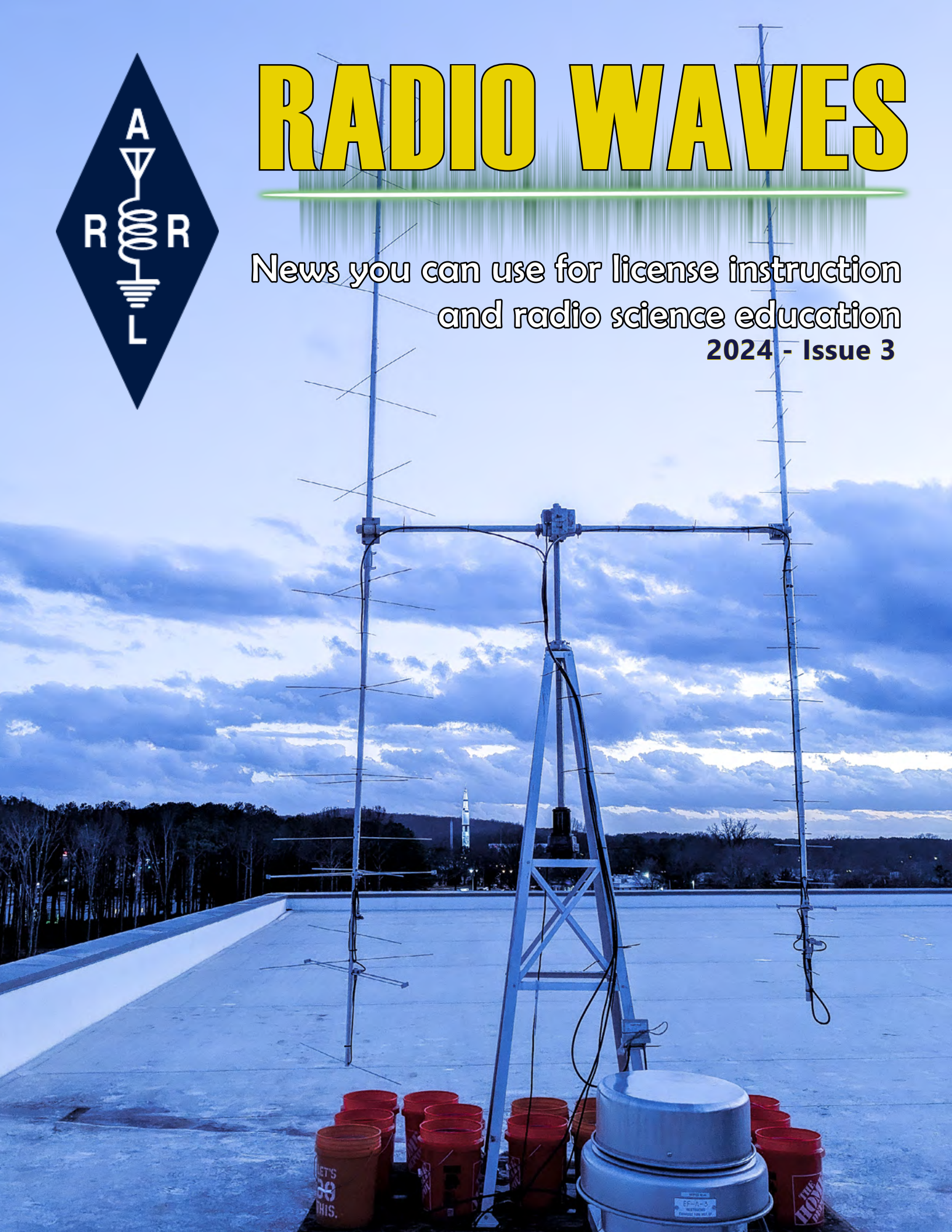
# RADIO WAVES

News you can use for license instruction and radio science education

2024 - Issue 3



# In this issue...



Cover photo submitted by Chris Brown, W9SBS. Find his story on page 6.

# Teacher Spotlight: Megan Tucker, KQ4MAM

**Interviewed by Eliza Croarkin, KC1TAP**
**Submitted 2024**


Megan Tucker teaches Kindergarten — 5th grade at Hillsboro Charter Academy (HCA). She is the Dean of Curriculum, the STEAM Specialist, the Gifted Specialist, the Instructional Facilitator of Technology, and she is in charge of Professional Development.

**Did you ever hear of amateur radio before attending Teachers Institute 1 (TI-1)? How did you find out about the application?**

Yes, I heard you could apply for a radio contact with the International Space Station [ISS] as well as high-altitude ballooning. Still, I had no idea about the breadth and depth of amateur radio and the natural applications in science. At the Future of Education Technology Conference (FETC), I met Steve Goodgame, K5ATA, the head of the ARRL Teachers Institute (TI) program. My colleagues knew speaking with him would help me reach my goal to talk to the space station.

**Ham radio is a multifaceted hobby. Which aspects of ham radio were most interesting to you personally and professionally?**

I personally enjoy the social aspect of ham radio, jumping on the repeater, listening to the chatter, and joining in. I especially like being a part of the nets. Another thing that I love doing with my class is capturing pictures during SSTV events, as well as listening to ARISS contacts using my Arrow antenna that I got during TI-1. As soon as my scholars see me approach the playground with my purple antenna, I'm like the "pied piper," and they come running to me from all over the playground.

**How did what you learned in TI-1 impact your teaching and school as a whole?**

My learning from TI-1 brought new STEAM ideas and opportunities, practical applications of wireless technology, and an enthusiasm for integrating amateur radio into education. It formed a tangible connection to harder physical science concepts like wave propagation, circuitry, and electronics. It also gave me more ideas for cross-curricular integration with geography (satellite tracking), math (calculating resistance, frequencies, and trajectories), and even language arts (communicating effectively using radio). It elevated our STEAM curriculum by bringing new resources and supplies, like handheld radios, Arrow antennas, satellite tracking software, resistors, multimeters, etc. Finally, it helped to showcase and ignite innovation. Introducing amateur radio and wireless technology concepts to HCA created a unique program that attracted

scholars and peers to want to know more about ham radio. We created a club where we learn the phonetic alphabet, explore circuitry, make radio calls on the local repeater with a mag mount antenna on the top of our playground equipment and a handheld radio, soldering jitterbugs, and my favorite involving resistors using a key to decode the resistance value and testing the resistance with multimeters! It's so much fun!

**You were invited to the first iteration of our newest TI — TI: Space. How did the TI: Space lectures and activities add to your previous understanding of radio technology?**

The lectures and activities in TI: Space added depth by building on my previous knowledge learned in TI-1 of basic electronics and wireless technology to the real-world application of these concepts in activities like the Radio JOVE antenna build or the engineering and launch of the pico balloons. We also did some basic soldering in TI-1, but in TI: Space, the soldering leveled up to be very specific for a very tiny space. One of my favorite activities was the city-wide fox hunt. It really helped to solidify the concept of why it is important to be able to locate a fox in a larger geographic area. It was awesome that we were able to listen to the Amateur Radio on the International Space Station (ARISS) contact using our Arrow antenna and handheld radio. We used this setup in the first TI to capture an SSTV image, which was amazing. By following the same steps for tuning into the right channel,


you can also hear the astronauts responding to questions asked by students. It is all about the timing and the programming output of the ISS.

Returning to Connecticut gave me more confidence and understanding when experiencing activities related to wireless technology. We were a small group with a common interest in space and used amateur radio to learn more about it. I met a core group of peers I still interface with frequently as mentors on my journey in ham radio. I loved that it was a select group because we really were able to geek out on specific topics.

***"My learning from TI-1 ...helped to showcase and ignite innovation." - Megan Tucker***



**You have been able to inspire other colleagues to take an interest in ARRL and our TI professional development. How did you do it?**

The first inspiration would be through "street cred" by bringing ARRL concepts to life in my classroom. I integrated amateur radio and wireless technology concepts into my curriculum, providing hands-on, real-world learning experiences. I also took pictures and posted them on social media while participating in engaging activities like satellite tracking, soldering, or radio communications, capturing student and faculty attention. When people see my big purple Arrow antenna, they know excitement is coming. My school's focus on STEAM and project-based learning gave me a natural platform to incorporate lessons from ARRL into the "HCA Way." Because I went with two other teachers, one of them a librarian, it inspired others to want to know what we were doing.

The second inspiration is using social media to share my knowledge with my colleagues. I created posts to get teachers excited about my TI training experiences and shared photos of me using equipment and lessons from TI-1 in my classroom. I also created and facilitated workshops at conferences to show how using ARRL-inspired lessons could enhance learning. I did highlight reels of all the amazing takeaways from TI-1, which encouraged my colleagues to want to apply when they saw the tangible benefits for students and teachers. It was an easy sell for my peers to apply for TI in 2024 because I promoted the benefits of the ARRL TI-1 on my teacher page and our school's Facebook pages.

Most recently, I invited ARRL to be a part of my presentation at the International Technology and Engineering Educators Association. It went extremely well, and I anticipate more growth for the ARRL TI program because it naturally lends itself to inspiring ingenuity and innovation. Finally, I am super excited about my ARISS contact coming up in mid-December. My scholars have been learning about the ISS and ham radio, and I can't wait for them to connect during the ARISS event.

How have your students used their licenses after passing their FCC exam?

At the end of November, I had my first student ever take the FCC exam for Technician license, and he passed (*above*). He is 10 years old and in 5th grade! I am so excited to see what he will do with his license, and it is all possible because of connections with the TI! I know one thing: now that we have a newly licensed ham at HCA, the motivation is real for the other scholars. I have at least three of them currently studying for the Technician test!

We both know how beneficial radio can be for hands-on, student-centered learning across grade levels. Are there any challenges you have experienced or can foresee about bringing radio into the classroom?

The biggest challenge that any educator faces is the lack of time. A teacher must be creative if the class is going to incorporate cutting-edge technology/knowledge of an unconventional topic, like amateur radio, and combine that with the standards of learning for any grade level. It takes some forward thinking and innovation. Our greatest strength is being prepared to show how our lesson objectives of wireless technology connect to school and state standards when asked.

Invite administration and teachers into your classroom to see what you are doing, offer to have their class learn with yours, and show them the spark so you can help spread the fire of amateur radio at your school, in your community, and beyond! When people see the excitement and learning, they will want to know how they can join the fun! Promoting positive perseverance in teaching and reaching students is the spark that lights the fire of learning for everyone!

# Jordan and Henry: Radio Begins a Beautiful Friendship

**Jordan Makower, WA2BRV, and Henry Seidner, WA2ROA**
**Interviewed by Eliza Croarkin, KC1TAP**
**Submitted 2024**

How did you and Henry Seidner, WA2ROA, meet in 1970?

Jordan: On my first day on the job as a Science science Teacher teacher for Pearl River High School (Rockland County, NY), a boy came up to me, while I was supervising a student lunchroom, and told me that his school station, WB2ABJ, needed a trustee. He asked me if I would do that. The boy was Henry Seidner, I had never met him before or was even aware that the school had an amateur radio station!

I told him I would do it, but he'd have to teach me what I would need to know to pass the FCC test and get a license. He agreed and gave up his lunch hours over the next several months to teach me Morse code and asked me to join his friends after school in their licensing study sessions. He then found a scientist at Lederle Laboratories, a nearby pharmaceutical company, to administer the FCC Novice test.

How did you and Jordan Makower, WA2BRV, meet in 1970?

Henry: In 1970, I was 14 years old attending Pearl River High School in Pearl River, New York. Already a licensed ham, I wanted to reactivate our high school club station, WB2ABJ. We needed a licensed "adult" trustee for the station. I approached Jordan during my lunch hour to ask if he would consider becoming our trustee, letting him know it would first require a ham radio license. Jordan was very willing to do this. We began working together, with me spending many hours teaching Jordan all about ham radio, Morse code, and what would be required to initially get his Novice license. Jordan was a very enthusiastic and quick learner. A few months later, Jordan became WA2BRV, and we had our trustee.

What made you fall in love with ham radio?

Jordan: I had been interested in science since I was about 8 years old. On my own, I investigated magnetism, electricity, chemistry, physics, and geology. As a student in high school, I bought electronic parts and built several of the projects shown in Popular Electronics, a magazine at that time. I saw ads in that magazine about getting a commercial radio license and amateur radio, but the size of the transmitters shown seemed scary. I thought I wouldn't be able to attempt such a project.

Several years later, a neighbor had a short-wave receiver and called us in to listen to the foreign stations he was receiving. Years after that, in another state, another neighbor showed me the SWL cards he received from the stations he wrote to. That year, my wife bought me a shortwave radio kit and I began listening in, too.
As a person who already loved technology, I learned how to use minimal equipment to get the best reception. It was the beginning of a great hobby.

What made you fall in love with ham radio?

Henry: When I was 10 years old, I discovered shortwave radio. It was fascinating to receive radio stations from all over the world — BBC, Radio Moscow, Radio Prague, etc. I collected QSL cards and different information offered by the shortwave stations. Eventually, I discovered ham radio. The concept of being able to talk to the people all over the world from my bedroom was extremely exciting. I initially received my Novice license and then quickly upgraded to General and Advanced class. I remember having an ARRL map of the world over my station, on which I placed pins for each country I worked. In my mind, the world became a much smaller place. The whole globe was the size of my map! Over the years, I have made many close and dear friends that I initially met on the radio. I am still in regular contact with these friends, including Jordan.

What was the biggest change to the club or the hobby by the time you retired 28 years later?

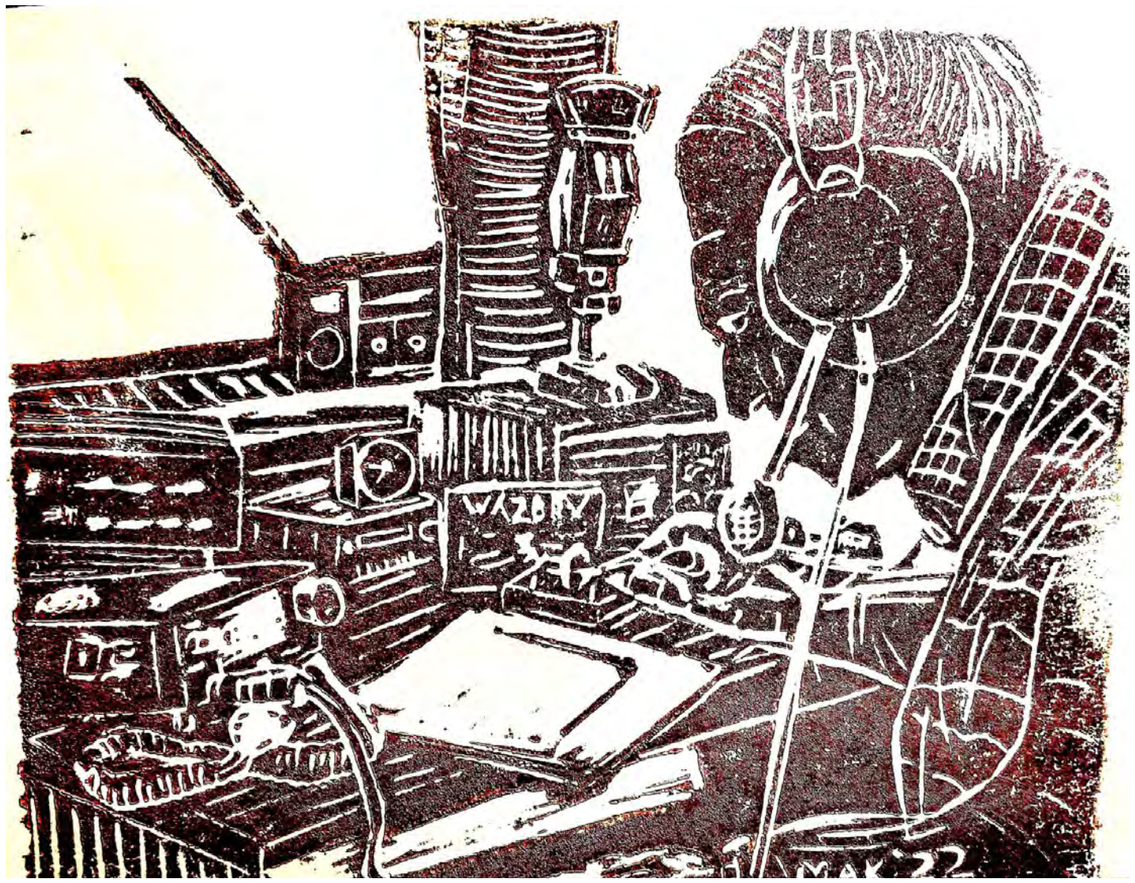
Jordan: The biggest change/challenge to the club was that the school principal didn't know (or care) about the club and kept moving us further from our antenna. This required a few hundred feet of coaxial cable, which resulted in losing power to contact distant stations. At the same time, he wanted me to display the QSL cards of the stations we reached and scolded me, saying that he wanted to see newer cards when we displayed the countries we had reached.

One change to the hobby was that as technology advanced, kids couldn't afford to build their own radios and would have to buy an expensive rig to use at home. I lent kids the club's radios to use on their vacations and weekends. Even the repairs became complicated; rather than buy a replacement resistor, capacitor, or tube, a person would have to send a modular component away to be replaced. Heathkit, previously a source for inexpensive radios, was teetering on the precipice of insolvency. We began looking for older, used radios for the kids to use. When I retired (due to illness), no one volunteered to take my place as trustee, and no one in the community stepped forward to do that job either.

A few photos from the school radio club, WB2ABJ, in 1974.

### What trend in popularity have you seen at your club over the years?

Henry: I'm fortunate to have a very active club in Florida, the Boca Raton Amateur Radio Association (BRARA). I serve as vice president, chair of the New Member & Welcoming Committee, and director on the board. We have a fully equipped station from 160 to satellite. We have weekly breakfasts, monthly lunches, and monthly meetings in person and on Zoom. Unfortunately, I am seeing a "graying" in our membership, with few younger people coming into the hobby.



A linoleum block print made by Jordan Makower, WA2BRV.

### What has Henry taught you?

Jordan: Henry has kept in contact with me for more than 50 years since we first met. I learned how to be a net control operator for my area by watching him handle messaging by Morse code and voice. I joined the Army Military Auxiliary Radio System (and was an active member for more than 25 years). I saw the ease with which Henry conversed with people from all over the world; he was always kind and could find common ground with anyone to spread goodwill.

### What has Jordan taught you?

Henry: Jordan has many hobbies and interests. In addition to ham radio, Jordan is an artist (*above*) and astronomer, just to name just a few. He has shared great insight and information about those interests, which at times I needed and appreciated. Most importantly, and for more than 50 years, even though we live on opposite sides of the country, Jordan has taught me the meaning and value of a true, lasting friendship.

# Ham Radio Soaring at ASCTE

Chris Brown, W9SBS
Submitted 2024

The Alabama School of Cyber Technology and Engineering (ASCTE), a statewide residential magnet high school in Huntsville, last checked in with Radio Waves before our ARISS contact on February 1, 2024. Since then, with the help of ARRL and the Huntsville Amateur Radio Club (HARC), we have continued to soar.

Participating in the ARISS program and making a live contact with an astronaut was undoubtedly the highlight of the year at ASCTE. HARC members and our AMSAT Ambassador were instrumental in providing antennas, a rotor, and VHF/UHF radios to support the contact. The program was a rousing success as our students spoke with NASA astronaut Jasmin Moghbeli aboard the space station. The event was covered by local news and was live streamed on YouTube, giving fantastic exposure to ASCTE and amateur radio. Community interest is so great that ASCTE is giving a presentation about ARISS at the GigaParts Ham Radio Day event.

Shortly after our ARISS contact, ASCTE participated in ARRL's School Club Roundup contest in February. We amassed 1,920 points, by far our best score yet, with DX contacts in Europe and Latin America and many contacts throughout the US. One of the best moments of the contest was when an operator in North Carolina recognized our call sign because he had listened in on our ARISS contact.

At the end of February, the Marshall Space Flight Center Amateur Radio Club, with support from HARC, offered our first-ever on-site amateur radio license testing session. We had a dozen students test for a license, including three upgrade tests, plus one adult who joined us to test for her General license. Most of the group passed their tests, and we now have 12 licensed students in the club, including two General and one Extra.

Finally, through the generosity of ARRL, our club gained new equipment, including a Geochron Atlas 4k display system and additional fox-hunting transmitters and antennas. Students love conducting fox hunts, and these highly visible activities are great at attracting new students to join the club. The Atlas 4k display has also been a nice addition to our equipment suite, facilitating several educational activities like testing maximum usable frequency.

With the steadfast support of ARRL and the local amateur radio community, ham radio is reaching new heights at ASCTE. It is absolutely one of the most talked-about activities on campus. The next generation of radio enthusiasts is joining the hobby and being developed right now, thanks to your support.

# As seen in this issue of *Radio Waves*...

Our 2025 Teachers Institute (TI) Applications are live! TI-1 is open to all US educators, and it is the only prerequisite for any of the 2025 TI Electives offered. Please visit our TI webpage to learn more about the sessions offered and complete an application if interested.

A big thank you to all those who made this edition possible.

*Radio Waves* aims to showcase how educators and license class instructors are getting their students and local communities involved in ham radio. These efforts deserve to be documented and shared. The contributors are teachers and instructors who are currently bringing amateur radio into the classrooms and beyond, just like you.

Many instructors and teachers made mention of materials and resources created by ARRL. Click any bullet to learn more about the item.

- *ARRL Teachers Institute*
- *ARRL Scholarships*
- *ARRL Instructor Resources*
- *ARRL Teaching Lesson Plans*

Add Your Voice: Write a short narrative about a specific teaching struggle, success, or learning breakthrough. We are seeking submissions of 300 – 500 words, and you are highly encouraged to send any pictures of yourself, your students, and the activities you introduced. Submissions can be sent to our email: radiowaves@arrl.org. Please use our Model Release Form for photos. Explore our previous publications.

By submitting writing or photographs with completed model release forms, you grant ARRL permission to edit and use these materials for any publication purpose.