



Yavapai Signal

The Yavapai Amateur Radio Club – Prescott, Arizona – DM-34 – Volume 35 – No. 8 – August 2020

| Upcoming Club Events | | | | |
|--|-----------------------------|--------------------|--|------------------------------|
| Event | Date | Time | Place | Contact / Info: |
| General Meeting | August 6, 2020 Thursday | 1900 MST 7 p.m. | Prescott Rodeo Grounds | Club Website |
| YARC Breakfast | August 20, 2020 Thursday | 0800 MST 8 a.m. | BackBurner Restaurant, Prescott Valley | Don WB7TPH or Jeff WB7RFY |
| Transmitter Hunt | August 9, 2020 Sunday | 1300 MST 1 p.m. | OneAZ Credit Union parking lot, Gail Gardner Way & Willow Creek Rd., Prescott | Pete K6VVR or John WB9VGJ |
| Amateur Radio License Testing — See page 4. | | | | |
| Breakfast and Lunch Gatherings — See page 17. | | | | |

| YARC: | Badges | Patches | Shirts |
|---------------------------|-------------------|-------------------|---|
| Features: | Name & Call | Club Name & Logo | With or Without Name & Call |
| Contact Person(s): | Sam Prather K7SCP | Sam Prather K7SCP | Pete Morrison K6VVR |
| Cost: | \$8.00 each | \$3.00 each | Without Name & Call \$20.00 — With Name & Call \$24.00 each |

| Club Website Registration |
|--|
| In order to receive the <u>Signal</u> (the club's official newsletter), you must be a member of the club. Make sure your email is correct by logging into our website (www.w7yrc.org), then clicking on the members tab and viewing your profile. |

Welcome to the Yavapai Amateur Radio Club

The Yavapai Amateur Radio Club (YARC) is an ARRL affiliate Special Service Club. The club participates in many activities in the quad-city (Prescott, Prescott Valley, Chino Valley, and Dewey-Humboldt) area by providing communications for local events, emergency communications, and promotion of the hobby throughout the community.

Membership in YARC is open to any interested amateur or non-amateur alike. Dues are \$20.00 per year (full-time students \$15). YARC general meetings are usually at 1900 MST on the first Thursday of every month at the Danny Freeman Building, Prescott Rodeo Grounds, 840 Rodeo Drive in Prescott.

www.w7yrc.org

YAVAPAI AMATEUR RADIO CLUB – PO BOX 11994 – PRESCOTT AZ 86304-1994

Club Nets

| Band | Mode | Frequency | PL | Night | Time |
|------|-----------|-----------------------|-----------|-----------|----------|
| 2M | FM | 147.260 MHz | +103.5 Hz | Wednesday | 1900 MST |
| 2M | SSB (USB) | 144.250 MHz | N/A | Wednesday | 2000 MST |
| 10M | SSB (USB) | 28.444 MHz +/- QRM | N/A | Thursday | 2000 MST |
| ¾M | FM | 447.650 MHz | -100.0 Hz | Saturday | 0900 MST |

Yavapai County ARES/RACES Nets

| | | | | | |
|----|----|-------------|-----------|--------|----------|
| 2M | FM | 147.260 MHz | +103.5 Hz | Monday | 1830 MST |
| 2M | FM | 145.290 MHz | -127.3 Hz | Monday | 1900 M |

Club Repeaters

| | | | | | |
|----|----|-------------|-----------|---------------|---------------|
| 2M | FM | 146.880 MHz | -100.0 Hz | Open Use 24/7 | Open Use 24/7 |
| ¾M | FM | 447.650 MHz | -100.0 Hz | Open Use 24/7 | Open Use 24/7 |

Submission Deadline for the Yavapai Signal

from editor Loren Singh, AE7CG

The usual deadline for submission of articles and photos to appear in the Yavapai Signal is the 18th calendar day of each month. That gives me time to edit and format submissions, and to have the newsletter available for distribution to the club membership by the 20th calendar day of each month. The aim is to have the newsletter in the hands of club members approximately 10 days or so before the holding of the general meetings on the first Thursday of each month.

ae7cg@arrl.net

Share Your Surplus Items

Bring any ham related surplus items that you no longer need to the next club meeting. There will be a table at the meeting where your items can be placed. Let your fellow club member take those things that they want. The table will be available at each monthly meeting.

Canned Food Donations

Bring your non-perishable food items to the monthly club meetings and Terry Pemberton KB7TRE will take them to the local food bank. Give your bagged items to Terry.



CORONAVIRUS
COVID-19



From the President's Desk

by Bill Noe, WG7W

Summer is flying by even though we are still involved in the pandemic shutdown. Things have been in a state of flux the last month or so. Some restrictions were removed and then replaced and other restrictions that we did not have before were enabled, dependent on where you lived and the instructions of the area elected officials. We, here in Yavapai County, remain less effected than the more metropolitan areas.

YARC has resumed some activities. We have resumed the transmitter hunts in the first part of the month. The Third Thursday Breakfast at the BackBurner Restaurant has returned with restrictions in place for social distancing and the wearing of PPE by the restaurant employees. We have tested in the past and will test again on the 25th of July, VE testing that is. If there are no changes there will be a general meeting on the 6th of August.

PLEASE keep in mind that these activities are open to all that wish to attend. If you feel that the activity is not safe for you or you feel uncomfortable about attending, do not participate in person. If you do attend in person it's up to you if you wear a mask and distance. Others may or may not. Do what is comfortable for you.

We had a ZOOM meeting on the 9th of July. YARC business was very limited but the presentation, done by Doug Thuriault NO1D, about recent additions and upgrades to our repeater system was very thorough and informative. If you missed the presentation a copy of Doug's slides are on our website. He told us about Allstar and the linking of our repeaters. He hinted that we would soon have Echolink available on our system. All this made possible by controllers that Doug constructed, programmed and placed in service.

If possible, we will attempt to ZOOM the meeting on August 6th from the Freeman Building at the Rodeo Grounds. In the past, wireless internet has been an issue there but we will try. This will be an important meeting as the club Bylaw re-write will be voted on.

Your board has worked hard reviewing the Bylaws to return them to a guiding document that we will not have to continually change. The items removed from the current bylaws that are policies we follow will be placed in another document, Policies and Procedures. The revised Bylaws will give the Policies and Procedures the authority to regulate the day to day business of the club that may have to be adjusted or changed frequently.

Your board would urge you to review the mass club emails sent to you recently to make informed decisions and votes. The revised Bylaws and a companion document explaining the changes were attached to those emails. The current Bylaws are posted on the website. There currently is no Policies and Procedures. That document will be created if and when the revised Bylaws are approved.

Above I mentioned Echolink. As I write this Echolink is up and operational on our linked repeaters. Echolink, for the uninitiated, is a communication method using software and the internet to interface with our repeaters. There is software that may be used in conjunction with your computer or as an app on your smart cellphone. The computer based software is a little more complicated but the app on your smartphone is a very easy and simple setup task. I downloaded, installed, activated and was using my smartphone to communicate with Bob Smith WB6ODR over the repeater.

One of the reasons to join and participate in a club is to have opportunities to communicate with other amateurs. YARC has been very successful in offering opportunities. Your growing repeater system is a prime example. When you see and speak to any of our Repeater Committee be sure to thank them for their efforts on your behalf. They have and will continue to work on your repeaters to improve your opportunities.

Meeting Minutes

By decision of the board of directors, minutes of the board and general meeting minutes will no longer appear in the Yavapai Signal. They are posted online at the club's website:

www.w7yrc.org → Members → Login → Reports

- |
- Board Minutes
- Club Minutes

Mentor / Buddy

Our club is in need of help for new and no so new inexperienced Hams. There are a number of club members that have passed their license test but are asking, "Now what?".

Anyone interested in helping our club members in need or, if you are someone who needs help, please contact:

Dave Erlach W7Vsx at w7vsx@w7yrc.org .

Mentor Buddies

| Name | Call Sign | E-mail | Telephone |
|-------------------|-----------|--|--------------|
| Don Bauer | WB7TPH | dbauer2250@aol.com | 928.775.4690 |
| Frank Bender | K8FB | fhb47@hotmail.com | 928.379.5575 |
| Pete Morrison | K6VVR | pm-service@cableone.net | 928.899.8555 |
| Bill Noe | WG7W | wq7w@arrl.net | 928.710.6925 |
| Dick Hughes | W6CCD | w6ccd@arrl.net | 928.759.0337 |
| Ron Purcell | KI7EVK | 728rwp@gmail.com | 707.849.7099 |
| Jack Szelka | A1K | radioaik@gmail.com | 401.580.0330 |
| Mike Reid | N7IEP | n7iep@arrl.net | 480.250.6093 |
| Sandy Meadowcroft | KF4JHC | sandymeado2@yahoo.com | 928.660.8323 |
| Mike Belanger | W1DGL | Fix_broke_airplanes@hotmail.com | 520.831.4893 |
| Jerry Warzeha | KØFC | jerry.warzeha@hotmail.com | 612.205.3810 |

Amateur Radio License Testing

by Don Bauer, WB7TPH

It has been a trying few months for testing and for the candidates who want to get licensed or upgrade. The largest hurdle has been getting and keeping a suitable venue. Next is the issue of social distancing. In May, we successfully tested at the Jeep Posse building keeping candidates spaced out to afford them suitable distance and comfort.

This month (July) we will test 18 people in two waves using the same format we adopted in May. We have insisted on pre-registration (no walk-ins), and we are full for this test.

Registrations are now being taken for September 12. Not knowing what curve ball this virus thing will give us, we are planning to keep to the social distancing format. Therefore, if you wish to be tested in September, you are strongly advised to pre-register soon.

Repeater Status

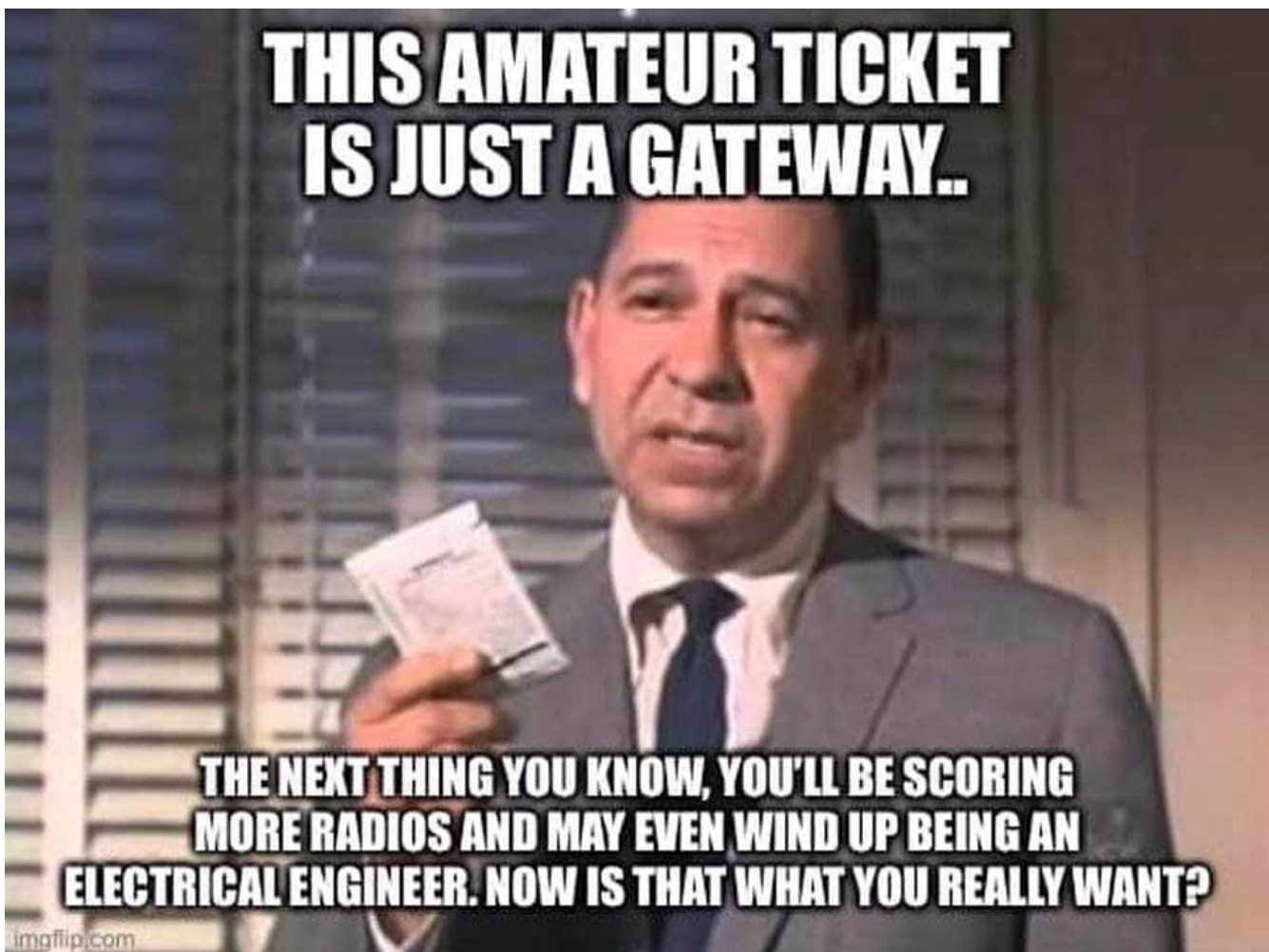
by Doug Theriault, NO1D

YARC's 2m and 70cm repeaters are now linked via Allstar. Check out a presentation up on the clubs website presented by Doug NO1D on the linking effort. For now the 2m/70cm repeaters are linked full time for the next several months at which time we will revisit whether we should link occasionally or leave our machines linked full time. If you have a friend who has an Allstar node, have them try to connect into YARC's hub, Allstar node 502370 for a QSO with you.

In addition to Allstar/Linking effort, YARC now has Echolink support into our repeater network. Look for W7YRC-R in your Echolink application and add it to your favorites list. Connect to this interface to access the clubs repeaters while traveling outside our repeater coverage area. The W7YRC-R interface instantiates on the YARC Allstar Hub Node allowing transmissions across both repeaters while they are linked. For more info on Echolink, check out the echolink.org site online.

Over the next month the repeater committee plans a tune up of the old 2m repeater from the Mingus Tanks site. The Yaesu DR1X is currently running at Pete's K6VVR's QTH and supports C4FM digital mode for those in Prescott area. Once the tune up is complete we will consider installation of the Yaesu DR1X at the Mingus Tanks site or at another location. We are also investigating installation of a 2m repeater in the PV/Dewey area linked into our network to again increase our coverage area for club members.

Join into the Noontime Net Monday through Friday and try out Echolink if you have the application on your smartphone !





Art Protas KG6AY — Hard at work on June 24, 2020

Taking Down a Tower — June 24, 2020

by Jim Zimmerman, N6KZ

Today the YARC Elmers took down and removed a Tri-Ex 55-ft, crank-up tower and antennas for the widow of Ken Edwards N6KBI of Prescott Valley. The take down crew consisted of: N7CW; KG6AY; W7VSX; KT7P; K8FB; KJ7NWO; and N6KZ (me). Ken's widow Sue donated the tower and antennas to YARC. We are selling the tower (complete with a raising fixture, thrust bearing, and electric raising winch) for \$500. In addition to the crank-up tower and accessories, we are also selling the KLM KT-34XA six-element, tri-band Yagi (32-foot boom) for \$100. Interested parties should contact me (Jim N6KZ) at 928-713-0542.





Chris Carter N7HVC operating during ARRL Field Day, June 27 – 28, 2020
(Photo courtesy of Mike Belanger W1DGL)



High-end Ham Radio Gives Up Its Firmware Secrets

by Dan Maloney

hackaday.com , July 14, 2020

Amateur radio operators have always been at the top of their game when they've been hacking radios. A ham license gives you permission to open up a radio and modify it, or even to build a radio from scratch. True, as technology has advanced the opportunities for old school radio hacking have diminished, but that doesn't mean that the new computerized radios aren't vulnerable to the diligent ham's tender ministrations.

A case in point: the Kenwood TH-D74A's firmware has been dumped and partially decoded. A somewhat informal collaboration between Hash (AG5OW) and Travis Goodspeed (KK4VCZ), the process that started with Hash's teardown of his radio. The radio, a tri-band handy talkie with capabilities miles beyond even the most complex of [the cheap imports](#) and with a price tag to match, had a serial port and JTAG connector. A JTAGulator allowed him to probe some of the secrets, but a full exploration required spending \$140 on a spare PCB for the radio and some deft work removing the BGA-packaged Flash ROM and dumping its image to disk.

Travis picked up the analysis from there. He found three programs within the image, including the radio's firmware and a bunch of strings used in the radio's user interface, in both English and Japanese. The work is far from complete, but the foundation is there for further exploration and potential future firmware patches to give the radio a different feature set.

This is a great case study in reverse engineering, and it's really worth a trip down the rabbit hole to learn more.



July 2020 Foxhunt
by John Broughton, WB9VGJ

The July 2020 foxhunt was held Sunday July 5, 2020. The foxes were Pete K6VVR, Patrick KG7EWD, and Jerry KF7FPD.

There were three teams for this hunt: 1) Bob WB6ODR and Linda KD7EEO; 2) Robert WA6FBA; and 3) Jeff WB7RFY, Keith KI7GTX, and John WB9VGJ.

The results of the hunt were:

| Finish | Team | Time |
|--------|----------------------------|---------|
| 1 | WB7RFY, KI7GTX, and WB9VGJ | 48 min. |
| 2 | WA6FBA | 55 min. |
| — | WB6ODR and KD7EEO | DNF |

The foxes hid the transmitters in a park on Canyon Drive south of Copper Basin Road and west of White Spar Road on the south side of Prescott.

With all the hills and winding roads, the transmitter's signal varied quite a bit. Our team took several readings, starting at the top of the Pioneer's Cemetery, as did the other two teams.

You can see pictures of the hunt here. The signal didn't get real strong until we were almost at the park. As we drove in from the west on Canyon Dr. WA6FBA was driving in from the east.

K6VVR got very devious with the hiding of the secondary transmitter. He had a piece of 4" x 4" lumber that he kept for a year to get weathered. He hollowed out one end and put the transmitter inside the hole. He then slid the piece of lumber in under a large pile of branches with the end containing the transmitter to the inside of the pile. We hunters knew the transmitter was in the pile, but could not see it and started moving sticks around on the pile. K6VVR then pulled out the lumber to show us where the transmitter was so we would not dismantle the pile.

After both teams found the primary and secondary transmitters, we carried on conversations among ourselves and waited for the 3rd team to show up. After waiting a while, we did contact WB6ODR via radio to ask his location. As he was some distance from the park, he decided to stop hunting.

It was an interesting hunt with the varying signals making it seem like we were close at times as we would get a good signal that would fade considerably when we moved just a block or two from that location.

You can see pictures of the hunt here:

<https://tinyurl.com/YARCFoxhuntJuly2020>

Due to coronavirus concerns, we did not go anywhere for socializing after the hunt.

Securing PowerPole Connectors

by Dan Romanchik, KB6NU

In preparation for this year's Field Day, I made a bunch of cables with PowerPole connectors to connect the solar panel, charge controller and batteries that I used. If you're not familiar with PowerPoles, you might want to check out this YouTube video (<https://www.youtube.com/watch?v=o31iuOcq-jo>). They're really great connectors, and have become the DC connector of choice for many hams.

When I make up PowerPole cables, I normally don't bother trying to secure the two halves together, especially if you're using some decently heavy gauge wire. They fit together pretty tightly, and don't come apart easily. Even so, I think securing them together is a good idea. You can buy a little roll pin to insert between the red and black housings that is supposed to prevent them from coming apart, but many folks complain that the pin has a tendency to fall out. This not only defeats the purpose, but could also damage your equipment.

Securing them is the right thing to do, though, and I recently came across some great suggestions on how to do this in the daily digest that I receive from the Elecraft-KX mailing list (<https://groups.io/g/Elecraft-KX>). Here are the best tips from the thread, Securing Anderson Power Poles (<https://groups.io/g/Elecraft-KX/topic/75060413>):

- Rudy K8SWD: You can thermally bond the red and black housings with a soldering iron like you are making little welds on both sides. Permanent (mostly) but it works better than the roll pins. Just clean the tip really good before soldering!
- Dave KØCDA: [Anderson] also make connectors that are thermally bonded together in pairs. They do NOT come apart.
- Don W3FPR: I use a drop of Super Glue on the junction of the plastic pieces. Warning – that glue grabs quickly, so slide the 2 pieces only enough to start the assembly, then apply the drop of glue and quickly finish sliding them together. I have never had ones prepared like that come apart, and I don't use roll pins. I will say one more thing – use only the genuine APPs. I have seen some knockoffs that do not mate well.
- Greg KC9NRO: Take a hot soldering iron. Wipe the tip with sponge. Run the tip down both side of APP bonding the black and red sides together. Clean soldering iron tip and apply some solder to tip. That's how I roll. Never comes apart.
- Mike AI4NS: PVC cement will soften the plastic enough to bond them together. You can also get plastic welding rods, such as Dainty Plastic Welding Rods (https://www.amazon.com/dp/B086HNQXM3/ref=cm_sw_r_cp_api_i_poR8Eb88N54P4). Chuck a rod in a Dremel and weld them together. I have made plastic boxes and panels using this method.
- Jack WD4E: Snip the cotton end off a Q-tip, cutting at an angle. Insert into hole made for roll pin, cut off excess, save remainder of Q-tip for next requirement.
- Troy K4JDA: 2.5 mm screws work well, stay in, and are easily removable.

I posted these suggestions to my blog (<https://KB6NU.com>) and got a few more great suggestions:

- Tom KB8UUZ: Fat tooth picks also work great. Jam it in, break it off.
- Bruce NØNHP: I use MEK (Methyl Ethyl Ketone) replacement to clean my circuit boards after soldering. A single drop of MEK on the junction between the two halves of the PowerPole shell will fuse them. It can be broken with a sharp tap but not accidentally. It will set and dry in seconds and should be applied after the shell pieces are put together.

I think these are all great suggestions. I think that I'm going to try the cotton swab method. While reading them, another thought occurred to me. I haven't tried this yet, but I'm thinking a little drop of hot glue on the roll-pin hole might work, too.

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Dan Romanchik, KB6NU, is the author of the KB6NU amateur radio blog (KB6NU.Com), the "No Nonsense" amateur radio license study guides (KB6NU.Com/study-guides/), and often appears on the ICQPodcast (icqpodcast.com). When he's not thinking up new ways to keep his PowerPoles together, he likes to teach ham radio classes and operate CW on the HF bands.

The Uncertain Future of Ham Radio: Software-defined radio and cheap hardware are shaking up a hobby long associated with engineering

by Julianne Pepitone
(From: [IEEE Spectrum](#), July 10, 2020)

Will the amateur airwaves fall silent? Since the dawn of radio, amateur operators—hams—have transmitted on tenaciously guarded slices of spectrum. Electronic engineering has benefited tremendously from their activity, from the level of the individual engineer to the entire field. But the rise of the Internet in the 1990s, with its ability to easily connect billions of people, captured the attention of many potential hams. Now, with time taking its toll on the ranks of operators, new technologies offer opportunities to revitalize amateur radio, even if in a form that previous generations might not recognize.

The [number of U.S. amateur licenses](#) has held at an anemic 1 percent annual growth for the past few years, with about 7,000 new licensees added every year for a total of 755,430 in 2018. The U.S. Federal Communications Commission doesn't track demographic data of operators, but anecdotally, white men in their 60s and 70s make up much of the population. As these baby boomers age out, the fear is that there are too few young people to sustain the hobby.

"It's the \$60,000 question: How do we get the kids involved?" says Howard Michel, former CEO of the [American Radio Relay League](#) (ARRL). (Since speaking with *IEEE Spectrum*, Michel has left the ARRL. A permanent replacement has not yet been appointed.)

This question of how to attract younger operators also reveals deep divides in the ham community about the future of amateur radio. Like any large population, ham enthusiasts are no monolith; their opinions and outlooks on the decades to come vary widely. And emerging digital technologies are exacerbating these divides: Some hams see them as the future of amateur radio, while others grouse that they are eviscerating some of the best things about it.

No matter where they land on these battle lines, however, everyone understands one fact. The world is changing; the amount of spectrum is not. And it will be hard to argue that spectrum reserved for amateur use and experimentation should not be sold off to commercial users if hardly any amateurs are taking advantage of it.

Before we look to the future, let's examine the current state of play. In the United States, the ARRL, as the national association for hams, is at the forefront, and with more than 160,000 members it is the largest group of radio amateurs in the world. The 106-year-old organization offers educational courses for hams; holds contests where operators compete on the basis of, say, making the most long-distance contacts in 48 hours; trains emergency communicators for disasters; lobbies to protect amateur radio's spectrum allocation; and more.

Michel led the ARRL between October 2018 and January 2020, and he fits easily the profile of the "average" American ham: The 66-year-old from Dartmouth, Mass., credits his career in electrical and computer engineering to an early interest in amateur radio. He received his call sign, WB2ITX, 50 years ago and has loved the hobby ever since.

"When our president goes around to speak to groups, he'll ask, 'How many people here are under 20 [years old]?' In a group of 100 people, he might get one raising their hand," Michel says.

ARRL does sponsor some child-centric activities. The group runs twice-annual [Kids Day](#) events, fosters [contacts with school clubs](#) across the country, and publishes resources for teachers to lead radio-centric [classroom activities](#). But Michel readily admits "we don't have the resources to go out to middle schools"—which are key for piquing children's interest.

Sustained interest is essential because potential hams must clear a particular barrier before they can take to the airwaves: a licensing exam. Licensing requirements vary—in the United States no license is required to listen to ham radio signals—but every country requires operators to demonstrate some technical knowledge and an understanding of the relevant regulations before they can get a registered call sign and begin transmitting.

For those younger people who *are* drawn to ham radio, up to those in their 30s and 40s, the primary motivating factor is different from that of their predecessors. With the Internet and social media services like WhatsApp and Facebook, they don't need a transceiver to talk with someone halfway around the world (a big attraction in the days before email and cheap long-distance phone calls). Instead, many are interested in the capacity for public service, such as providing communications in the wake of a disaster, or event comms for activities like city marathons.

"There's something about this post-9/11 group, having grown up with technology and having seen the impact of climate change," Michel says. "They see how fragile cellphone infrastructure can be. What we need to do is convince them there's more than getting licensed and putting a radio in your drawer and waiting for the end of the world."

New Frontiers

The future lies in operators like Dhruv Rebba (KC9ZJX), who won Amateur Radio Newsline's [2019 Young Ham of the Year](#) award. He's the 15-year-old son of immigrants from India and a sophomore at Normal Community High School in Illinois, where he also runs varsity cross-country and is active in the Future Business Leaders of America and robotics clubs. And he's most interested in using amateur radio bands to communicate with astronauts in space.

Rebba earned his technician class license when he was 9, after having visited the annual Dayton Hamvention with his father. (In the United States, there are currently three levels of amateur radio license, issued after completing a written exam for each—technician, general, and extra. Higher levels give operators access to more radio spectrum.)

"My dad had kind of just brought me along, but then I saw all the booths and the stalls and the Morse code, and I thought it was really cool," Rebba says. "It was something my friends weren't doing."

He joined the [Central Illinois Radio Club](#) of Bloomington, experimented with making radio contacts, participated in ARRL's annual Field Days, and volunteered at the communications booths at local races.

But then Rebba found a way to combine ham radio with his passion for space: He learned about the [Amateur Radio on the International Space Station](#) (ARISS) program, managed by an international consortium of amateur radio organizations, which allows students to apply to speak directly with crew members onboard the ISS. (There is also an automated digital transponder on the ISS that allows [hams to ping the station as it orbits](#).)

Rebba rallied his principal, science teacher, and classmates at Chiddix Junior High, and on 23 October 2017, they made contact with astronaut Joe Acaba (KE5DAR). For Rebba, who served as lead control operator, it was a crystallizing moment.

"The younger generation would be more interested in emergency communications and the space aspect, I think. We want to be making an impact," Rebba says. "The hobby aspect is great, but a lot of my friends would argue it's quite easy to talk to people overseas with texting and everything, so it's kind of lost its magic."

That statement might break the hearts of some of the more experienced hams recalling their tinkering time in their childhood basements. But some older operators welcome the change.

Take Bob Heil (K9EID), the famed sound engineer who created touring systems and audio equipment for acts including the Who, the Grateful Dead, and Peter Dinklage. His company [Heil Sound](#), in Fairview Heights, Ill., also manufactures amateur radio technology.

"I'd say wake up and smell the roses and see what ham radio is doing for emergencies!" Heil says cheerfully. "Dhruv and all of these kids are doing incredible things. They love that they can plug a kit the size of a cigar box into a computer and the screen becomes a ham radio.... It's all getting mixed together and it's wonderful."

But there are other hams who think that the amateur radio community needs to be much more actively courting change if it is to survive. Sterling Mann (N0SSC), himself a millennial at age 27, wrote on his blog that "[Millennials Are Killing Ham Radio](#)."

It's a clickbait title, Mann admits: His blog post focuses on the challenge of balancing support for the dominant, graying ham population while pulling in younger people too. "The target demographic of every single amateur radio show, podcast, club, media outlet, society, magazine, livestream, or otherwise, is not young people," he wrote. To capture the interest of young people, he urges that ham radio give up its century-long focus on person-to-person contacts in favor of activities where human to machine, or machine to machine, communication is the focus.

These differing interests are manifesting in something of an analog-to-digital technological divide. As [Spectrum reported in July 2019](#), one of the key debates in ham radio is its main function in the future: Is it a social hobby? A utility to deliver data traffic? And who gets to decide?

Those questions have no definitive or immediate answers, but they cut to the core of the future of ham radio. Loring Kutchins, president of the [Amateur Radio Safety Foundation, Inc.](#) (ARSA)—which funds and guides the "global radio email" system Winlink—says the divide between hobbyists and utilitarians seems to come down to age.

"Younger people who have come along tend to see amateur radio as a service, as it's defined by FCC rules, which outline the purpose of amateur radio—especially as it relates to emergency operations," Kutchins (W3QA) told *Spectrum* last year.

Kutchins, 68, expanded on the theme in a recent interview: “The people of my era will be gone—the people who got into it when it was magic to tune into Radio Moscow. But Grandpa’s ham radio set isn’t that big a deal compared to today’s technology. That doesn’t have to be sad. That’s normal.”

Gramps’ radios are certainly still around, however. “Ham radio is really a social hobby, or it has been a very social hobby—the rag-chewing has historically been the big part of it,” says Martin F. Jue (K5FLU), founder of radio accessories maker MFJ Enterprises, in Starkville, Miss. “Here in Mississippi, you get to 5 or 6 o’ clock and you have a big network going on and on—some of them are half-drunk chattin’ with you. It’s a social group, and they won’t even talk to you unless you’re in the group.”

But Jue, 76, notes the ham radio space has fragmented significantly beyond rag-chewing and DXing (making very long-distance contacts), and he credits the shift to digital. That’s where MFJ has moved with its antenna-heavy catalog of products.

“Ham radio is connected to the Internet now, where with a simple inexpensive handheld walkie-talkie and through the repeater systems connected to the Internet, you’re set to go,” he says. “You don’t need a HF [high-frequency] radio with a huge antenna to talk to people anywhere in the world.”

To that end, last year MFJ unveiled the [RigPi Station Server](#): a control system made up of a Raspberry Pi paired with open-source software that allows operators to control radios remotely from their iPhones or Web browser.

“Some folks can’t put up an antenna, but that doesn’t matter anymore because they can use somebody else’s radio through these RigPis,” Jue says.

He’s careful to note the RigPi concept isn’t plug and play—“you still need to know something about networking, how to open up a port”—but he sees the space evolving along similar lines.

“It’s all going more and more toward digital modes,” Jue says. “In terms of equipment I think it’ll all be digital at some point, right at the antenna all the way until it becomes audio.”

The Signal From Overseas

Outside the United States, there are some notable bright spots, according to Dave Sumner (K1ZZ), secretary of the [International Amateur Radio Union \(IARU\)](#). This collective of national amateur radio associations around the globe represents hams’ interests to the [International Telecommunication Union \(ITU\)](#), a specialized United Nations agency that allocates and manages spectrum. In fact, in China, Indonesia, and Thailand, amateur radio is positively booming, Sumner says.

China’s advancing technology and growing middle class, with disposable income, has led to a “dramatic” increase in operators, Sumner says. Indonesia is subject to natural disasters as an island nation, spurring interest in emergency communication, and its president is a licensed operator. Trends in Thailand are less clear, Sumner says, but he believes here, too, that a desire to build community response teams is driving curiosity about ham radio.

“So,” Sumner says, “you have to be careful not to subscribe to the notion that it’s all collapsing everywhere.”

China is also changing the game in other ways, putting cheap radios on the market. A few years ago, an entry-level handheld UHF/VHF radio cost around US \$100. Now, thanks to Chinese manufacturers like Baofeng, you can get one for under \$25. HF radios are changing, too, with the rise of software-defined radio.

“It’s the low-cost radios that have changed ham radio and the future thereof, and will continue to do so,” says Jeff Crispino, CEO of [Nooelec](#), a company in Wheatfield, N.Y., that makes test equipment and software-defined radios, where demodulating a signal is done in code, not hardwired electronics. “SDR was originally primarily for military operations because they were the only ones who could afford it, but over the past 10 years, this stuff has trickled down to become \$20if you want.” Activities like plane and boat tracking, and weather satellite communication, were “unheard of with analog” but are made much easier with SDR equipment, Crispino says.

Nooelec often hears from customers about how they're leveraging the company's products. For example, about 120 members from the group [Space Australia](#) to collect data from the Milky Way as a community project. They are using an SDR and a low-noise amplifier from Nooelec with a homemade horn antenna to detect the radio signal from interstellar clouds of hydrogen gas.

"We will develop products from that feedback loop—like for hydrogen line detection, we've developed accessories for that so you can tap into astronomical events with a \$20 device and a \$30 accessory," Crispino says.

Looking ahead, the Nooelec team has been talking about how to "flatten the learning curve" and lower the bar to entry, so that the average user—not only the technically adept—can explore and develop their own novel projects within the world of ham radio.

"It is an increasingly fragmented space," Crispino says. "But I don't think that has negative connotations. When you can pull in totally unique perspectives, you get unique applications. We certainly haven't thought of it all yet."

The ham universe is affected by the world around it—by culture, by technology, by climate change, by the emergence of a new generation. And amateur radio enthusiasts are a varied and vibrant community of millions of operators, new and experienced and old and young, into robotics or chatting or contesting or emergency communications, excited or nervous or pessimistic or upbeat about what ham radio will look like decades from now.

As Michel, the former ARRL CEO, puts it: "Every ham has [their] own perspective. What we've learned over the hundred-plus years is that there will always be these battles—AM modulation versus single-sideband modulation, whatever it may be. The technology evolves. And the marketplace will follow where the interests lie."

About the Author

[Julianne Pepitone](#) is a freelance technology, science, and business journalist and a frequent contributor to *IEEE Spectrum*. Her work has appeared in print, online, and on television outlets such as *Popular Mechanics*, CNN, and NBC News.



For Sale
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Telephone: 928.848.7905

| Item: | Asking: |
|---|-------------------|
| Icom IC-7000 transceiver — with the NIB LDG Electronics IT-100 autotuner, NIB Samlex 30 amp switching power supply, remote cables and RT systems software. | \$1000 |
| Astron power supply | Make offer |
| MFJ power supply — with 300 watt dummy load | Make offer |



Setting Up for Field Day, June 27, 2020



W7YRC 2M FM Net — 147.260 MHz, +,103.5 Hz pl — Wed., 1900 MST

Note: NCS = Net Control Station

| Call | Name | 06/24/20 | 07/01/20 | 07/08/20 | 07/15/20 |
|--------|---------|----------|----------|----------|----------|
| K6VVR | Pete | X | x | x | x |
| KF7FPD | Jerry | X | x | x | x |
| KF7INF | Dennis | X | | | x |
| KF7PQV | Dan | | | | x |
| KG6AY | Art | X | | | x |
| W7HAM | Ralph | X | x | x | x |
| WA6AQK | Ken | X | x | x | x |
| WN7E | Tom | | x | x | x |
| KG7EWD | Patrick | X | x | x | x |
| WA6FBA | Robert | X | | x | |
| K7LMJ | Mike | X | x | x | |
| W7WWB | Ron | | x | x | |
| KJ7WED | Bob | | | x | x |
| N7IEP | Mike | NCS | x | x | x |
| KT7P | John | X | | x | NCS |
| WA6SCW | Pat | | | | x |
| K7PRS | John | | | x | |
| NO1D | Doug | X | | x | |
| WG7W | Bill | X | NCS | x | x |
| KG7SDY | Stephen | X | x | | |
| KF2TM | Arnott | X | | x | |
| KA1SQW | Cathy | X | x | x | |
| KA9CLD | Mike | | x | | |
| KB5FIO | James | | | | |
| WQ6V | Larry | | | x | |
| KJ6KMK | Kathy | | | NCS | |
| KJ7NWO | Dan | | | x | |
| KC4UVA | Rick | | | x | x |
| KE6PRM | Hans | | | x | |
| K6PSR | Tony | | | | x |
| KF6DNY | JUERGEN | | | | x |

Breakfast and Lunch Gatherings

There are a number of lunch and breakfast gatherings in the area that are open to all radio amateurs and interested persons. Please let us know of any updates or corrections at info@w7yrc.org.

Third Thursday of the Month – **YARC** holds an informal **breakfast** gathering at the **BackBurner** Restaurant at 0800 MST. The restaurant is at 8400 Long Mesa Drive in Prescott Valley. Contact Don Bauer WB7TPH or Jeff Hanna WB7RFY.

Second Tuesday of the Month – **Quarter Century Wireless Association (QCWA) brunch** gathering, 1030 MST to 1230 MST at the **Golden Corral** Restaurant in Frontier Village in Prescott, off Highway 69. You do not have to be a QCWA member to attend.

Every Wednesday – **Breakfast** at 0700 MST at the **Manzanita Grill** at the Antelope Hills Golf Course, near the Prescott airport.

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|---------------------|-------------------|-----------|--|
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| Vice President | John Snedden | KT7P | vice.president@w7yrc.org |
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| Editor | Loren Singh | AE7CG | ae7cg@arrl.net |
| Webmaster | Randy Dashiell | W6TYV | webmaster@w7yrc.org |

| Yavapai Amateur Radio Club — W7YRC Club Station Access List — Effective March 4, 2020 | | | | |
|---|--------|------------|-----------------|--|
| Permanent Station Access (defined by YARC role) — | | | | |
| Name: | Call: | Lic. Class | Notes: | Telephone: |
| Bill Noe | WG7W | E | YARC President | 928.710.6925 – Do not contact for access |
| Frank Bender | K8FB | E | Station Manager | 928.379.5575 – OK to contact for access |
| Pete Morrison | K6VVR | E | W7YRC Trustee | 928.899.8555 - Do not contact for access |
| Bud Semon | N7CW | E | ARES/RACES DEC | 928.899.7400 - Do not contact for access |
| Rob Redford | KG7LMI | G | ARES/RACES EC | 623.252.3980 - Do not contact for access |
| Jo Schultheiss | KF7WOT | G | ARES/RACES EC | 928.925.0956 - Do not contact for access |
| Jim Zimmerman | N6KZ | E | Elmer Group | 928.713.0542 - OK to contact for access |
| Art Protas | KG6AY | E | Elmer Group | 928.227.2954 - OK to contact for access |
| Doug Freeman | KV8TD | E | N7GMH Trustee | 928.759.0958 - Do not contact for access |
| Building Access for Other Reasons (includes station access) — | | | | |
| Donald Bauer | WB7TPH | E | VE Chair | 928.775.4690 - Do not contact for access |
| Kathy Laing | KJ6KMK | E | License Classes | 928.778.2526 - Do not contact for access |
| Rotating Access (changes every July 1 st) This category is limited and consists of volunteer members — | | | | |
| Mike Belanger | W1DGL | E | Rotating Member | 520.831.4893 - OK to contact for access |
| Jim Custer | WØHJ | E | Rotating Member | 507.720.4053 - OK to contact for access |
| Tony Jackson | K6PSR | G | Rotating Member | 562.644.0528 - OK to contact for access |
| Note to YARC Members — For station access, first try to contact the Rotating Access members. If you are not able to contact the Rotating Access members, then try to contact the other “OK to contact for access” members. | | | | |