange County Fire Watch Project Manager, Tony Pointer. Tony manages Orange County Fire Watch activities for the Irvine Ranch Conservancy, OC Parks, City of Irvine, and City of Newport Beach with the assistance of over 300 volunteers at 36 physical locations and 38 Virtual Fire Tower Cameras in Orange County. He will be sharing information on the activities of the Fire Watch program and the current fire situation in Southern California. Orange County Fire Watch partners with multiple amateur radio organizations for deployments and communications on Red Flag Warning days.

Fullerton Radio Club
P.O. Box 545, Fullerton, CA 92836-0545

August 2022 FRC BOARD MEETING

The next Club Board meeting will be on

August 3, 2022

Due to the continued status of COVID-19 we will hold the meeting by Zoom at the usual Zoom ID and passcode.

Meeting time: 5:30 PM

All Members are welcome

Show –and–Tell
Bring something of interest to the meeting to show and share your story. Something old, new, or just of interest to hams.

Web site: www.FullertonRadioClub.org

July 2022 Board Meeting Minutes

The July Board meeting was called to order on July 6 by Zoom at 5:39 PM by President Bob Houghton AD6QF. Additional members present were; Vice President Robert Gimbel KG6WTQ, Secretary Paul Broden K6MHD, Treasurer Gene Thorpe KB6CMO, Board Members Larry McDavid W6FUB, and Walter Clark. Absent was Board Member Richard Belansky KG6UDD.

Minutes from the May and June Board Meetings were reviewed and approved.

Treasurers report as of the June bank statement: Checking $3953.07. Savings; $2609.02. Checks have been written to Larry for $133.93 and Walter for $52.77 to cover costs of AITP, and $226.77to Bob for the website maintenance.

Bob's records show 32 paid and one life member.

There was no old business for discussion.

New business:
• A discussion was undertaken as to whether we should continue to rent a bank safe deposit box when we have so little for safe storage; (i.e., club corporate registration papers). Conclusion was that a file for club papers will be maintained within a volunteered board member's personal home safe, with designation of a specific back-up person who will have access to the safe (family member).

• An additional topic for discussion was Larry's identification of an alternate selection of a new bank for club checking account. Also considered is the potential that no savings account is required since the banks all pay nearly zero in interest.

• A potential speaker was identified for the July club meeting; Tony Pointer, Orange County Fire Watch Project Manager.

There being no further business for discussion the meeting was clused at 6:09 PM.

Submitted by Club Secretary Paul Broden K6MHD

Morningside Mischief Makers on Field Day 2022

Sixty-four years ago, I participated in Field Day for the first time as a new Novice in a small hangar at the local municipal airport in Nebraska. Except for the high winds, it was great fun and I have missed very few Field Days since then. I have done Field Day on hilltops, at a fairgrounds, up in the mountains, in front of a hospital and between the towers of an AM radio station.

This year, April and I decided to try something different. There are about a half-dozen licensed hams at the Morningside senior community in northeast Fullerton, where we now live. Most have never done Field Day, but Vi Barrett W6CBA is a Field Day veteran who loves to get on the air with CW and SSB. Since moving into the Assisted Living part of Morningside, she can no longer have a HF station because her place is essentially underground. We decided to have Field Day right on the Morningside campus and make her an important part of it.

There is a shaded outdoor barbecue area at a high point in the southwest corner of the Morningside campus with tables and plenty of seating for lounging and chatting. I reserved it for Field Day weekend and started planning our antennas.

For the HF bands, I prepared simple BuddiPole NVIS antennas for 80 and 40 meters and a vertical for 20 meters. For VHF we had omni antennas for 6 meters, 2 meters and 70 centimeters. It turned out that 20 meters was hot all day, even after a solar storm hit around sunset. I didn't get around to trying 80 and 40 meters until the last hour on Sunday, and those bands were totally dead except for a couple of locals.

Before Field Day, I notified all of the Morningside licensed hams and invited them to come out and join in, or just say hello. All of them did that except one who was out of town. Numerous other residents dropped by to see what was going on. Chatting with these visitors really cut into our operating time, but we managed to work 22 ARRL sections in the USA and Canada. Vi (in the photo) had a blast and I haven't seen her so happy in years.

Vi B**arrett W6CBA**

Now it's time to plan for 2023!
Joe Moell K0OV

INTERNET ACCESS SPEED AND TECHNOLOGY

There has been much discussion here recently about Internet access speeds. Some of us have seen unexpected increases in access speeds but sometimes only in download speed, not also upload speed. Some of these changes are driven by sales/marketing issues and competition among Internet Service Providers (ISP) but some are actually controlled by technology and even basic physics. The type of Internet access you have is a key factor; most of us have progressed from analog modems on through DSL, AT&T U-verse, cable and fiber optic connections.

AT&T was one of the original suppliers of telephone service and thereby already had twisted-pair wires into our homes. Telephone is an analog technology so Internet analog modems were first used and progressed through several types with increasing speed capability, but with a speed limitation imposed by the frequency response of the standard telephone wire lines. Digital Subscriber Line (DSL) service then offered higher speed and many of us changed to DSL for Internet. But DSL has its own speed limits due to the length of the wires between the telephone central office and the home. Soon, optical fiber became available from some companies but required a whole new infrastructure of overhead and buried cabling. Everyone wanted faster Internet access so there was a marketing challenge to provide it despite the cost of new cabling and equipment.

AT&T was a dominant player and already had vast twisted-pair wiring

infrastructure in place for telephone use. The corporate mentality at AT&T was to use this existing copper wiring and find a way to minimize the cost of equipment for higher speed data service. Thus, evolved AT&T U-verse, a hybrid between fiber and twisted-pair cabling. AT&T pushed U-verse digital service for telephone, TV and Internet and refused to invest in fiber optic cable to the home. It was a strategic corporate decision made over 15 years ago but it was wrong!

AT&T corporate finally realized their choice to implement hybrid U-verse with old, original telephone twisted-pair cable to the home was wrong. Now, they are promoting fiber to the home and are busily playing catch-up to Verizon and Frontier; AT&T no longer offers U-verse to new customers. AT&T is now advertising high-speed fiber to the home where I live in Anaheim, California, but I can't find any location in Anaheim that actually has it yet. AT&T even has sales reps in Costco offering high-speed, symmetrical fiber Internet to the home for $50/month but when I check with them, they discover AT&T fiber is not installed where I live in Anaheim. Running new fiber optic cable to each home is a lot of work and is expensive!

Concurrent with all this telephone technology evolution, a vast Cable TV network evolved nationwide, with a new infrastructure of coaxial cable to the home. Coaxial cable inherently has much higher frequency capability than twisted-pair telephone cabling. Originally this service was just for TV but as demand increased for high-speed Internet access it was realized that the coaxial cable infrastructure already in-place could also handle digital TV and digital data for Internet. However, the network of those coaxial cables needed electronic amplifiers in many places along the coax cables to correct for signal strength loss in the coax cabling. Cable TV was developed to provide TV service to the home, not communication from the home back to the cable TV company. Hence, the many amplifiers placed throughout the cable network did not need to pass high-frequency signals back from the home to the cable company; doing this would have increased the cost of this equipment without benefit at that time.

Internet access, though, is inherently bi-directional. The cable TV system already provided high-speed download (or, downstream) through the use of high frequencies, often 860 MHz for TV signals and even higher in some cable systems. There is a fundamental electronic frequency limitation for cable TV upload (or, upstream) Internet data speed, due to the amplifiers and other hardware cable providers, such as Spectrum, have widely installed throughout their network. It will be very expensive to upgrade to new cable hardware that allows faster upload speed.

Fundamental physics, codified as the Nyquist Criterion, limits digital communication bandwidth based on the frequency used for the communication. Cable TV needed high-frequency capability to downstream TV to the home but had little need for upstream communication; hardware with limited upstream frequency capability was less expensive and was therefore implemented widely. Now, that old hardware is widely distributed across the cable TV network and will have to be replaced to get faster upload speeds. Dr. Harry Nyquist, a Bell Laboratories PhD physicist, showed in 1928 that the sampling speed (read, frequency) must be a minimum of 2X the data rate. Basically, it is a law of physics and can't be circumvented. It is this fundamental physics that limits cable Internet speed, particularly upload speed.

The old cable TV hardware throughout the USA that limits upstream frequency to approximately 50 MHz (this relatively low frequency may be slightly higher for some cable systems) also limits the upstream digital data rate to about 25 (MegaBitsPerSecond) Mbps. Note this parameter is for digital bits, not digital 8-bit bytes. This is why cable TV Internet upload speed is currently always far slower than the download speed. Fiber optic systems do not suffer this frequency limitation in either direction (upstream or downstream) so fiber optic Internet access speeds can be symmetrical in both directions. Changing this upstream speed limitation for cable will require ***vast*** expense for new hardware.

I changed from AT&T DSL service to Spectrum cable Internet access to get faster speed. Initially, the cable download speed was 100 (typically 117) Mbps and the upload speed was about 11 Mbps. Competition from mainly Verizon and Frontier fiber optic systems led Spectrum to unilaterally increase the cable download speed to 200 (typically 235) Mbps at no additional cost. Spectrum is again feeling that competitive pressure (especially as AT&T promotes fiber to the home) and has just again increased my download speed to 300 (often 350) Mbps at no additional cost. However, my upload speed remains at about 11 Mbps. The upload speed still suffers the technical limitation I described above. Achieving significantly faster upload speed will require vast hardware changes to the cable network at great expense. The alternative, of course, is fiber to the home, which

AT&T is now promoting. Maybe someday AT&T will finally catch up and be able to offer fiber to us all. The AT&T corporate folks who made the U-verse decision clearly got it wrong! AT&T is now paying a much higher price to install fiber to the home than they would have paid starting 15+ years ago.

AT&T U-verse is essentially dead. AT&T will support existing U-verse users (for now) but is not offering U-verse to any new customers. AT&T is now busy installing fiber optic cabling to the home but at great expense and at limited installation rate. They could have been installing fiber the past 15 years!

Spectrum does offer 400 and 1000 Mbps download speed in some markets, but at additional monthly cost. However, the upload speed still is limited; I've not seen any upload speed above 35 Mbps for cable Internet service. It would be nice to brag that I have 1000 Mbps download and upload speed but I'll have to wait for fiber optics to the home to get that. And, politics get involved as well! Cities contract for utilities and those contracts typically limit competition for similar services. So, if you have AT&T as your city telephone utility, you may not be offered Verizon or Frontier fiber optic Internet service! Generally, telephone and TV suppliers are not competitive so AT&T can install fiber optic cabling and Spectrum can operate coaxial cable with Internet service concurrently. These constraints are really political and can be negotiated in city utility contracts; who knows what goes on with your city government!

Fortunately, for most of us, it is the download speed that most affects our use of the Internet. Unless you often send large presentations, pictures or video from your home, an upload speed of 10-30 Mbps is not a problem. Want something faster? Look into fiber. Even the Low-Earth-Orbit (LEO) satellite Internet services cannot match the speed of fiber. Fiber cabling is more fragile than copper wire cabling and is usually installed in plastic conduit. Trucks with big spools of orange tubing being fed underground are installing conduit for fiber optics.

A screen shot showing how my Spectrum Internet access speed recently changed is seen below. Some say they received an email announcing this free speed increase, but I did not. I occasionally check my Internet access speeds using Speedtest by Ookla and found the download speed increase. Checking with Spectrum, I found this increase is being implemented only in some markets, likely where there is increasing competition from fiber optic systems.

Larry McDavid W6FUB