



Radio Waves

News you can use for license instruction and radio science education

October 2013

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Ham Radio: From Generation to Generation



To the left: Bev Matheson, KJ6RSX, opens the door to Amateur Radio for her students in Fontana, CA.

With the support of long distance coaching from David Collingham, K3LP, a Fontana High School graduate, Bev Matheson, KJ6RSX, a Fontana elementary school teacher, was encouraged to start a ham radio club for 4th and 5th grade students at Dorothy Grant Elementary School.

Matheson recognized the opportunity ham radio offers for students to do project based learning in the classroom and the tie-ins to new Common Core Standards.

“Besides the areas my students in the club

have indicated learning about, my students in my class use ham radio to develop many other skills.”

The Fontana Unified School District provided an opportunity for Matheson’s students to report on their activities and share what they are learning. [Read the full story](#) on the school district website.

Matheson enrolled in the ARRL Teachers Institute this past summer to find more ways to employ ham radio for learning in the classroom.

Band Chart of Tech Only Privileges

In response to popular request ARRL has developed a band chart specific to Technician Amateur Radio privileges. The chart is available on our website for download and print. You’ll find it among the resources listed here: www.arrl.org/tech-prep-resource-library Click on the link for, “Quick Reference Operating Aids, Band Charts”. It’s also available on this page www.arrl.org/get-on-the-air, under “Resources”.

Another resource requested by license instructors is a set of audio recordings of various amateur radio digital modes. We’ve placed some sample audio files on our instructor resource page at www.arrl.org/resources-for-license-instruction. Instructors can download these files to a laptop to play for students as part of classroom instruction on this topic.

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*"Wireless
Technology
training has been
money well spent!"
– Paul Veal,
NØAH*

Clubs, Licensing Classes and Learning Activities, Oh My!

Paul Veal ,NØAH, and Bob Sterner, KBØBS, both ARRL Teachers Institute participants, are working closely with students at Cherry Creek School District in Centennial, Colorado. They formed a radio club and provide regular license classes and learning activities in wireless technology and radio science for students.

"Bob, KBØBS, (ex KBØBOB) and his team, have done some amazing things. The investment in his Wireless Technology training has been money well spent!" said Veal, who also shared a copy of a Cherry Creek Young Amateur Radio Club update (below) distributed this past April. Perhaps there are some ideas here for others!

Veal and Sterner also take advantage of resources in their local community to engage students. "I'm finding the local satellite community, which is based here, has a ton of resources -- Clear Channel Satellite for example-- I got a great tour last month of their complex-- Echo Star and Comcast have some big satellite facilities here as well," said Veal.

As a result of the club's presence in these circles, a telecommunication industry trade publication, *Mission Critical Communications*, interviewed Veal on the topic of the importance of RF education. To read/down-load a copy of the article, [click here](#).

Cherry Creek Young Amateur Radio Club Update

We have been busy over the winter months trying to shore up the club structure. A few quick notes about where we stand:



Members of the club (WØCCY) at an ARES training event held at Grand View High School in Aurora, Colorado.

- Our Inside/Out class is back on for this summer.
- We will have the satellite trailer at the Rocky Mountain region HamCon www.hamconcolorado.org
- Our VE testing session have been helping to build the treasury nicely.
- A HUGE thanks to the Aurora Repeater Association www.noara.org and Rocky Mountain Ham www.rmham.org for helping us collect and resell equipment as recent swap meets.
- Field Day June 22 from 12p-3p we will have a station setup for anyone licensed or not to operate and we'll also have the satellite trailer for any 'birds' that might come over during the event.
- Our IRLP node is up and taking traffic.
- Last but certainly not least is about our satellite trailer. Information is going out today to middle schools in the area that the trailer is properly equipped for a NASA ISS contact. This means that we can bring the equipment to the school and facilitate a direct radio call to the ISS. We will support any school that asks for assistance to get the application to NASA and setup a contact.

If you haven't had a chance to get licensed please consider the upcoming class. Online self-study is also available anytime. As a reminder we have a 10 channel programmed radio for each student that gets licensed. That's right your first radio is FREE. Thanks to everyone for their support of the Cherry Creek Young Amateur Radio Club!

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Update on Recent ARISS Activities

The Amateur Radio on the International Space Station (ARISS) program provides scheduled opportunities for students in the US and around the world to interview astronauts via Amateur Radio. Contacts during this past summer with US students included Boy Scouts at the National Jamboree in Summit Bechtel Reserve in Mt. Hope, WV, and at Space Jam, held each year at Octave Chanute Aerospace Museum in Rantoul, IL and also at AirVenture in Oshkosh, WI.

This past May, a contact with students at Anacapa School in Santa Barbara, CA involved licensed radio amateur students. You can [view a video](#) of that contact on the school's web page. The ARISS contact was a culminating event for a research unit on "Space: Where are we going?" The synthesis unit involved hearing speakers discuss their fields of expertise with astronomy and space exploration, writing an individual research paper and contribution to a group presentation on related topics.

On September 7, 2013, students in Duluth, Minnesota spoke to astronaut Chris Cassidy, KF5KDR, in a direct contact from Duluth Children's Museum.

On September 4, 2013, students in Alpharetta, GA interviewed Cassidy at Mill Springs Academy from their school station.

Science teacher Martha Muir, W4MSA, commented on the contact, "Our ARISS contact was phenomenal! It had an impact on everyone – young and old. Since we're inviting folks here from other schools and didn't want them to drive here for just the 10 minutes of the astronaut chat, we scheduled the launching of over 50 model rockets that the 7th and 8th graders have been working on and invited our guests to watch this as well. We also invited our guests to stop by our apiary and farm. One of the teachers who maintains the apiary and farm invited guests to pick some okra. As I told some folks, we do all kinds of science here. This has been an amazing start to the school year." For more, see a [local news report](#) of the experience.

Muir participated in ARRL's Teachers Institute in the summer of 2012, and also in the advanced TI-2 on *Remote Sensing and Data Gathering* this past summer. Under her leadership, Mill Springs Academy applied for and received a school station grant from ARRL's Education & Technology Program in 2012.



Students at Mill Springs Academy on the air with Astronaut Chris Cassidy.

*"This has been an amazing start to the school year!" –
Martha Muir,
W4MSA*

An ARISS Opportunity:

Contact Debra Johnson, ARRL ARISS Program Manager, at djohnson@arrl.org if your school, local museum or other educational organization is interested in participating in a scheduled ARISS contact in May – November 2014. An educational plan describing the learning activities that will be provided for students leading up to and following the ARISS is necessary.



Astronaut Chris Cassidy, KF5KDR on board the ISS.
Photo courtesy of NASA

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Middle School students in Mississippi learn binary numbers, analog to digital conversion, and much more from a recent TI graduate.

2013 Teachers Institutes Deliver Immediate Impact

The ARRL offered two sessions of the 4-day professional development seminar, the *Introduction to Wireless Technology* (TI-1) to 24 teachers this past July, and one advanced TI-2 seminar on *Remote Sensing and Data Gathering*. If you missed the stories on ARRL Web news you can find them linked to the Teachers Institute Web page at www.arrl.org/teachers-institute-on-wireless-technology.

We received reports from some participating teachers that indicated the training is already being used to roll out exciting content to students this fall.

Richard Murek, W2LCN, teaches at Franklin Avenue Middle School, in Franklin, NJ. He shared some promising news: "We had some major changes at the school over the summer and a set of courses was filled but they had no teacher

available. I received a call at the end of August and was asked (directed) to take the programming class over. I received enough money to purchase 12 BOE bots and 12 arduinos. The course was scheduled for C and Java and has been adapted to PBASIC/C/ Java. It's been three weeks and I'm still keeping my head above water. I couldn't have done this without the training."

Bill Richardson, N5VEI, is a technology teacher at Olde Towne Middle School in Ridgeland, Mississippi. He participated in the TI-1 and this year attended the pilot session of the TI-2 on *Remote Sensing and Data Gathering*. Since returning to Mississippi, Richardson has been super-charged to incorporate what he learned there into his classroom instruction.

Here's his early report:

"I started a unit on binary numbers last week. We converted to decimal and back and forth. Now we are taking a quiz today with a test on electronics history and binary later this week. Next week we will touch on Hex and move to an 8th grade lesson on ADC [Analog to Digital]. We will be moving into sampling right after that as we did in class, and finally move into binary searches. This is all a prelim into my electronics unit. I am going for my national board certification and will use the electronics as my primary source for that certification. More lessons are coming," said Richardson.



Watch for announcements about 2014 Teachers Institutes in QST or on the ARRL website in early 2014. You will also receive an announcement as a member of our newsletter mailing list.

At left, ARRL Education & Technology Program Director, Mark Spencer, WA8SME assists a teacher at the Teachers Institute held at ARRL headquarters in July.

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A Meeting Place for Classroom Teachers



TI Instructor, Tommy Gober, N5DUX, (3rd from left, back row) accompanied by the teachers who participated in the TI session held in Rocklin, California this past summer.

Numerous attempts have been made in the past to create an online community for participants of ARRL's Teachers Institutes (TI) where they can share ideas, ask questions and receive advice from each other. As much as we can tell, those efforts have not led to anything sustained. Yet, we recognize that some of the dialog that occurs in email responses to individual questions asked of TI instructors would be valuable if shared with others who may be asking the same kinds of questions.

Here are some of the approaches we've taken to provide venues to share ideas and advice more widely.

One of the purposes of this newsletter is to highlight activities that

are reported to the Education staff at ARRL that we think may benefit a wider audience.

We also post reports and stories we receive on the ARRL website at www.arrl.org/classroom-activities (scroll from there to the "reports" and "stories" pages), but it seems that a newsletter is helpful to raise attention to the activities that are being reported to us.

In addition, there is an [ETP FAQ](#) page on our website that perhaps you may not have discovered. We are working on refreshing the content. If this approach is beneficial please let us know so we can put more emphasis on maintaining it.

There is a fledgling page in the ETP Resource section of our website titled,

["Lesson ideas and learning activities"](#). TI instructor

Nathan McCray, K9CPO, posted some foundational lesson ideas on ham radio and electronics topics there intended to help teachers find a starting place to cut into the rich possibilities of classroom curriculum connections.

We also have an online [forum](#) on the ARRL website (scroll down to "Amateur Radio in the Classroom") where ARRL members can ask questions and weigh in on discussion topics. This has not been very active—but perhaps it also hasn't been widely discovered.

Two teachers have also taken the initiative to organize public discussion groups on the online educational collaboration platform, [Edmodo](#). Anthony Luscre, K8ZT, a 2012 Teachers Institute graduate, also recently appointed as Ohio Assistant Section Manager for Educational Outreach, offers this invitation: "I would love to hear from teachers or others involved in Amateur Radio in Ohio, but welcome those from any state. I have created an Edmodo Group, "Radio Technology in Classroom" and would invite you to join by using group code- 6djb6r."

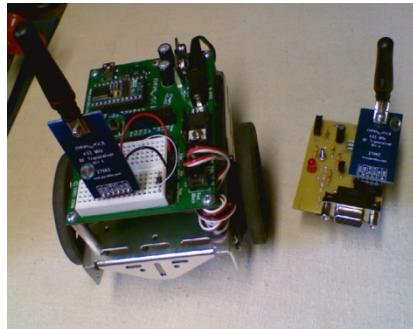
Beverly Matheson, KJ6RSX, a 2013 TI graduate, also originated an Edmodo group named "ARRL TI 2013". She welcomes teachers from past years. To participate in Matheson's group, use the group code: d6urop.

Please let us know which of these approaches are helpful to you or what might be more helpful. Please send your suggestions to

Debra Johnson,
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Education Services
Manager at
djohnson@arrl.org

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A Marriage of Robots and Ham Radio



Parallax BoeBot® outfitted with MAREA transceiver.

"A way to emulate what happens when Mars rovers...are managed from Earth."

Last May ARRL published a Web story about one of the newest resources developed for the Education & Technology Program (ETP), a transceiver designed for packet control of the Parallax Boe-Bot®. Mark Spencer, WA8SME, ETP Director, developed this resource to provide students with a way to emulate what happens when Mars rovers, like Curiosity, are managed from Earth. From the initial concept it wasn't a very large step to the idea of a

program involving students across the country programming and managing robots to perform specific tasks remotely via packet radio—even through the packet station on the ISS!. The program, called MAREA (Mars Lander Marine Amateur Radio Robotics Exploration Activity) is fully described on the ARRL website at www.arrl.org/marea.

The transceiver developed for the Boe-Bot® was demonstrated to teachers participating in the Teachers Institute this past summer. Several of those teachers indicated their interest in participating in a pilot program. Organizational conference calls/webinars will be initiated in the coming months. If you are a classroom teacher, Scout or youth group leader and you'd like to find out more about what's involved to participate, please contact Debra Johnson, djohnson@arrl.org or Mark Spencer at mspencer@arrl.org.

Exam-Prep Jepperdee is Born

Bob Raffaele, W2XM, put a lot of time and imagination into creating an exam preparation study resource modeled after the popular television game show, *Jeopardy!* "About three years ago, I developed a Jeopardy-type game which I used in various science classes when I was the substitute teacher. The game seemed to be well liked. So, about two years ago, I began loading it with ham-radio trivia questions and presenting quiz programs at amateur-radio club meetings. [Nathaniel Greenman], KB2HPX, and I have made several such presentations; our audiences have enjoyed them. Last year, I decided to make quiz games that used questions from the various amateur-radio question pools. I've made a

game for each level of ham exam."

Raffaele has developed and produced two Tech level, two General level and one Extra level Exam-Prep Jepperdee games. You can download them from ARRL's online instructor resource library at www.arrl.org/resources-for-license-instruction. "When I use these games, I use home-brewed apparatus that includes lights, push-buttons, a sounder and lockout circuitry. The hardware part of the game is rather low-tech." If you're interested in building your own Jepperdee, contact Raffaele at W2XM@arrl.net. He'll be happy to share his design—and let him know if you would like him to develop more games.

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2014 Tech Question Pool Being Finalized

The scheduled review cycle for the pool of questions from which the FCC amateur radio Technician, Element 2 license exams are generated is near completion by the Question Pool Committee elected by the National Conference of Volunteer Examiner Coordinators ([NCVEC](#)). Question Pool Committee Chairman,

Roland Anders, K3RA, said the review is still in progress, and changes to the pool are, as usual, generally to improve clarity, to improve or replace weak or inappropriate questions, and to bring questions up to date with technology. He adds that work is currently on track to meet the goal of public domain release of the new



Technician question pool in early December, 2013.

The new question pool will become effective for license exams beginning July 1, 2014 and be effective until June 30, 2018.

2013 Licensing Statistics

The following report of FCC licenses issued is supplied by Maria Somma, AB1FM, ARRL VEC Manager.

Somma notes that Technician licensing is currently running 6% ahead of totals around this time last year, while upgrades for General and Extra are both reflecting a slower pace.

FCC License Activity	2011	2012	2013 as of 9/30/13
Technician	21,316	23,974	19,195
General	9,667	10,132	7,372
Extra	3,426	3,259	2,326
Total Issued	34,409	37,365	23,586



A student at Pine Tree High School in Longview, Texas celebrates his accomplishment.

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Resources for License Instructors:

www.arrl.org/resources-for-license-instruction

Resources for Teachers:

www.arrl.org/amateur-radio-in-the-classroom

Education & Technology Program:

www.arrl.org/education-technology-program

Teachers Institute on Wireless Technology:

www.arrl.org/teachers-institute-on-wireless-technology

ARISS Program:

www.arrl.org/amateur-radio-on-the-international-space-station

Continuing Education Program:

www.arrl.org/cep

2013 Upcoming Events, Opportunities and Deadlines

Fall School Club Round-up is **October 21st-25th**. For rules and contest information, visit: www.arrl.org/school-club-roundup. If you're participating for the first time, be sure to review the advice offered by other teachers on that web page by reading "Getting Organized for Success".

Boy Scout Jamboree on the Air (JOTA) is **October 19th-20th**. Find more information on the ARRL website at: www.arrl.org/jamboree-on-the-air-jota, and on the Boy Scouts of America [JOTA web page](#). where you can [register your JOTA activity](#).

The deadline is **November 1st**, for applications for **Education & Technology Program School Station Grants** and Progress Grants. You'll find application forms on our website at: www.arrl.org/etp-grants. Be sure to take a look at the scoring rubric to make sure you have included the information we'll be looking for as we evaluate your application.

ARRL Foundation Scholarship Application Period Now Open

The ARRL Foundation is now accepting scholarship applications from college bound students who are licensed radio amateurs. More than 70 scholarships are available. For more information and an application visit:
www.arrl.org/scholarship-program.

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