

April Club Meeting

Date: Friday, April 22, 2005.

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

Place: Covington School, 205 Covington Road, Los Altos

Speaker: Andreas Jung, N6NU

Topic: Text messaging capabilities of APRS

Summary: Did you know your 2 meter FM transceiver can be used for sending and receiving text messages to or from other hams? That you can send messages while mobile that non-hams can read on their computers? The Advanced Packet Reporting System (APRS) permits sending packets that contain more than just GPS coordinates. In fact, GPS coordinates are optional; you can text message instead. Come and learn how to use these little known capabilities of APRS.

Bring your questions to Cr. Know-it-all. New feature! "Mini-Morse" code practice session before the meeting.

March Meeting Report

At the March meeting, Dru Anderson, KG6LAD, spoke about Amateur Radio's role in providing communications for disaster relief efforts.



Dru Anderson, KG6LAD



Steve Leander, KV60

Steve Leander, KV60, carried away the raffle prize, an ICOM IC-T2H handheld. Congratulations to Steve. The "Wish You Were Here" number for Howard Feiner, KF6YXH, was chosen. Unfortunately, Howard was not present.

Upcoming Events

Apr 22 7:00 PM, Club meeting, Covington School
 Apr 23 8 AM to 1 PM, [VOMARC Hamfest](#)
 May 5 7:30 PM, Board Mtg at the Los Altos Town Crier
 May 14 6 AM to noon, [Electronics Flea Market](#)
 May 14 8 AM to 9 PM, [AM-Tech day](#), SLAC
 May 27 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.shtml>

Presidents Corner

Club Meeting. April 22 at 7pm. Learn how to use APRS to send messages, not just GPS coordinates.

Flea Market. The Electronics Flea Market has moved to De Anza College. The next market is scheduled for May 14, so start your day with the flea market, then bring your new toys to Am-Tech Day at SLAC. Check www.asvaro.org for details and directions. The Palo Alto Amateur Radio Association is hosting this Flea Market.

Am-Tech DAY. May 14 is our next Am-Tech Day at SLAC, check the FARS web site (www.fars.k6ya.org/) for details on the location or subscribe to the FARS Announcement list (www.fars.k6ya.org/mail/) to make sure you get an email reminder.

- de Mikel, KN6QI

Board of Directors Meeting Minutes

Thursday, February 3, 2005 at 7:30 p.m

Conf. Room, Los Altos Town Crier, 138 Main Street, Los Altos

Present: Richard Baldwinson, Dave Cooper, Robert Flemate, Ron Green, Mark Hardy, Phil Hawkins, Ruth Lacey, Steve Leander, Mikel Lechner, Steve Stearns, Howard Takaoka.

Absent: Rob Goodson

President Lechner called the meeting to order at 7:30 p.m.

The January 6 board meeting minutes were accepted as read.

Dave Cooper reported on the member signup for the year 2005. (President Lechner asked that 20 copies of the new roster be available at the next FARS meeting with the names of the unpaid members so indicated.)

The banquet was a success. The restaurant cost was \$2732.30. Two meals at a total cost of \$69 were unpaid for due to non-appearance, but will be paid for. Income from the banquet was \$437.45. The cost of the raffle prizes was not met, with a loss of \$150 to be split between FARS and PAARA. Current bank account total: \$7228.29

A discussion followed regarding the need to stimulate banquet-goers to buy raffle tickets. Dave Cooper made a motion to approve a bill for \$108.75 for the Relay. Dick Baldwinson seconded. Approved unanimously.

Dave regretted that Mark's slides of Ham Day were not shown at the banquet and suggested that they be shown at the next FARS meeting.

Reporting on AM-TEC Day, Dave announced that there were about 80 participants. The next A-T Day is Saturday, February 5, 8:00 a.m. to 9 p.m. at SLAC.

Possible program topics were discussed. The topic for the February meeting will be electromagnetics. President Lechner suggested that a short, 3-sentence summary of a program be placed in the Relay afterwards to show members what they missed. Suggestions for future programs were offered by several board members.

The Electronics Flea Market is being forced to move again this year. ASVARO is currently looking for a new location with at least 800 spaces (400 spaces for vendors, 400+ for buyers).

ASVARO would appreciate help in finding a new location as time is running short they have not had good luck on finding a new location. This is an important problem for FARS, since the Flea Market represents about 50% of annual income.

[See the President's corner for more info on this topic-ed]

President Lechner announced that it was time for FARS to present a new ham training class. Steve Leander offered to organize it. Discussion followed. President Lechner moved to elect Steve as the new training officer. The motion was seconded by Dick Baldwinson. Unanimously approved.

The meeting was adjourned by President Lechner at 9:12 p.m.

The next board meeting will be Thursday, March 3, at 7:30 p.m.

- de Ruth Lacey, Secretary

Letter of Appreciation (Received by K6OIK, 4/7/05)

Hi Steve,

I know it has been almost 4 years since you held the Technicians classes at Terman in Palo Alto and the Radio, Electronics & Electricity merit badges for the scouts at the Mt View library, but I thought you would be interested to know that my son has just about finished his Eagle requirements in Troop 33. Matthew finished his Eagle project last weekend. Your 3 merit badge kick started him in scouts - he now has 35 merit badges. It has also been a quick 4 years.

Thanks for getting Matthew started on the merit badge trail.

Jack Giebler (The father of KG6GRT)

Dr. Know-It-All

Question: I've heard that it's difficult to match a shortened center-loaded vertical for the HF bands of the type typically used for QRP and portable work because, even with a good ground plane, the feed-point impedance is so low.

Since a shortened antenna is capacitive, one needs to add inductance to make it resonate. So, take the typical center-loaded vertical for one of the HF bands and shorten it just enough so one could add a small, high Q coil at the base to bring it back to resonance. It seems to me that the coil now provides a variable impedance as one moves from the grounded bottom of the coil up to the top and the antenna. By tapping the center of the feed line coax up on the coil, one should be able to find a 50-ohm point.

As a variation of this idea, if one uses a tuned circuit at the base, one should not only be able to tap up to find the optimum feed point, but also tap the antenna down on the coil to optimize the antenna impedance match. From Rich, W6APZ.

Answer:

Upon checking various amateur handbooks and antenna books, no simple, comprehensive analysis of matching an electrically short vertical monopole with a base loading coil could be found. So the points raised above are apparently not trivial. Answering the question may occupy several columns. This month we will review the basic problem and the classical solutions. Next month, we'll tackle the problem in a rigorous manner, and discover some interesting, and apparently unknown, twists.

Let's start with a review of antenna impedance. Impedances are complex numbers consisting of real and imaginary parts, denoted

$Z(f) = R(f) + jX(f)$, where "j" is the square root of -1. The real and imaginary parts depend on frequency, but, for passive devices, are not independent of each other. The real part $R(f)$ determines the imaginary part $X(f)$, and vice versa. The real and imaginary parts of an impedance are called its resistive and reactive parts. Simple lumped elements such as resistors, capacitors, and inductors have simple impedances. For example, the impedance of an "ideal" resistor is a constant and real value at all frequencies: $Z(f) = R$. The impedance of an "ideal" inductor, of inductance L , is a positive imaginary function of frequency: $Z(f) = jX(f)$, where $X(f) = 2\pi fL$. Likewise, the impedance of an "ideal" capacitor, of capacitance C , is a negative imaginary function of frequency: $Z(f) = jX(f)$, where $X(f) = -1/(2\pi fC)$. R , L , and C are understood to be positive constants that don't vary with frequency. It's customary to say that inductors have positive reactance, and capacitors have negative reactance.

Some authors mistakenly write $Z_C = -jX_C$, where $X_C = 1/(2\pi fC)$. However, this notation leads to confusion because it removes the algebraic sign from reactances and makes all reactances positive, which is wrong, or else X_C is not the symbol for capacitive reactance but its negative, which is worse.

Antennas, unlike lumped element resistors, capacitors, and inductors, have more complicated impedances. The resistive part of an antenna's impedance is a sum of terms that represent the radiation and dissipation of power. If an antenna has no losses, then the resistive part of its impedance is its radiation resistance. More commonly, however, the resistive part consists of radiation resistance plus conduction losses, called by various names such as " I^2R " losses, "copper" losses, or "ohmic" losses. In addition to conduction losses in the antenna proper, there can be dielectric losses in insulation and insulators. There can also be losses due to currents induced in nearby conductors that aren't part of the antenna proper. Examples include guy wires, ground-plane radials, and earth ground losses. The imaginary or reactive part of an antenna's impedance represent stored energy that doesn't radiate. This energy shuttles back and forth between electric and magnetic fields in the near field region. In some antennas, like dipoles and monopoles, the near fields play an important role as a middle-man by driving the far field radiation.

An antenna system is "resonant" when it's feedpoint impedance is purely resistive without reactance. The goal of impedance matching techniques is to get an antenna to accept and radiate as much power as possible. In practice, this means doing something to make the antenna look like a real impedance of 50 ohms. Just achieving resonance isn't enough. In fact, resonance shouldn't be the goal because a non-resonant antenna can be a fine performer provided its impedance is close enough to 50 ohms real. Conversely, a resonant antenna can be a stinker if its impedance, although real, is far from 50 ohms.

At frequencies below resonance, a dipole or monopole is electrically short. As frequency decreases to zero, the resistive part of such an antenna's impedance approaches zero, while the reactive part approaches minus infinity. In short, the short antenna looks like a capacitor.

Three methods are commonly used for correcting the impedance problem of electrically short monopoles and dipoles (not counting delta, gamma, shunt, and T feeds, which are another story). The first method is called "top loading" and makes an

antenna appear longer than it is by adding a meandering wire or a capacitive “hat” to the end of the monopole, or both ends of a dipole. This is the best method because it gives the highest radiation resistance. The second method is called “center loading” and involves putting a series inductor in the middle of the monopole, or in the middle of both legs of a dipole. Placement near the end requires much greater inductance than placement near the base. The exact placement is generally chosen for maximum radiation efficiency, i.e. a compromise between maximizing radiation resistance and minimizing conduction loss. Center loading gives less radiation efficiency than top loading. In the lossless case, i.e. infinite wire conductivity and coil Q , top loading is preferable to center loading because the former gives higher radiation resistance. Any losses act to increase the advantage of top loading over center loading further.

The top and center loading methods can be combined when an antenna can support only a small capacitive hat. Top and center loading give only partial impedance corrections. What these methods do well is to bring an antenna to resonance. The radiation resistance does increase, but not all the way to 50 ohms. So these methods are always combined with the third method, the only stand-alone method among all three.

The third method is called “base loading.” It uses a network at the base of the monopole and leaves the radiator alone. By far the most common network is the tapped loading coil. Base loading has the lowest radiation efficiency of the three methods because it does not raise the radiation resistance of the antenna. It is, however, the only method among the three that can control both the resistance and reactance. So it can achieve a 50 ohm load impedance. This is why a short top-loaded vertical monopole might still have a base loading coil. In future installments, we’ll review different networks for base loading, and we’ll discover little-known facts about impedance matching using base loading coils.

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>.

CLUB INFORMATION

President:	Mikel Lechner, KN6QI
Vice President:	Steve Stearns, K6OIK
Treasurer:	David Cooper KE6PFF
Secretary:	Ruth Lacey, KG6RZG
Radio Officer:	Phil Hawkins, KA6MZE
Training Officer:	Mike Zensius, KG6GUE
Relay Editor:	Mark Hardy, KG6GRR

FARS Board: Dick Baldwinson N6ATD, Howard Takaoka KG6GRO, Robert Flemate KE6TFU, Rob Goodson N2RAG, Steve Leander KV6O, Ron Green KG6RLG.

Station Trustee: Stan Kuhl, K6MA
 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 also submit an announcement to the FARS Announcement at fars-announce@svpal.org. The list is moderated and messages will be posted as approved by the list moderator.

The FARS board of directors may be reached at fars-board@svpal.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 \$6. Visitors are always welcome! Directions in this newsletter. Talk-in: N6NFI (145.23-, 100 Hz) or W6ASH repeater (145.27-, 100 Hz).

The 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 subject to editing and/or compression. ASCII files via Internet or diskettes preferred; but all readable forms welcome.

Here is how to reach the editor:
 Mark Hardy, KG6GRR
 Mail: 2998 Jerald Avenue
 Santa Clara, CA 95051
 Voice: 408-243-0701 (Before 9 PM, preferred)
 Fax: 408-243-0701
 Email: kg6grr@arrl.net, At FARS meetings.



FARS Membership Form

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

FARS 2005 MEMBERSHIP RENEWAL FORM Date: _____

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 Member(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 \$6 for badge fee. Please write one check for both banquet and membership.

Please note: Membership runs from January 1 to December 31.

Send your check payable to FARS, to:

David A. Cooper, KE6PFF
270 Redwood Shores Parkway
PMB 41
Redwood City, CA 94065-1173



How to get to regular meetings: (Visitors always welcome)

Our 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. From Foothill Expressway, 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 as above at (A).

TALK-IN via the [N6NFI](#) (145.230-; 100Hz PL) repeater or the [W6ASH](#) 145.27- (100Hz PL) repeater