



# Stanislaus Amateur Radio Association

## Quarterly Newsletter

MAY 2014

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### **Stanislaus Amateur Radio Association**

#### **Monthly Meetings – Third Tuesday of Each Month**

**May 20, 2014 – 7:00 p.m.**

**June 17, 2014 – 7:00 p.m.**

**July 15, 2014 – 7:00 p.m.**

**Modesto Regional Fire Authority (OES)**

**3705 Oakdale Road**

**Modesto, CA 95357**

# 2014 FIELD DAY

# JUNE 28-29

## 2014 SARA CLUB EVENTS!

### MAY

- 3      Saturday      MS Walk 0800-1200 Downey Park needs 3 operators  
[http://walkcan.nationalmssociety.org/site/TR?fr\\_id=23509&pg=entry](http://walkcan.nationalmssociety.org/site/TR?fr_id=23509&pg=entry)
- 10      Saturday      Ride for Mom 0630-1600 Johansen High School needs 10 operators  
<http://rideformom.com/>
- 10      Saturday      Crop walk 1100-1300 Geneva Presbyterian Church Coffee/Fairmont  
need 4 operators  
[http://hunger.cwsglobal.org/site/TR?fr\\_id=18558&pg=entry](http://hunger.cwsglobal.org/site/TR?fr_id=18558&pg=entry)
- 11      Sunday      Regalado Road Race Wamble Road (Burchell Nursery east of Oakdale  
0630-1500 need 7 operators  
<http://www.ncnca.org/ncncaevent/regalado-road-race-0>
- 17      Saturday      Modesto Criterium 0800-1500 further information to follow 4-6  
operators needed  
<http://www.ncnca.org/ncncaevent/modesto-downtown-criterium>
- 18      Sunday      Modesto Road Race Salida area 0800-1200 further information to  
follow 6-8 operators needed  
<http://www.ncnca.org/ncncaevent/modesto-road-race-2>

### JUNE

- 14      Saturday      Canyon Classic 0600-1600 Creekside Middle School Patterson 20  
operators needed  
<http://www.canyonclassiccentury.org/>

### AUGUST

- 2      Saturday      Warnerville Time Trials Willms road east of Oakdale—4-5 operators  
<http://www.ncnca.org/ncncaevent/warnerville-time-trial-0>

### SEPTEMBER

- 13      Saturday      West Valley Century Patterson—estimated 10-12 operators needed  
<http://www.westvalleycentury.com/>

- 20      Saturday      Cancer Awareness Ride 0700-1500 need 10 operators  
<http://www.cvrrunning.com/calendar.htm#September>
- 27      Saturday      Covered Bridge Bike Classic 0600-1600 Hersey Visitor Center  
Oakdale need 12 operators  
<http://healingnationsmodesto.org/special-events>

## OCTOBER

- 11      Saturday      The Fruit Yard Century – Stanislaus County Bicycle Club  
Fruit Yard Restaurant - 132/Geer 0700-1600 need 10 operators  
[http://www.stancobike.org/fruit\\_yard\\_century.html](http://www.stancobike.org/fruit_yard_century.html)

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# StanARES Ham Cram Study Session and Examination

*Sponsored by Stanislaus Amateur Radio Association*

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The Ham Cram is an all day study session and test out for your ham radio license. Doors open at 7:45 AM on test day, registration begins at 8AM. And the study begins at 8:30am.

The Ham Cram is designed for new licensees and General upgrade only. No Ham Cram will be offered for Extra upgrades although the Extra exam is available for the Test Out.

Test out only, please arrive between 3:30 and 4:00 pm to register, tests will be given at 4:00PM

Ham Cram cost is \$20, Test Only \$15

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## Our next Ham Cram

**When:** August 16, 2014

**Where:** Stanislaus Emergency Operations Center

3705 Oakdale Road, Modesto, CA

For questions contact John, K6JRO, at [HamCram@StanAres.org](mailto:HamCram@StanAres.org)

### **S.A.R.A. Mt. Oso Repeater System**

Located on Mt. Oso at an elevation of 3400 ft. with reliable coverage from Fresno to Woodland.

- 145.390 MHz Negative Offset
- 224.140 MHz Negative Offset
- 51.800 MHz Negative Offset
- 440.225 MHz Positive Offset (1/2 Watt very low power)

All repeaters require 136.5 Hz PL tone for access.

All Mt. Oso repeaters can be linked to each other in any combination by authorized control operators.

440.225 repeater is back on the air after reducing transmitter power to 1/2 watt due to Pave Paws interference complaints.

### **S.A.R.A. Low Level Repeater**

Located atop the Doubletree hotel in downtown Modesto on 145.110 MHz Negative offset PL 136.5 Hz

### **S.A.R.A. Packet Node**

Located on Mt. Oso, It's identifier is "SARA" 144.910 MHz 1200 Baud, 438.960 MHz 9600 Baud

## **LADIES OF HAM RADIO**

**This is a net just for you! No matter if you are new to the hobby or have been doing it for years.**

**No excuses come join us!!!!!!**

**Where:        The Sara Repeater 145.390**

**When:        Monday Night at 7pm**

**What will we talk about? A little bit of everything!**

**Hope to hear you Monday Nights!**

# Green Eggs and Ham

## ROCKIN B's BURGER COMPANY

222 McHenry Avenue – Modesto



Greetings, this month's article will be a review of a new burger joint occupying an old burger joint located on lower McHenry Ave. in mid town Modesto. Perhaps in the past you have dined at what used to be Bleachers at 222 McHenry Ave. Modesto. Well they went out of business for reasons I have yet to find out. After many successful years of putting out excellent hamburgers and tri-tip sandwiches, Bleachers shut their doors.

Now I am happy to say that Rockin B's Burger Company which is a family owned business has reopened the establishment with a similar menu but with more choices and in my opinion excellent food. My favorite is the Shay-Shay and is absolutely the best burger I have ever had. This burger truly does rock with flavorful meat, avocados, tomatoes, bacon, jalapeño's and just the right amount of cheese. If you really want to do it up right add their garlic fries. Customer service was good, friendly and attentive. I recommend Rockin B's to every fan I know!

*73's de W6UHF, Paul O*



**A BLAST  
FROM THE  
PAST!!!**

**READ ON**







# JUNE 1984

# The READOUT

File

SARA'S Deep-Pit Barbeque and campout is this weekend, June 22-23-24 at the Tracy Wildlife Association campgrounds on the banks of Old River near Tracy. SARA has reserved the grounds for two nights and three days beginning after work on Friday June 22 and continuing through Sunday June 24th.

For those who would like to make a weekend of it, you may check in on Friday evening after work and set up camp. This will give you an opportunity to see the pig being prepared and lowered into the pit for overnight cooking.

The Deep-Pit barbeque pig will be served on Saturday June 23rd at 12 noon. The chef is SARA President, Bill, W6AFS. The menu includes fresh tossed green salad with choice of dressing, buttered french bread, western style BBQ beans, hot dogs and coffee. Cold beer and soft drinks will be available. Remember to bring your own table ware. If you plan to spend the night, the fee for overnight camping is \$4 per unit per night. If you plan to just spend the day and enjoy lunch the cost is \$7.50 per person which includes the price

(Continued on Page 3)



©  
"WE ALL THOUGHT IT WAS FUNNY TOO, UNTIL,  
HIS FALL HARVEST."

## STANISLAUS AMATEUR RADIO ASSOCIATION

P.O. BOX 4601 • MODESTO CALIFORNIA • 95352



of admission to the grounds. Children under 12 are only \$1.00.

There will be a transmitter hunt on Saturday. The transmitter to be hidden by W6LHQ. Bring your talkies and DF antennas if you have any. Remember, its not necessary to have DF (Direction Finding) equipment to participate in the hunt. A talkie works nicely! A \$1.00 entry fee makes up the pot that goes to the person who finds the transmitter. It's a lot of fun so plan to participate.

There is a very large, open, grassy area for baseball, football, soccer, or whatever you want to play. Excellent for the kids! If you want to try your luck at fishing, Old River winds its way through the grounds. We also will set up a horseshoe pitching area. Large oak trees provide the shade and support for any antennas you might want to string up. Be sure to bring along a bow & arrow and fishing line. We will have the SARA generator there to supply electricity for those who need it. Bring along your own drop cords and junction boxes. There are restroom facilities on the grounds.

Because we must purchase the food in advance, you must purchase your tickets in advance so we can plan for the right amount of people. Because this is a break even event, we must plan carefully. This requires that tickets be purchased in advance and NO TICKETS WILL BE SOLD AT THE GROUNDS. The deadline is absolutely no later than June 17th. That is absolutely the last day that tickets will be sold. On the 22nd the food is purchased and thats it.

To reach the grounds from Modesto take the Manteca Bypass to Hwy 205 which is the Tracy Bypass. Take the Tracy Blvd. off ramp and go North on Tracy Blvd. till you cross over the bridge on Old River. Make an left turn on Finch (just across the bridge) and go 3 tenths of a mile to the entrance. Talk-In on the SARA repeater.

Please remember, as with all SARA functions, the event is open to members as well as non-members. Please feel free to makeup a group of friends and have a good time. Please don't forget to bring your own tableware. See you there!



## ARES REPRESENTATIVES WILL ATTEND AS ARRL CELEBRATES 100 YEARS IN 2014

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[National Convention](#) · [Centennial QSO Party](#) · [Second Century Campaign](#)



Our club has five members attending ARRL's conference as they celebrate 100 years of "Advancing the Art and Science of Radio." Founded in 1914, **ARRL** is the national association for Amateur Radio in the USA. Today, with more than 160,000 members, ARRL is the largest organization of radio amateurs in the world. Upward of 7 dozen **vendors and exhibitors** already are planning to be on hand for the ARRL National **Centennial Convention** in mid-July. Convention activities begin on Thursday, July 17. The 60,000 square foot exhibit hall will be open all day Friday and Saturday, July 18 and 19, at the **Connecticut Convention Center** in Hartford, for what promises to be the largest gathering of its kind in the Northeast.

The ARRL and **R&L Electronics** will co-sponsor a drawing for a \$5000 **grand prize** gift certificate, and ARRL and **FlexRadio** will co-sponsor a \$2500 gift certificate. "The certificates will be redeemable at the co-sponsors' respective establishments," Deb Jahnke explained. Winners will be drawn from eligible registrants at the end of the convention on Saturday, July 19. The winners do not need to present during the drawings.

## **THAT DOORBELL LOOKS INNOCENT, BUT IT MAY BE A FEDERAL OFFENDER (THANK YOU BARRY!)**

### ***FCC AGENTS TRACK ROGUE RADIO WAVES TO AQUARIUMS, BULBS, BLANKETS; \$16,000 FINES***

By THOMAS GRITA

Updated March 12, 2014 12:52 a.m. ET

A federal agent who shows up unannounced at a building along a Texas highway might be looking for any number of things: illicit drugs or immigration violations, say, or illegal firearms.

Or fluorescent lights.

Which was what the agent had in mind who walked into the Perfect Cuts salon in San Antonio last July. The lights were violating communications regulations.

The agent had used signal-tracking equipment to home in on the offenders and told the owner, Ronald Bethany, that his lights emitted radio signals that interfered with an [AT&T](#) Inc. cellphone tower. That violated Federal Communications Commission rules protecting airwaves licensed to AT&T, the agency determined. Mr. Bethany didn't have a license to operate on that frequency, the FCC agent told him, so his fixtures needed to go. "I told them 'OK, but who is going to pay for this?' " Mr. Bethany says. "I've got to use the lights."

Interference can be serious business. In 2012, hedge-fund mogul [Philip Falcone](#)'s wireless venture, LightSquared Inc., filed for Chapter 11 bankruptcy after the FCC determined it would interfere with GPS signals.

The mixed signals aren't always so weighty. In recent years, the FCC has issued warning letters directing people to stop operating cordless phones, television sets and wireless cameras.

Last June, an FCC letter to a Springfield, Ore., address warned that "harmful" interference had been traced to the property and that the operator may have to "cease operation" of the device: "possibly a bad doorbell transformer."

That 2013 letter lists other common culprits, including aquarium heaters. Similar letters in 2012 went to several operators of videogame consoles. "This unresolved problem," the letters typically warn, "could result in a monetary forfeiture."

The FCC can demand fines up to \$16,000 a day or \$112,500 an incident from people who aren't FCC licensees. Offenders usually rectify problems, the FCC says, often working them out with whoever is complaining.

Managing the radio spectrum "has been part of our core mission since the inception of the FCC in 1934," says Julius Knapp, head of the agency's Office of Engineering and Technology.

Most anything electrical can violate. "Incidental radiators," in FCC lingo, are devices like electric motors that aren't built to generate radio signals but do anyway. "Unintentional radiators" are designed to generate signals within devices like computers but aren't supposed to broadcast. "Intentional radiators" like cordless phones can transgress when they transmit outside intended frequencies.

Agents arrived at Shelton's Auto Lube and Auto Wash in Fortuna, Calif., in 2008 looking for signals disrupting AM broadcasts. They traced them to Shelton's carwash equipment.

"I didn't know anyone listened to AM radio anymore," says owner Odell Shelton. The FCC told him a driver complained about car-radio reception. It took a few days to find and fix the problem.

The government doesn't much care why interference happens. To the FCC, noise is noise.

In a 2013 letter, the FCC wrote to the owner of a plasma TV set after a ham-radio operator complained to the agency of interference. "Continued operation of the television," warned the letter, from which the TV owner's identification is redacted, "is not legal under FCC rules."

It doesn't matter how far bad signals extend. The FCC pressed Perfect Fit Industries into a consent decree in which the Charlotte, N.C., bedding maker agreed to develop a compliance plan and pay a \$7,000 fine in 2005 after some of its electric blankets caused interference, FCC documents show. Perfect Fit didn't respond to inquiries.

"Just because it doesn't go very far," says the FCC's Mr. Knapp, "doesn't mean that we don't need to fix it."

Ham-radio operators are a frequent source of complaints. A 2012 FCC letter told a Pomona Park, Fla., resident to stop using a well pump that conflicted with amateur-radio frequencies.

A 2009 letter warned Woodstock Farm Animal Sanctuary, Woodstock, N.Y., that its electric fence was causing interference for a ham-radio operator and noted it had been warned before.

"We didn't want our rambunctious, dark-colored, 2,000-pound steers pushing down the fence, wandering onto the adjacent state road and causing a deadly accident," says sanctuary co-founder Doug Abel.

"Right next door, our ham-radio-loving neighbor has a 60-foot high antenna that would allegedly pick up a clicking sound from our fence." He installed hardware to damp the signals.

Private signal sleuths, too, hunt down errant emissions. Jay Jacobsmeyer, president of wireless-engineering consultants Pericle Communications Co., investigates interference at 150 to 200 cell sites a year, mostly for wireless clients. His team last November faced a puzzling signal in San Diego that would pop up, disappear for weeks, then resume.

Using directional equipment, it identified a cordless phone on a yacht that occasionally visited, Mr. Jacobsmeyer says. The skipper agreed not to use the system in port.

Radio hobbyist Tom Thompson of Boulder, Colo., last year tracked a signal using a homemade contraption. After knocking on the suspect's door, he traced it to ballasts on marijuana grow-room lights. He says he built a filter that the grower agreed to use.

Ballasts are frequent offenders. Makers of the components, which regulate electricity to bulbs, test them for FCC compliance. Some interfere anyway.

Ballasts earned Brookfield Office Properties Inc., the real-estate company, a citation last month at one of its Los Angeles buildings where lights were interfering with a [Verizon](#) Communications Inc. cell site. The FCC had warned Brookfield in May, asking for progress reports, but it received none, the new letter said. It warned of fines and possible equipment seizure or jail time.

A spokeswoman for Brookfield says it tries to resolve issues regarding its properties but doesn't comment on "regulatory matters."

The lights at Perfect Cuts in San Antonio came from [General Electric](#) Co. , which in 2011 found some of its ballasts caused interference, a spokesman says. GE has offered to replace those ballasts free of charge.

Mr. Bethany says he initially declined GE's offer. But when an FCC letter after the agent's visit mentioned a possible \$16,000-a-day fine, he swapped ballasts.

He still doesn't see why he needed to, given that his 18-year-old shop predates the cell tower. "I was here first."



**Don Nicolaysen (KR6US) shared the following Radio Waves and I thought it was very VERY educational!**



# Radio Waves

News you can use for license instruction and radio science education

Winter 2014

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## High School Students Put Packet Radio to Work for Local Environmental Study



Lake Roosevelt High School teacher Ralph Rise, KG7DDE, instructs students Isaiah Baty (left) and Jordan Charles, KG7GVA (right), on building eggbeater antennas. Isaiah is scheduled to take the ham license test in February.

At Lake Roosevelt High School in Coulee Dam, WA, students learning Next Generation Science Standards (NGSS) will soon be exploring climate science using collected, real-time weather data transmitted by packet radio. Their newly acquired Technician class licenses have provided them the ticket to do it.

Lake Roosevelt teacher Ralph Rise, KG7DDE, says the school will use grant funding to build 2.4 GHz WiFi transmitters that can send data from environmental monitoring sensors to a local WiFi receiver connected to a ham radio with a Terminal Node Controller (TNC).

The local station will automatically send information as ham radio packet data

through student-made repeaters back to a school-based ham radio with TNC. The data will be transferred to a computer and converted into a format Excel can graph. It will then be made available to NGSS students via the Internet.

“Our interest in gathering real-time environmental data comes from a partnership with the Bureau of Indian Affairs foresters working with the Colville Confederated Tribe of Indians,” says KG7DDE. “We want to monitor weather data to establish climate data and see if climate influences the spread of the Spruce Bud Worm through the Tribal forest.”

## School Tool Tip

David Anderson, K1AN, has produced a video for World Genesis Foundation that explains the educational relevance of amateur radio. Check it out on the home page of the project website at [www.RadioQRV.com](http://www.RadioQRV.com) or at <http://youtube/ivUMIADFSDw>.

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Please let us know what approaches have been useful to you in teaching Amateur Radio — or what you'd like to read more about to help in your classroom. Send your suggestions or requests to Debra Johnson, K1DMJ, ARRL Education Services Manager, at [djohnson@arrl.org](mailto:djohnson@arrl.org).

## Licensing Classes and Learning Activities

### Club Boasts Fourfold Increase in New Licensees/Upgrades

The Federal Way Amateur Radio Club (FWARC) Training Team has some very exciting news to share: After a revamp of its approach to marketing and conducting its licensing classes, the number of people the Washington State club helped get their first license or an upgrade was four times higher in 2013 than in past years.

Daniel Stevens, KL7WM, FWARC President and Training Coordinator, believes the changes that had the biggest impact were promoting the classes as free — but requiring nominal materials and test fees — and advertising them two to three months in advance.

Regularly scheduled classes were offered in several locations, usually over 2 Saturdays every 3 months. Students who missed one Saturday were able to make it

up months later, giving them both flexibility and time for lesson absorption. Additional classes were held at the request of some outside parties.

The quality of the classes was improved, says Daniel, KL7WM, through better training material and a team-of-teachers approach. Not only did each teacher bring examples and illustrations from their own experiences, but they also had access to substantial resources, including a specially developed, 27-page illustrated handout and PowerPoint training slide decks provided by MicroHAMS ([www.microhams.com](http://www.microhams.com)). A social net demonstrated for 20 to 30 minutes each class helped enliven the material. The 95% pass rate students achieved is a ringing endorsement of FWARC's new approach to its amateur radio classes.



Dustin, KF7FK and Mike, KJ7WC offer a hands-on demonstration at a FWARC training class.

### Success by the Numbers

FWARC's "tweaks" in marketing and materials proved magic. Here are the particulars:

FWARC held 17 VE tests at nine locations in five cities. A total of 224 people were tested and 204 passed at least one test for a license. They held 11 classes — seven Technician, three General, and one Extra.

Breaking it down further:

- 169 new hams were licensed (128 Technician, 38 General who passed elements 2 and 3, and 3 Extras who passed all three elements).
- 15 upgraded to General; 20 upgraded to Extra.
- The VE Team signed 204 CSCEs for 128 Technicians, 53 Generals and 23 Extras.

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## Update on Recent ARISS Activities

The Amateur Radio on the International Space Station (ARISS) program continues to provide exciting opportunities for students in the US and around the world to conduct scheduled interviews with astronauts via Amateur Radio.

In one particularly inspiring effort, sixteen-year-old Rebecca “Becca” Rubsamen, KJ6TWM, returned to her old school, Rancho Romero Elementary in Alamo, CA, to serve as head engineer for an ARISS contact with astronaut Mike Hopkins, KF5LJG. The November 13, 2013, event gave more than 100 students who gathered in the school’s playground a chance to learn about the science of space and of radio, and to experience an 8-minute-long QSO with Hopkins.

Rebecca, KJ6TWM, a sophomore at Bentley School in Lafayette, CA, built the VHF radio and the two antennas used in the contact in her backyard, helped by her father, Reid Rubsamen, N6APC. But, according to N6APC, his daughter was definitely the driving force behind the contact, approaching the Rancho Romero Elementary School with the idea. “She drafted the application, helped develop the curriculum, and convinced astronaut James

Van Hoften to come to Science Night to help promote the contact,” he said. A video of the event can be found at [www.rebeccarubsamen.com/photos.html](http://www.rebeccarubsamen.com/photos.html).

Another successful contact occurred on October 30, between astronaut Hopkins and the Kopernik Observatory and Science Center in Vestal, NY. This non-profit learning institution promotes interdisciplinary education in the fields of Science, Technology, Engineering and Mathematics (STEM).

A telebridge contact with the Cradle of Aviation Museum, Garden City, NY, was conducted via IK1SLD on November 4. Astronaut Luca Parmitano, KF5KDP, answered questions during the exchange. He also spoke with students at Warren County Technical School, Washington, NJ, that same day.

Sixth-graders at Berkeley Middle School, Williamsburg, VA, packed their gymnasium to pose their questions to astronaut Hopkins on January 8.

For information about upcoming ARISS contacts, visit [www.ariss.org/upcoming-contacts.html](http://www.ariss.org/upcoming-contacts.html).



Rebecca Rubsamen, KJ6TWM (far left), leads an ARISS contact at Rancho Romero Elementary School as students line up to ask questions of astronaut Mike Hopkins, KF5LJG.

*“[Rebecca] drafted the application, helped develop the curriculum, and convinced astronaut James Van Hoften to come to Science Night to help promote the contact.”*  
— Reid Rubsamen, K6APC

## An ARISS Opportunity

Contact Debra Johnson, K1DMJ, ARRL ARISS Program Manager, at [djohnson@arrl.org](mailto:djohnson@arrl.org), if your school, local museum or other educational organization is interested in participating in a scheduled ARISS contact during the Fall 2014 – Spring 2015 time period. An educational plan describing the learning activities that will be provided for students leading up to and following the contact is necessary. To learn more about the ARISS program visit [www.arrl.org/amateur-radio-on-the-international-space-station](http://www.arrl.org/amateur-radio-on-the-international-space-station).



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## Instructor Corner — News, Ideas, Support

### Instructor Qualifications.

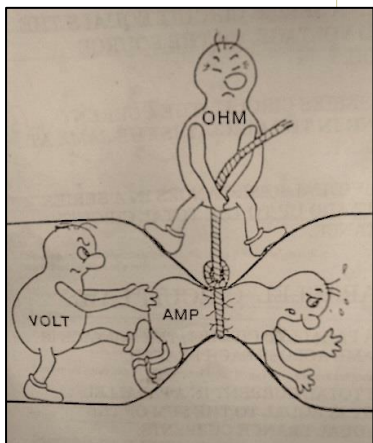
We're often asked by hams who are being recruited as instructors for local license preparation classes if the ARRL offers recommendations for what's required to serve in that role. Recently a committee of the ARRL Board has taken up that discussion. The resulting list of suggested qualifications is intended to serve as a guideline for those thinking about taking up the challenge and for clubs considering which members are best suited to serve in that capacity. These qualifications are listed on the ARRL website at: [www.arrl.org/license-instructor-qualifications](http://www.arrl.org/license-instructor-qualifications).

**Instructor Survey.** If you participated in our recent online survey of ARRL

registered instructors — thank you! We had a strong response: 528 to be exact. This survey helps us get a better handle on the format of classes that are being offered and the resources that instructors are using. Although the survey is now closed, if you still have suggestions for further improvement of our *Ham Radio License Manual* or for our *Instructor's Manual*, please send them to me at [djohnson@arrl.org](mailto:djohnson@arrl.org). We really appreciate getting all your comments and suggestions about the resources you would like to have.

**Revision of ARRL Technician License Publications.** You are probably aware that the new question pool for the

Technician license exam has been released by the National Conference of Volunteer Examiner Coordinators (see page 7 of this newsletter for more). Accordingly, the ARRL publications team is working on developing a new edition of our student study manual, *The Ham Radio License Manual*, to be released in April. We will also be revising our ARRL *Instructor's Manual for Technician License Courses*, which is designed to coordinate with the presentation of topics in *The Ham Radio License Manual*. We plan to have the revised instructor materials available in June.



Visuals help students “go with the flow” in an electronics unit. (Cartoon thanks to Dick Harman, WA4USB)

## Share Your Own Teaching Tips On Gain, Decibels and Logarithms

Most students preparing for their first amateur radio license or for an upgrade to a General license find gain, decibels and logs to be challenging topics. Many instructors use “rules of thumb” to help students remember the correct responses to exam questions, but that method may not result in comprehension. Everyone — students and instructors alike — would benefit if we could teach this topic more effectively. If you have resources that you find helpful, or a strategy that you find successful, please send them to us! We'll develop a reference library to share on our instructor resource page ([www.arrl.org/shop/Instructor-Resources/](http://www.arrl.org/shop/Instructor-Resources/)). Send your strategies to Debra Johnson, K1DMJ, ARRL Education Services Manager at [djohnson@arrl.org](mailto:djohnson@arrl.org).

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## In The Classroom...



A new twist on an old formula helps students grasp electronics concepts.

## Teaching Ohm's Law

By Bill Richardson, N5VEI

In the STEM course that I teach to eighth-graders in Olde Towne Middle School in Ridgeland, MS, the students now get really excited by electronics.

My class learned the familiar triangle or circle depicting E (or V) over IR. While the math was basic, visualizing it as a unified formula was a challenge for some. One technique that helped them understand voltage, current, and resistance was using comparisons to lakes, streams, water towers, and dams.

Once students had mastered Ohm's Law we moved on to series and parallel circuits. The concept of parallel circuits was harder for them to grasp, but using visuals of pipes splitting into parallel structures helped many of them. One common difficulty they had was being able to quickly find common denominators.

The main problem I saw with the students learning the formula was because of the way it is usually written:

$$R_{total} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots}$$

While most of us learned it this way, I once saw a video of an engineer whose approach really made sense. He explained parallel resistance to a group of students using this formula:

$$R_{Total} = (1/R_1 + 1/R_2 + 1/R_3 + 1/R_N)^{-1}$$

While the two formulas are virtually the same, the second presented the concepts in a way my students understood, and they could now work diligently on mastering the skills on paper for the upcoming lab: building a series and parallel breadboard.

The happy outcome of the lesson was that the vast majority of students passed the test on the unit. I was also pleased to find that many of the girls were interested in electronics and in building the projects we were learning.

Next, my students will work on parallel and series circuits, drawing a conclusion or hypothesis about each. They will then build the circuits, take all critical measurements, and prove or disprove their hypotheses. After that, we'll go into series and parallel LEDs.

Bill Richardson, N5VEI, has taught middle and high school for 14 years and holds an Amateur Extra class license.

*"The happy outcome of the lesson was that the vast majority of students passed the test on the unit."*

— Bill Richardson,  
N5VEI

Winter 2014

## School Club Roundup

The club station at Mill Springs Academy (MSA) in Alpharetta, GA, an ARRL Education & Technology Program (ETP) grant-recipient, hums with activity through the School Club Roundup (SCR). MSA science teacher and radio club trustee Martha Muir, W4MSA, a grad of the ARRL Teachers Institute TI-1 and TI-2 sessions, recently shared some of the school's SCR experiences, saying,

"We're trying to get as many students on the air as we can. We've scheduled a different level of our school to come by on different days this week and work with a volunteer from NFARL [North Fulton Amateur Radio League] to get on the air. Yesterday, Jim Stafford, W4QO, graciously/patiently/masterfully helped a crew of 4th graders have a conversation with another marvelously patient guy in Arkansas (AC5UG). Word from 'up the hill' is that they went back to their classes all excited about what they had just done."



Teachers do analog-to-digital conversion of temperature readings from a thermistor at the TI-2 Remote Sensing, hosted by Dayton Amateur Radio Association in Dayton, OH, July 2013. (Photo courtesy of Joe Brassard, KA8C)



Students at Mill Springs Academy participate in their first School Club Roundup in October 2013.

For more news on SCR happenings, see the January QST article, "[Working the School Club Roundup on VHF](#)." The next opportunity to participate in the contest is coming up February 10–14. Make sure to visit the ARRL SCR web page at [www.arrl.org/school-club-roundup](http://www.arrl.org/school-club-roundup) for rules, results, and ideas to get started.

## Education & Technology Program News

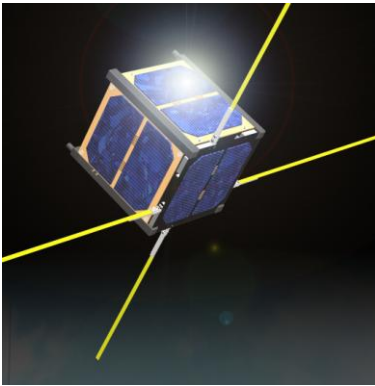
**Teachers Institute Schedule for 2014.** The ARRL will again offer three sessions of the Teachers Institute (TI). There will be two sessions of the *Introduction to Wireless Technology* (TI-1) and one session of the advanced Teachers Institute (TI-2) on the topic of *Remote Sensing and Data Gathering*, as outlined below:

2014 Teachers Institute Schedule	
Dates	Location
<b>TI-1 Introduction to Wireless Technology</b>	
June 23–26	Dayton Amateur Radio Association, Dayton, OH
July 22–25	ARRL Headquarters, Newington, CT
<b>TI-2 Remote Sensing and Data Gathering</b>	
July 8–11	ARRL Headquarters, Newington, CT

For more information and an application for this four-day, expenses-paid professional development opportunity, visit [www.arrl.org/teachers-institute-on-wireless-technology](http://www.arrl.org/teachers-institute-on-wireless-technology).

Contact ARRL Education Services at [etp@arrl.org](mailto:etp@arrl.org) if you would like printed copies of our TI brochure to distribute to interested teachers.

Winter 2014



With the launch of AMSAT-UK's FUNcube satellite this past November, students and hams around the world have the opportunity to learn from a materials science experiment launched on the satellite.

## FUNcube Guide for Educators

AMSAT-UK said its FUNcube project was designed "to create an educational CubeSat which is intended to enthuse, excite and educate students about radio, space, physics and electronics. It will also support educational science, technology, engineering, and mathematics (STEM) initiatives."

A new FUNcube guide developed by ETP Director Mark Spencer,

WA8SME, aims to maximize the educational focus of the satellite. Spencer's *Pragmatic Guide for Using the FUNcube (AO-73) Materials Science Experiment in the Classroom* prompts readers to dig beyond FUNcube's transponder and telemetry uploads and downloads and "take a closer look at what is really going on" as the satellite orbits Earth.

Spencer's *Guide* is shared on the ARRL's ETP classroom resource page at [www.arrl.org/classroom-library-satellite-communications](http://www.arrl.org/classroom-library-satellite-communications).

For more on the educational opportunities presented by the satellite, read the ARRL's [news story](#) and visit the FUNcube website at <http://funcube.org.uk/>.

**Other New ETP Resources to Connect Classrooms to Space Research.** The ARRL ETP page mentioned in the FUNcube story above also offers links to many other instructional resources recently developed by Spencer to help teachers take advantage of experiments that will be launched later this year or early next year on AMSAT's Fox satellite. This includes experiments to study satellite "wobble" employing a gyroscope and on Maximum Power Point Tracking (MPPT) that demonstrates how the power generated by the satellite's solar panels is managed for maximum efficiency.

**Recent Grant Awards.** The ARRL received six applications for station equipment and other

instructional resources under its ETP this past November. Four applications were approved, awarding grants to the following schools:

- Edward S. McBride High School in Long Beach, CA
- North Mac Middle School in Girard, IL
- Forest Knolls Elementary School in Silver Spring, MD
- Olde Town Middle School in Ridgeland, MS

Teachers affiliated with each of these schools have participated in professional development training through ARRL's Teachers Institute. For details about the grant awards, read the [news story](#) on the ARRL's website.

The next deadline for grant applications is November 1, 2014. For more information and to download an application, visit [www.arrl.org/etp-grants](http://www.arrl.org/etp-grants).

As with all resources developed for schools through donations to the ETP Fund ([www.arrl.org/education-and-technology-fund](http://www.arrl.org/education-and-technology-fund)), hams and instructors in the Amateur Radio community are invited to employ these materials in their work with Scouts and in other educational venues, or for their own self-enlightenment. We are able to offer anything we hold in inventory to clubs and individuals at cost plus a small increment donation to support the ETP. Please ask if you are interested in acquiring any of the resources described.



Winter 2014

## Input for General Class License Exam Invited

The Question Pool Committee (QPC) of the National Conference of Volunteer Examiner Coordinators (NCVEC) has concluded its review of the Technician question pool, and it is now starting the process of reviewing the General class question pool in preparation for a new release for exams, effective July, 2015.

Now is the time to be heard if you have specific suggestions about topics to add or remove, or changes or updates to specific questions! Send your input to [qpcinput@ncvec.org](mailto:qpcinput@ncvec.org).

You may also send suggestions directly to the members of the QPC listed on the NCVEC website at: [www.ncvec.org/](http://www.ncvec.org/).

Be assured that when a comment is made to them, they will discuss the issue, and you are promised a reply by the committee chairman.



## 2013 Licensing Statistics

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

Somma notes that new licensees increased by 7% over 2012 (28,886 in 2013 versus 27,082 in 2012). Licensed US Amateur totals as of December 31, 2013 were at a new high of 717,201, a 1% increase over the 2012 year end total of 709,575.



The ranks of licensed hams continue to grow, thanks in part to classes held by organizations like the Federal Way Amateur Radio Club. (Photo thanks to Daniel Stevens, KL7WM)

### NEW AND UPGRADED FCC LICENSES ISSUED BY YEAR

FCC License Activity	2011	2012	2013
Technician	21,316	23,974	25,621
General	9,667	10,132	9,567
Extra	3,426	3,259	3,023
<b>Total Issued</b>	<b>34,409</b>	<b>37,365</b>	<b>38,211</b>

Winter 2014

**Contact Us:****ARRL Education Services**

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Newington, CT 06111

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(860) 594-0296  
[djohnson@arrl.org](mailto:djohnson@arrl.org)

Mark Spencer, WA8SME  
Education & Technology Program  
Director  
[mspencer@arrl.org](mailto:mspencer@arrl.org)

**Resources for License Instructors:**

[www.arrl.org/resources-for-license-instruction](http://www.arrl.org/resources-for-license-instruction)

**Resources for Teachers:**

[www.arrl.org/amateur-radio-in-the-classroom](http://www.arrl.org/amateur-radio-in-the-classroom)

**Education & Technology Program:**

[www.arrl.org/education-technology-program](http://www.arrl.org/education-technology-program)

**Teachers Institute on Wireless Technology:**

[www.arrl.org/teachers-institute-on-wireless-technology](http://www.arrl.org/teachers-institute-on-wireless-technology)

**ARISS Program:**

[www.arrl.org/amateur-radio-on-the-international-space-station](http://www.arrl.org/amateur-radio-on-the-international-space-station)

## 2014 Upcoming Events, Opportunities and Deadlines

**The School Club Roundup** for the Winter/Spring Term will occur from **February 10–14**. The primary means of submitting a score and log are now via the Web. Visit [www.arrl.org/school-club-roundup](http://www.arrl.org/school-club-roundup) for more information.

**The Foundation for Amateur Radio (FAR)** is inviting applications for the Amateur Radio-related scholarships it administers. Applications are due by **April 30**. For more information, visit [www.arrl.org/news/foundation-for-amateur-radio-far-invites-scholarship-applications](http://www.arrl.org/news/foundation-for-amateur-radio-far-invites-scholarship-applications).

**Applications for ARRL's Teachers Institute** on Wireless Technology are due May 1. Visit [www.arrl.org/teachers-institute-on-wireless-technology](http://www.arrl.org/teachers-institute-on-wireless-technology) for more information.

## Herb Brier Award Nomination Deadline

**The Herb Brier Award**, named after long-time CQ Novice Editor Herb Brier, W9AD, is given to a recipient who exhibits the spirit of effective, caring Amateur Radio instruction. It is co-sponsored by ARRL and the Lake County Amateur Radio Club and bestowed by the ARRL to recognize the very best in volunteer Amateur Radio instructors. This is a wonderful way to recognize the efforts of an effective instructor or instructor team. The nomination **deadline is March 15, 2014**. You can review the requirements at [www.arrl.org/herb-s-brier-award](http://www.arrl.org/herb-s-brier-award) and use the nomination form provided on the ARRL website. Do note the documentation requirements that must accompany a nomination, which may take some preparation time.

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## BASIC INCIDENT COMMAND SYSTEM (ICS) 200.B

*THIS COURSE HAS BEEN APPROVED FOR TWELVE AND ONE HALF HOURS (12.5) OF CONTINUING EDUCATION BY AN APPROVED CALIFORNIA EMS CE PROVIDER AND IS INSTRUCTOR BASED. CALIFORNIA EMS CE PROVIDER #60-0250. NO BRN/CE WILL BE ISSUED.*

*Presented by Modesto Regional Fire Authority Office of Emergency Services Division and Stanislaus County Operational Area*

When: May 27-28, 2014  
0800 - 1700 (8 hours on May 27)  
0800 - 1230 (4.5 hours on May 28)

Where: MRFA/Stanislaus County OES/EOC  
3705 Oakdale Road  
Modesto, CA

Fees: No charge  
(Funded through FY11/FY12 Homeland Security Grant)

Contact: Melba Hibbard 209-552-3600  
[mhibbard@modestorfa.org](mailto:mhibbard@modestorfa.org)  
Dave Funk 209-552-3600  
[dfunk@stanoes.com](mailto:dfunk@stanoes.com)

Registration Online: <http://www.stanoes.com>

A twelve and one half (12.5) hour course that meets the requirements of the National Incident Management System for the Basic Incident Command Course. This course is designed to go beyond the basics of NIMS/SEMS/ICS introduction courses and focuses on the expanding incident and management of single resources. Other topics covered are Leadership and Management, Delegation of Authority, Management by Objectives, Functional Areas and Positions, Briefings, Organizational Flexibility, and Transfer of Command. **This class will not be State Fire Marshal/CICCS Certified (SFM certification may be offered if local requests are received in advance of the course).**

**Target Audience:** First line supervisors, single resource leaders, or other emergency response/management personnel who require a basic level of NIMS/SEMS/ICS training.

**Pre-requisite:** Completion of: IS - 700: Introduction to NIMS  
ICS-100: Introduction to ICS

*Space is limited, so early registration is recommended.*



## ICS 100.B INTRODUCTION TO THE INCIDENT COMMAND SYSTEM (ICS)

*THIS COURSE HAS BEEN APPROVED FOR FOUR (4) HOURS OF CONTINUING EDUCATION BY AN APPROVED CALIFORNIA EMS CE PROVIDER AND IS INSTRUCTOR BASED. CALIFORNIA EMS CE PROVIDER #60-0250. NO BRN/CE WILL BE ISSUED.*

Presented by Modesto Regional Fire OES Division and Stanislaus County Operational Area

When: May 21, 2014  
1300 – 1700 (1-5 pm)

Where: Stanislaus County OES/EOC  
3705 Oakdale Road  
Modesto, CA 95370

Fees: No charge (Funded through FY11/12 Homeland Security Grant)

Contact: Melba Hibbard 209-552-3600  
[mhibbard@modestorfa.org](mailto:mhibbard@modestorfa.org)

Dave Funk 209-552-3600  
[dfunk@stanoes.com](mailto:dfunk@stanoes.com)

Registration Online: <http://www.stanoes.com>

The Modesto Regional Fire Authority/Stanislaus County Operational Area is presenting a four (4) hour course that introduces the Incident Command System. This course meets NIMS requirements for compliance with ICS 100b. It also discusses California's Standardized Emergency Management System. This awareness level training will cover topics such as: Purpose of ICS; Basic Features of ICS; Incident Commander and Command Staff Functions; General Staff Functions; Facilities; and Common ICS Responsibilities.

**Target Audience:** Emergency response personnel, disaster service workers, government employees, Amateur Radio Emergency Service and other Ham club operators, Search and Rescue Team members, and generally anyone who may respond or be involved in coordinating and supporting incident management activities.

**Pre-requisite:** None

*Space is limited, so early registration is recommended.*





## IS 700.A INTRODUCTION TO NATIONAL INCIDENT MANAGEMENT SYSTEM

*THIS COURSE HAS BEEN APPROVED FOR FOUR (4) HOURS OF CONTINUING EDUCATION BY AN APPROVED CALIFORNIA EMS CE PROVIDER AND IS INSTRUCTOR BASED. CALIFORNIA EMS CE PROVIDER #60-0250. NO BRN/CE WILL BE ISSUED.*

Presented by Modesto Regional Fire OES Division and Stanislaus County Operational Area

When: May 21, 2014  
0800 - 1200

Where: Stanislaus County OES/EOC  
3705 Oakdale Road  
Modesto, Ca. 95370

Fees: No charge (Funded through FY11/12 Homeland Security Grant)

Contact: Melba Hibbard 209-552-3600  
[mhibbard@modestorfa.org](mailto:mhibbard@modestorfa.org)

Dave Funk 209-552-3600  
[dfunk@stanoes.com](mailto:dfunk@stanoes.com)

Registration Online: <http://www.stanoes.com>

The Modesto Regional Fire Authority OES Division/Stanislaus County Operational Area is presenting a four (4) hour course that introduces the National Incident Management System. This course meets NIMS requirements for compliance with IS700a. It also discusses California's Standardized Emergency Management System. This awareness level training will cover topics such as: NIMS Components, Concepts, and Principles.

**Target Audience:** Emergency response personnel, disaster service workers, government employees, Amateur Radio Emergency Service and other Ham club operators, Search and Rescue Team members, and generally anyone who may respond or be involved in coordinating and supporting incident management activities.

**Pre-requisite:** None

***Space is limited, so early registration is recommended.***