

November Club Meeting

Date: Friday, November 20, 2009

Time: Socializing at 7 pm, Meeting at 7:30

Place: Covington School, 205 Covington Road, Los Altos

Speaker: Jerry Ramie, KI6LGY

Topic: Utility Communications in the Modern Power Grid

Summary: Jerry will describe communications in the smart grid and its attributes, including the strengths and weaknesses of all utility communications media choices with emphasis on their potential to cause interference to and be interfered with by the amateur service.

Jerry will cover the system design choices, including which combination of internal and external media were chosen by the three major utilities in California. Jerry will talk about the "smart" meters that PG&E is starting to install. The smart meters apparently involve two different communication techniques: The link between the meter and home uses ZigBee at 2.4 GHz or 900 MHz. The link between the meter and the utility uses frequency hop spread spectrum (FHSS).

PG&E is placing orders for millions of these meters before trials, which are scheduled for later this year. Without tests, the new meters immunity to interference from amateur transmissions is unknown. It's not clear if these devices have any immunity considerations in their designs.

Prizes: The first prize for this month is a Yaesu FT-1900 2-meter 55-watt mobile transceiver. 2nd prize a 2009 ARRL Handbook. Third prize is a 2009-2010 Repeater Directory. Fourth prize is an Adventures of Zack and Mack Calendar.

The club offers refreshments (great coffee, great cookies), great raffle prizes and technical advice at the meeting: Bring your questions for Dr. Know-It-All and get great answers. Be sure to attend for an enjoyable evening!

Pre-Meeting Dinner: There is a pre-meeting dinner at 6:00 pm for those who would like to attend. We meet at the Beausejour Restaurant, 170 State St., Los Altos. There are Great Early Bird specials.

Upcoming Events

Nov 20 7:00 pm, [Club meeting](#), FARS Homebrew Contest
 Dec 3 7:30 pm, Board Mtg at the Los Altos Town Crier
 [Electronics Flea Market](#) Resumes March 2010
 Dec 5 8 am to 9 pm, [Am-Tech Day](#), SLAC NAL
 Dec 18 7:00 pm, [Club meeting](#), Covington School
 Thursdays 8:00 pm, FARS net, 145.230(-), 100 Hz PL

See more events, [FARS Calendar](http://www.fars.k6ya.org/events/calendar) <<http://www.fars.k6ya.org/events/calendar>>

President's Corner



Membership Meeting. Our next regular membership meeting is Friday, November 20th at 7pm. This month's talk is **Utility Communications in the Modern Power Grid** with Jerry Ramie, KI6LGY. He talks about the modern

"Smart Grid" that will help us distribute and use energy more efficiently. He focuses on the new "smart" electric meters, how they work, and how the technology might affect or be affected by amateur radio.

Elections. November is our Annual Membership meeting, where we will elect five directors to the FARS Board. Members are encouraged to attend and vote. The following have been nominated by the Board to serve three-year terms on the FARS Board of Directors: Mikel Lechner, KN6QI; Steve Stearns, K6OIK; Dave Cooper, K6WA; Phil Hawkins, KA6MZE; and Robert Flemate, KE6TFU.

Winter Banquet 2010. The FARS/PAARA Winter Banquet 2010 is scheduled for January 22nd. Our speaker is Professor Thomas H. Lee of the Stanford Microwave Integrated Circuits Laboratory. His talk From Arc Alley to Silicon Valley, covers some of the history of technology and radio in the Silicon Valley. His talk, is based in part on his book chapter entitled A Nonlinear History of Radio. All the details and sign-up forms are available at <http://www.fars.k6ya.org/events/banquet>.

Am-Tech Day. The next Amateur Radio Technology Day is scheduled for December 12th. A new feature is movies at 7pm and there is always a lot of activity and interesting programs, so be sure to check it out. Bring out your portable gear to show or work contacts. Also, try out our GOTA station. Check the web site (www.fars.k6ya.org/amtechday/) or the email list (www.fars.k6ya.org/mail/) for the date and program information.

Electronics Flea Market. The next Electronics Flea Market is closed for the winter months. The next flea market is scheduled for March 2010.

Email Notices. Subscribe to the FARS Announcement list (www.fars.k6ya.org/mail/) to receive reminders of FARS activities and other news.

de Mikel, KN6QI

October Meeting Report

FARS extends a big thank you to last month's speaker Khaled Nikro and Applied Wave Research. Khaled offered a 60-day trial of AWR Design Suite which includes Microwave Office to everyone who attended the October FARS meeting. The software runs under Windows. Anyone who wishes to take advantage of the offer needs only to register on the AWR web site. Once registered, instructions are sent by email and include a password which permits downloading the software and tutorial documents. The download is approximately 180 Mbytes.

CLUB INFORMATION

President: Mikel Lechner, KN6QI
Vice President: Steve Stearns, K6OIK
Treasurer: David Cooper K6WA
Secretary:
Radio Officer: Phil Hawkins, KA6MZE
Training Officer: Kevin Weiler, K6XXX
Relay Editor: Mark Hardy, K6MDH
FARS Board: Dick Baldwinson N6ATD, Peter Chow AF6DS,
Robert Flemate KE6TFU, Nimit Hongyim K6XOX,
Gerry Horn K6TXD, Charlie Morrin KI6FX Y,
Barbara Neuhauser AE6RM.

K6YA Trustee: Phil Hawkins, KA6MZE
FARS Web Page: <http://www.fars.k6ya.org>
Download Relay: <http://www.fars.k6ya.org/relay>

Club members and non-members are encouraged to subscribe to the FARS Announcement list by browsing www.fars.k6ya.org/mail, clicking on Subscribe/Unsubscribe and following the instructions under "Subscribing to fars-announce."

You may submit announcements to the FARS Announcement at fars-announce@sypal.org. The list is moderated and messages will be posted as approved by the list moderator.

Contact the FARS board of directors at fars-board@sypal.org

Club meetings are held at 7 PM on the fourth Friday of each month except January (Winter Banquet); and sometimes there are changes for June (for field day) and Nov. & Dec (for holidays).

Annual club membership is \$20. Club badges are \$9. Visitors are always welcome! Directions in this newsletter. Talk-in: N6NFI (145.23-, 100 Hz) or W6ASH repeater (145.27-, 100 Hz).

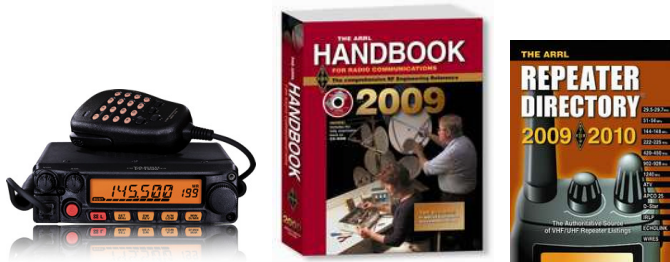
FARS *Relay* is the official monthly newsletter of the Foothills Amateur Radio Society. Contributions to the newsletter from members, family, and guests are earnestly solicited! Contributions are subject to editing and/or compression. All readable forms welcome.

Here is how to reach the editor:

Mark Hardy, K6MDH
Mail: P.O. Box 2248
Santa Clara, CA 95055
Voice: 408-243-0701 (Before 9 PM, preferred)
Email: mark.af6do@gmail.com, At FARS meetings.

November Raffle Prizes

The first prize for November is a Yaesu FT-1900 two meter 55-watt mobile transceiver. 2nd prize is a 2009 ARRL Handbook. Third prize is a 2009-2010 Repeater Directory. Fourth prize is an Adventures of Zack and Mack Calendar. Photos from manufacturers' websites.



October Meeting Report (Cont.)



**Gary, Arv, Doña, Mikel and Nimit - Raffle Winners
Picture Thanks to David Cooper, K6WA**

The first prize, a Larson Model KG-2/70CXPL 2Meter/440 On Glass antenna was won by Gary Barnes, KI6HIG. Second prize, a MFJ-822 HF/VHF 300 watt 1.8-200 MHz X-Needle SWR/Watt Meter, was won by Nimit Hongyim, K6XOX. Arv Hamer, , took home the third prize ARRL Repeater Directory. Mikel Lechner, KN6QI won the Icom Adventures of Zack and Max Calendar. The Yaesu World Map was won by Doña Kerns, KI6DAR. The Wish You Were Here (WYWH) number for Sherman Tam, KI6TSO, was chosen

Dr. Know-It-All

Dear Doctor,

I'm former amateur radio operator W5IGN and have just retired after 38 years as physics professor at the College of Charleston. I used to build crystal radios by the dozen. I am trying to develop a simple easy to build (coil wrapped around pill bottles and single germanium diodes) radio for introductory calculus physics students to build in a single afternoon lab.

I have a feeling that I could build a much better one if I understood better how the impedance matching between a long wire antenna dropped from a 40 foot (or so) roof and an incoming tuned tank circuit or center tapped coil works. I am thinking that some sort of additional "loading coil" might greatly improve the received volume (an hence the students' satisfaction).

So what I am looking for is an article or a text book or something like that to read about antenna impedance matching at a level I could understand with a couple of weeks work reading on my part.

It occurred to me that you might know off the top of your head where I might do some useful reading. Thanks in advance.

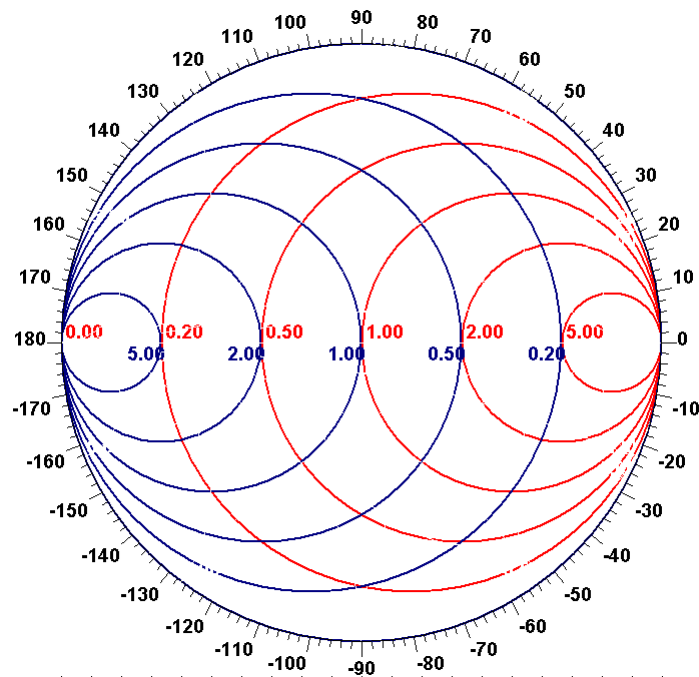
Laney Mills
Professor Meritus
College of Charleston

Answer: I have found that impedance matching can be taught without mathematics by teaching students to think about impedance matching as a special kind of board game. The board is a Smith chart. The board is like a chess board but with interesting differences. Instead of rows and

columns (rank and file), we have resistance circles and reactance arcs, two families of orthogonal circles. If you rotate the Smith chart 180 degrees, you have a different coordinate system of conductance circles and susceptance arcs. The impedance matching game is played by making moves along the resistance and conductance circles. The reactance and susceptance arcs are not used.

Like chess, there are different kinds of men, each able to make different moves on the board. The men are analogous to bishops and rooks, rather than knights or pawns, because they can move any distance along their allowed paths. The analogy to chess stops here. A player's men do not capture an opponent's men. Instead a player deploys his men according to rules to accomplish a goal. There are four kinds of men with these names and movements:

- Cs men move counter-clockwise along resistance circles
- Ls men move clockwise along resistance circles
- Cp men move clockwise along conductance circles
- Lp men move counter-clockwise along conductance circles



The game can be played with two players as adversaries, one player solitaire, or several players cooperating as a team. Here is the 2-player version.

Player 1 picks a starting point on the board. This is the initial impedance that Player 2 must try to match.

Player 2 has the job of creating a path via a sequence of moves that starts at the initial impedance and ends at the

“match point” at the center of the Smith chart. He has an unlimited supply of the four kinds of men with which to move along arcs on the board. You can think of the game as a relay race. For each segment of the path, the player chooses the kind of man and how far he travels before handing off to the next man. The player's score is determined by the men he uses to create a path from initial impedance to match point. After the first round, the players reverse roles, and Player 2 chooses a starting point (initial impedance) for Player 1.

Scoring: There are several variants on scoring. One scoring scheme is to count all men as equal. A player's score is the number of men he uses, and the player who gets the lowest score wins. A variant scoring scheme is to count only the Ls and Lp men. The other men (Cs and Cp) can be used freely and do not affect the score. Again the lowest score wins.

After students learn to play this game, the teacher can introduce the idea of electrical networks that have ladder topology. The teacher shows the correspondence between a sequence of moves and a ladder network that has series and parallel elements. The four kinds of men correspond to capacitors and inductors in the series and parallel branches of the ladder network. I have taught children to design sophisticated single-frequency impedance matching networks by playing this game.

You can read the mathematics of impedance matching in books and articles. However, you will have a lot more fun if you can obtain a copy of a simple program called winSMITH. It was originally written by Eagleware and sold by Noble Publishing. Eagleware is now owned by Agilent and Noble by SciTech. Perhaps you can find a used copy of winSMITH for sale on eBay or Amazon.com. WinSMITH is a Windows version of an earlier, now obsolete DOS program called MicroSmith, written by Wes Hayward, that ARRL sold 15 years ago.

That's it for this month. You can send your comments or questions about any aspect of Amateur Radio to Dr. Know-It-All. Written comments and questions are accepted at the monthly meetings of the Foothills Amateur Radio Society, by email to FARS officers and board members, or through the FARS web site at <http://www.fars.k6ya.org>

5 Tips to Getting the Best Measurements Out of Your Oscilloscope

As an engineer, you use an oscilloscope to test your projects on a daily basis - which means there could be quite a few practices that you're taking for granted, or just overlooking. Time for a refresher? This free article has 5 easy tips that you can use to ensure the best and most accurate measurements out of your equipment!

http://www.radio-electronics.com/info/t_and_m/oscilloscope/using-oscilloscope-scope.php

FARS 2009 MEMBERSHIP RENEWAL FORM

Date: _____

PLEASE fill out the form for all new/renewal memberships.

Name(s) & Callsign(s) & Class (E-A-G-T-N-None): _____

Mailing Address: _____

Home phone: _____ Work phone: _____

Fax (H or W?) _____ Packet BBS Address: _____

E-mail: _____ ARRL Exp Date(s): _____

Preferred modes: (e.g. HF-SSB/VHF/QRP/Other): _____

I'm willing to Elmer new hams with: _____

Special topics of interest / suggestions for club meeting speakers:

Dues: \$20 per year, new members add \$9 for badge fee. **Please note:** Membership runs from January 1 to December 31.

Send your check payable to FARS, to:

David A. Cooper
PMB 41
270 Redwood Shores Parkway
Redwood City, CA 94065-1173



How to get to FARS Club meetings (Visitors always welcome)

Meetings are held at the Covington Elementary School (directions below) on the fourth Friday. Socializing at 7 PM with the regular meeting at 7:30 PM. There may be changes in the meeting dates for January, June, November, and December.

DIRECTIONS:

From Interstate 280. take the El Monte exit Northeast. Cross Foothill Expressway. (A) At the first traffic light turn right on Covington. (B) Immediately at the fork take the left street (Covington). Go about 1/10th of a mile. Turn left into the parking lot. The gym is the tall building to your right with red and white stripes.

From Foothill Expwy., take the El Monte exit and go Northeast; then follow directions as above at point (A).

From US101 or El Camino: take San Antonio Road west (to Foothill Expressway). Then follow directions above at point (A).

TALK-IN via the [N6NEI](#) (145.230-; 100Hz PL) repeater or the [W6ASH](#) 145.27- (100Hz PL) repeater.