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Radio Waves

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In This Issue:

Promoting Amateur Radio at the 2025 Physics and Astronomy Congress

by Ron Kumon, PhD, K8DTJ, and Ruth Willet, KM4LAO

More than 1,000 undergraduate students, faculty, and other professionals gathered in Denver, Colorado, from October 30 to November 1, 2025, for the 2025 Physics and Astronomy Congress (SPSCon). This triennial event, which is sponsored by the Society of Physics Students (SPS), the Sigma Pi Sigma Physics Honor Society, and the American Institute of Physics, is the largest meeting dedicated to undergraduate physics and astronomy education in the country. For the first time, the meeting featured a "Congress on the Air" special event station, KØP, which was organized and operated by Sigma Pi Sigma member and Penn State University student Ruth Willet, KM4LAO, and SPS President and Kettering University Professor Ron Kumon, PhD, K8DTJ. Our goal for the weekend was to connect physics and astronomy students with hands-on radio technology, cultivate an interest in amateur radio, and inspire college students to pursue an amateur license.

The event station was operated on Friday, October 31, and Saturday, November 1, coinciding with networking sessions for students. Our team constructed a portable HF station in front

Ruth Willet, KM4LAO, and East Tennessee State University Professor Richard Prince, PhD, KR4GTA, talk to students about amateur radio while making contacts at special event station KØP. [Ashauni Lennox, photo]

Ruth, KM4LAO, talks to students about amateur radio at special event station KØP. A temporary mast with a wire antenna is shown at left. [Ashauni Lennox, photo]

of the Sheraton Denver Downtown, consisting of an Icom IC-7000 transceiver, an LDG Electronics AT-200ProII autotuner borrowed from the Penn State Amateur Radio Club, a Bioenno battery, and a tri-band SOTABEAMS antenna and mast. Attendees had the opportunity to see the station and get on the air. While Ruth and Ron organized the station, several other newly licensed attendees at SPSCon volunteered their time to help run the station and make their first contacts. During 2 hours of operation, we were able to make seven contacts from six states and talked to more than 40 students.

Creating The Leffell School Space Engineering Program

by Raz Idan, KE2FEB

Like a lot of 5-year-olds, I loved space – the vastness, the mystery, and of course the pretty pictures. I never grew out of it, and I ultimately decided to study physics and space systems engineering. Now, I get to inspire that same sense of wonder by teaching the next generation of engineers at The Leffell School, a K-12 independent Jewish day school in Hartsdale, New York.

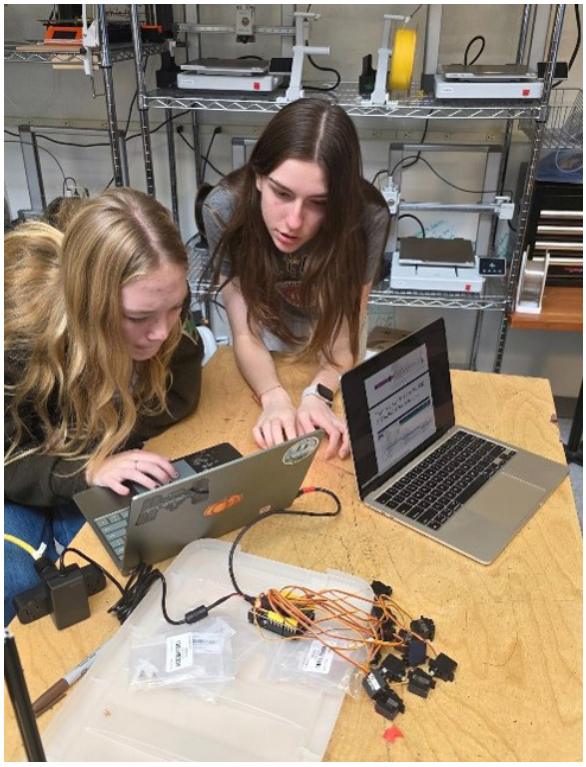
Last year, a discussion with a group of engineering students led me to a decision: We are going to space, or at least the edge of it. We decided to launch a high-altitude balloon, with the aim of reaching 100,000 feet. I quickly learned that in order to track the balloon and transmit a beacon, I needed to be a licensed amateur radio operator, so I passed my Technician license exam and we got to work on the high-altitude balloon's payload box.

The entire Leffell School community got involved – from 5-year-olds all the way up to teachers and parents – by submitting artwork to be placed in the payload and soar to the stratosphere. I believe art provides an approachable and meaningful way to connect the wider school community to this engineering project.

Five students led the design and fabrication of the payload box, working in collaboration with the Environmental Science class to address specific research questions related to atmospheric conditions. The payload included on-board sensors for monitoring temperature, pressure, ozone, and CO_2/particulate, enabling real-time data collection throughout the flight.

When more students joined this program, what was initially a high-altitude balloon initiative expanded to become The Leffell School Space Engineering elective, a course for 10th-, 11th-, and 12th-grade engineering students focused on space systems, orbital mechanics, radio communication, and hands-on engineering design.

Students divided into teams and researched, designed, and built projects related to space exploration and



Students from The Leffell School Space Engineering Program work together to code and test the servo motors for the ISS Mimic. [Raz Idan, KE2FEB, photo]

amateur radio. Current student projects include modifying a recovered Graw DFM-17 radiosonde for future balloon launches, building and improving the AMSAT CubeSat Simulator, and constructing the ISS Mimic, a scale model of the International Space Station.

Leffell School Space Engineering Program students assemble the AMSAT CubeSatSim. [Raz Idan, KE2FEB, photo]

We successfully launched and recovered our high-altitude balloon on May 12, 2026. On launch day, students split into four dedicated teams: Payload, Inflation, Tracking, and Documentation. Thanks to their seamless teamwork, the entire operation was a resounding success. The flight began in Hudson, New York, and concluded near Hartford, Connecticut, after reaching a maximum altitude of 90,799 feet! In addition to scientific instruments, the payload carried seven pieces of art created by members of The Leffell School community as part of our "Art at the Edge of Space" community competition.

In addition to working on these projects, some students studied for and received their own amateur radio licenses, and thus The Leffell School Radio Club, W2LFL, was born. Students got to build their own Yagi antennas, receive telemetry and slow-scan television signals from satellites in space, participate in a foxhunt, and get on the air. It was clear how excited the students were when they heard those first "beeps" coming down from space!

I believe that this challenging, hands-on, project-based curriculum will show students that even the most ambitious goals are within reach. Space can feel distant and inaccessible, especially to high school students, but amateur radio and hands-on engineering have a way of changing that perspective. When students build systems with their own hands, communicate through satellites overhead, and work through real engineering challenges, they begin to see themselves as active contributors rather than just observers. My hope is that they carry that mindset forward, not only in space engineering, but in whatever challenges they choose to pursue.

Raz Idan, KE2FEB (front), and students from The Leffell School Space Engineering Program use their homebrewed Yagi antennas to receive slow-scan television images from the ISS. [Raz Idan, KE2FEB, photo]

Zoom Sessions for ARRL Teachers

by Drew Mortensen, AC3DS

Over the past few years, thanks in part to ARRL's Teachers Institute on Wireless Technology (TI), there is a growing number of educators who are actively using radio as a means to engage students in STEM education. Now, once a month, teachers who have participated in the TI program will have an opportunity to come together virtually to share their experiences and discuss the topics that matter to them. If you are a teacher who uses radio in your classroom – public, private, homeschool, virtual, or in-person – we encourage you to join us!

The video meeting typically happens on the second Wednesday of each month, starting at 8 PM ET. There are no fixed agendas, no lengthy lectures, and no requirements of any sort – show up, ask questions, do some show-and-tell, talk about what you want, and leave when it suits you. The fine folks in ARRL's Education Department will have some giveaways, update you on upcoming teacher-related events, and provide insight and assistance as needed. Come hang out with us and learn about the fun things that your colleagues are up to!

If you are interested in participating, check out the ARRL Teacher's Institute Discord server for more information.

Upcoming Meetings

- July 8, 2026
- August 12, 2026
- September 9, 2026
- October 14, 2026
- November 11, 2026
- December 9, 2026
- January 13, 2027
- February 10, 2027
- March 10, 2027

Building the Future of Ham Radio in Sarasota, Florida

by George Becht, N2SQ

In 2009, when my son was a freshman at the Sarasota Military Academy (SMA), Headmaster and SMA co-founder Dan Kennedy asked if I could start an amateur radio club at the school. I said I would try, but I had no idea where to start – I was employed by Verizon at the time and worked the evening shift, so the only time I could run the club was during the school's lunch hour.

We organized the club and received the call sign W4SMA. We did not receive funding from the school, so we were dependent on donations of money and equipment. One of the club's first supporters was Dave Brandenburg, K5RQ. Through his generous donation, we bought a three-element SteppIR antenna and rotor, which we installed on a tower with the help of Dan Marquis of Central Florida Tower. Now we were officially on the air.

Over the years, the club grew, and we changed meeting times as my schedule at Verizon changed. When I retired in 2014, I could finally devote more time to the program. The cadets were mic shy at first, but as time went on they became more eager to operate. We worked the world. Many students, faculty, and parents received their license. Unfortunately, however, we later had to remove our antenna tower, and I was forced to put the club on hiatus after 8 years of operating.

I had hope that the program would be restarted – and, eventually, it was. In 2023, John Geimer, K4GEI, asked if I would help him reboot the school's amateur radio program. The new program is bigger and better than I could have imagined. We call it Radio 1, and it is an accredited class. We offer online testing several times a semester with the help of the N1UVO VE team, which has made it very convenient to test and license students.

Meanwhile, at our middle school, SMA Prep, science teacher Dawn Sudbury, KR4HKP, was studying for her ham radio license – her grandfather was a ham, so she was familiar with it. Dawn attended an ARRL Teachers Institute T1 class in 2025 and passed her Technician license exam there. After this experience, she wanted to add amateur radio to her school's STEM club. Upon finding out what she was planning, I offered to help.

Dawn invited me to speak at one of the STEM club's after-school sessions. The presentation was well received, so we moved ahead with our plan to incorporate amateur radio into the school. We organized a radio club and attained the call sign WA4SMA. Because some students are unable to attend the after-school STEM club, we are planning to make Ham Study a weekly part of the school's science class. We are currently working on the construction of our radio station, and we hope to be on the air by next semester as equipment and money come in from generous hams who see the value of reaching the next generation of young hams. The future of ham radio looks bright here in Florida!

There are so many people I want to thank for aiding in the success of our program that I could fill a book. Each of you has a part in the legacy of the amateur radio program at the Sarasota Military Academy and SMA Prep, and you have my deepest appreciation and thanks. Without your help, we would not be where we are today. Special thanks to the ARRL TI team!

Getting Hands On with Ham Radio

by Gary R. Johnson, AA6GJ

I did not start my professional life as a teacher – far from it. I struggled in my education all the way through high school. Learning from lectures and reading books was very difficult for me. I did not find out until I was in teacher training that I have a form of dyslexia. I thought I was the "dumb kid" in class.

That all changed when I went to Pasadena City College and met up with the best professor and mentor in the world, Ken Johnson, W6FU (SK). He was the broadcast engineering professor. I was originally signed up to be a Stage Tech major because I had been good at that in high school, but I ended up in Ken's Radio Controls Lab, thinking that it would be a good way to learn about being a sound man.

Unbeknownst to me, I had accidentally enrolled in Broadcast Engineering courses. When I went to my first class, I was immediately overwhelmed, and when Professor Johnson said we had to get a commercial FCC license to operate our on-campus 3 kW FM station, I panicked. Remember, I thought of myself as the dumb kid. How was I ever going to learn all the rules, math, electronics, etc. in broadcast engineering? I was ready to quit. Then I spoke to Professor Johnson, and he immediately put me at ease with the kind demeanor and confidence that he displayed to all his students. He said, "Stick with us. Don't worry about the book learning. We're going to get your hands on the real deal here. I've known many students in your boat, and they went on to be successful engineers. You'll see."

Was he ever right! I went on to see the power of hands-on training. Over time, Professor Johnson helped me get my first ham license and call sign, WN6MOI. He helped me build my first ham radio station, and he was my first CW contact. He introduced me to all of the professors in the Electronics Department. Once I was able to get my hands on real electronic circuits, the math finally made sense – I was hooked!

Professor Johnson came to me one day and said, "I think you would make a fine teacher. I see that in you." *Me? A teacher? I'm the dumb kid!* He said, "Gary, you are far from dumb, you'll see." He made me the student Chief Engineer of KPCS (now KPCC) 89.3 MHz FM. I began training new students in broadcast operations. Talk about hands on!

I ultimately did all of it. I became a Broadcast Engineer; I was a Chief Engineer at two TV stations; I was a college instructor, and for the last 9 years of my career I was a credentialed elementary school teacher, teaching first- and second-grade students. On the first day of every school year, I would tell my young students, "There are no dumb kids in this classroom. Never let anyone tell you that you are dumb, because I was told that when I was your age, and look at me now. I'm the teacher!" They always gave me the biggest, proudest smiles when they heard that. I always tried my best to use hands-on techniques to help my students learn, and I watched them shine when the light bulbs went on in their brain. They would say, "I got it, Mr. J!"

Now that I have been retired for several years, I teach amateur radio classes, both online and in person, using those same methods taught to me by my first mentor. I see the light bulbs go on, and I see our students become successful amateur operators.

I have developed many hands-on demonstrations that I use in our classes, many of which will be included in Gordon West's new Technician license manual. There will be a few QR codes at the end of selected chapters that will connect you to those demonstration videos.

One of my favorites is a demonstration of a simple current amplifier and how it applies to the Technician-class examination, which you can access through the QR code below.

I hope you enjoy this hands-on technique. If you start using it in your own classes, you are going to have a lot of fun, and your students will be happy, too.

Never forget – there are no dumb questions, and there are no dumb students!