

# The PROPAGATOR

September, 2003

The Monthly Newsletter of South Orange Amateur Radio Association

## SOARA Member Dave Seroski, KG6QCI, Honored at HAMCON

Soara member Dave Seroski, KG6QCI, was presented a prestigious award from the ARRL at Hamcon 2003, this past September 6 th. The award, entitled the "Special Service Award," is given to those who contribute significantly to



the furthering of Amateur Radio. It was awarded to Dave at the Hamcon Banquet by Art Goddard, W6XD, ARRL South Western Division Director. The recognition is for the promotional video recently produced by Dave titled *Introduction to Ham Radio*, which you may recall was shown at a recent SOARA meeting. Kudos to Dave for such a great job. Dave tells us that he is working on another video, more specifically about SOARA, and he plans to submit this one to the ARRL as well. Way to go Dave! □

## SOARA AT HAMCON 2003

Thanks to the efforts of quite a few SOARA members, we had a very strong presence at the recent ARRL Southwest Division Convention, Hamcon 2003, held this past weekend, September 5, 6, and 7, in Long Beach, CA. By all accounts, this year's convention was the largest and best attended SW Division Convention in quite some time, if not ever. SOARA had an attractive display and information table in the Clubs and

Organizations section that we can be proud of. Thanks to several members such as Jim (K6EEE), Bud (WB6RDO), Robin (KG6MCA), Brian (NJ6N), Steve, (KG6OYK), Lou (KG6FCT), and Jeremy (KG6JD) who gave freely of their time to make sure the Club table was always staffed.

The club had an even more high profile role as the presenters of the Royal Order of the Wouff Hong ceremony on Saturday evening. With just two weeks to prepare and rehearse, 15 members enthusiastically jumped in, headlong, to learn their roles, make costumes, obtain props and equipment, prepare special effects, do sound recording, sell tickets, and accomplish all the many unforeseen tasks that inevitably seem to arise at the last moment. Each donated many hours and even their personal money and equipment to make this ceremony happen. These loyal SOARA members are:

Cast: Bud (WB6RDO), Dale (W8RRV), Heiko (AD6OI), Jeremy (KG6JAD), Ray (AE6H), and Tak (W6SI).  
 Director: Mike, KF6HVO.  
 Sound and Special Effects: Howard (KG6GI), and Dave (KG6QCI) (also Key Grip).  
 Lighting: Karl (KF6MDF).  
 Admissions and Tickets: Robin (KG6MCA), Patty (AD6OH), Alan (WB6T).  
 Certificates: Brian (NJ6N), and Steve (KG6OYK).

## LIVE ECHOLINK

Digital modes are becoming increasingly in evidence in amateur radio. Along with the use of the internet to establish links and the use of voice-over-IP (VoIP), these changes are difficult to follow without the guidance of hams who have explored them. At the August general meeting Brian Roode, NJ6N, presented an overview and demonstration of EchoLink. EchoLink is one of the new techniques of linking hams using the internet. The links may be from a computer, a radio, or a repeater at each end. (This differs from IRLP which may not be accessed directly from a computer without the radio involved.)

EchoLink has more than 100,000 registered users in 137 countries. Information, software download and registration details are available at the EchoLink web site: [www.echolink.org](http://www.echolink.org).

If you missed the presentation you can see the slides on the SOARA web site. Follow the links to the August 18, 2003, meeting where you will find links to either HTML or PowerPoint versions of: *NJ6N's EchoLink Presentation to SOARA August 18, 2003*. It is a good introduction to an exciting new dimension to amateur radio.

Watch for announcements at the general meetings on new possibilities for linking over the SOARA repeaters. There are several ideas in the works. Come hear about them and join in the discussions. □

The extraordinary efforts of all the above people, some of whom I may have forgotten, and of course, the support of significant others, made all this possible.

Please join me in thanking the members listed above for once again demonstrating what an exceptional group of people we have making up our incredibly outstanding club.

73, Ray, AE6H □



## The Way I See It: Understanding Radio Theory Without Math.

In 1939 Philip H. Smith published an article in the magazine *Electronics* in which he introduced a graphical method of solving RF impedance matching problems. The “Smith Chart” is still a popular tool in analyzing problems and understanding RF circuits. Graphical techniques often give us insights not available with standard mathematical formulas.

Previously we looked at a simple technique of plotting the value of an impedance on a two dimensional plane where resistance lies along the horizontal axis (increasing to the right) and reactance along the vertical axis. We treat inductive reactance as positive (up) and capacitive reactance as negative (down).

At a fixed frequency the reactance is represented by a point on this plot. If we allow the frequency to vary, the reactance will, of course, vary and we have to plot the result as a line. We will only consider fixed frequency here. Let’s make sure we understand why a single point represents the impedance (it may be the impedance we see at the feed end of the transmission line to our antenna). Impedance is the ratio of voltage to current in a two terminal circuit. If we force a current through the terminals of a circuit and then read the voltage developed, we have the information to determine the impedance. Since we are interested in RF circuits, naturally, we are using an AC current and voltage. The values we use are the RMS values and if the impedance has a reactive component, then there is some phase difference between the voltage and the current.

Remembering the definition of impedance as the ratio of the voltage to the current we can see that if we put two impedance’s in series, the same current will flow through both, and the voltage developed will be the sum of the voltages. The impedances simply add. Remember that we are talking about AC voltages, and that the phase of the voltage (relative to the current) developed across the two impedance’s will, in general, be different.

In fact, the two voltages could be exactly out of phase and the voltages partially cancel! That is not too much of a surprise. We know that the series combination of inductance and capacitance can cancel each other (at some frequency).

Parallel combinations of impedance are not as easy to analyse. The voltage is common and the currents add. It then becomes convenient to talk about conductance, susceptance, and admittance. These are the inverse of resistance, reactance, and impedance. They are the ratio of current to voltage in a circuit. They are handy but not nearly as familiar. We just need to know that they exist and have the pleasant characteristic that they can be merely added in parallel circuits. It will come as no surprise that capacitive and inductive susceptances have opposite signs.

It should be obvious that we could treat admittance graphically just as we did impedance. It would be easy to follow cases where we add parallel circuits. Now the rub is that we usually want to use both series and parallel components in, say, constructing an antenna tuner. It is not obvious how the two types of connections (series and parallel) are treated together on the plots we have discussed.

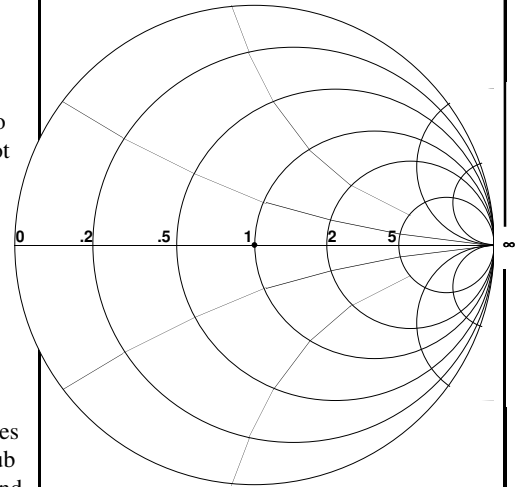
Enter the Smith Chart. In figure 1 is a representation of the chart. The horizontal axis represents resistance. You will notice that it starts at zero (we don’t consider negative resistances) on the left and ends on the right at infinity ( $\infty$ ), with 1 in the center. Perhaps it is a strange warping of our resistance axis but a useful one.

If I turn the axis around the other way (zero on the right), it would correspond to the conductance axis without having to move any of the points I had plotted. This will be handy.

The circles which pass through the points on the resistance axis are “constant resistance” circles. Note that they all have the point at infinity in common. The other curved lines are portions of circles which represent lines of constant reactance. The lines above the resistance axis are for inductive reactance and those below are for capacitive reactance. For a given starting impedance, as you add reactance (remember the sign “+” or “-”) you move the location along one of the curves of constant resistance. Adding a resistance

would move the point along a curve of constant reactance to the new resistance circle.

So far we don’t have anything we didn’t have with the original impedance plane representation, except we are working on curved lines. Where is the benefit?



The benefit comes from the above noted fact that the conductance form of the chart is quite similar. In fact, it appears to be just the same chart flipped horizontally. The admittance curves flip along with the rest of the chart. You can obtain charts with both the impedance and admittance markings (in a different color so you can keep track of them).

To solve an impedance matching problem you start with the observed feedline impedance. Adding series and parallel reactances allow you to move along the constant resistance or constant conductance lines. The goal is to get to the “1” on the resistance line. For most applications we are working with 50Ω coax, so we “normalize” all of our values so that 50Ω becomes 1 (divide all values by 50Ω).

I don’t expect this brief explanation to turn you into Smith Chart experts, only that you will gain some feeling for the chart and, more important, some understanding of how Ls and Cs can change the impedance of an antenna feedline into 50Ω. Understanding this takes some thinking about, but it will take a lot of the magic out of antenna tuners.

There is still more to learn about antenna tuners. Keep tuned! (I can’t believe I said that.) □

Year 2003	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
General Meeting 7:00 PM	27	24	17	21	19	16	21	18	15	20	17 Auction	No meeting
Program	W6XD	WD6DIH	W6PJ	N6NHP	Spring Auction	Field Day	KO6SY	NJ6N			Fall Auction	
VEC Testing 5:30 PM	27	24	17	21	19	16	21	18	15	20	17	—
Propagator Deadline	21	17	10	14	12	9	14	11	8	13	10	
Board Meeting	2/3	3/3	24	28	26	23	28	25	22	27	24	
ARRL Field Day						28/29						
SOARA picnic								2				
Fall Auction											17	
SOARA Holiday Party												7

### ON THE AIR

Operating Tips by  
John Walker, AC7GK

Last month I talked about having a good radio voice and left you hanging by saying that everything should be relaxed except . . . The big diaphragm muscle located below the lungs, which needs to be pulled down for us to breathe properly. This is not so easy as it sounds. Check yourself by standing tall and breathing normally. Do your shoulders move? Then you are chest breathing. Does only your stomach go out when you inhale with some expansion of the ribs? Then you are doing it correctly. Do you take little breaths? Then you are not using your full lung capacity.

As a side note, deep breathing as we talk has the added benefit of bringing more oxygen into the body, thus giving us more oxygen to

burn our fuel with and making us more alert and energetic. (Did you know that yawning is the body's way of getting more oxygen and getting rid of carbon dioxide when we don't breathe deeply enough?)

When we breathe with our chest and shoulders, we don't have the vertical column of support that gives us a full sound. Do we find ourselves hunched over the radio mike, with shoulders rounded, head forward and body curled up? Straightening the body, sitting tall and breathing by pushing down the big diaphragm muscle plus relaxing the throat and neck can give us more of the big, full sound that we want.

Until next time, so here is a big, rich 73. ☐

### Dues Notices Will Soon be in the Mail

It is that time again. A dues notice will soon be arriving in your mail box. SOARA is supported primarily by the dues that members pay once a year. Notices go out in September and the dues are due by October first. Prompt payment is greatly appreciated.

Payment can be made by returning the form at the bottom of the dues letter along with

your check. Please note that the form lists all of the information that the club has for you. If any of this information has changed, please indicate the changes on the form. Especially changes in license class, call sign, or e-mail address should be noted.

Thanks to all for their support of the club. As a result, we have been growing and expanding our activities.

### Amateur Radio License Preparation Course

·**What:** SOARA's FCC Technician & General Class license courses

·**Where:** Mission Viejo Community Center on 26932 Veterans Way

·**When:** Technician  
Aug 28th thru Oct 16th, 2003  
General  
Oct 30th thru Dec 11th  
All classes 7:00 PM - 9:00 PM

·**Cost:** \$35.00 – Payable the first day of class (covers examination fee and materials.)

·**Contact:** Chad Edwards at ·  
kq6tl@soara.org

The course for the Technician class license is in progress. Classes for those wishing to upgrade to General will be starting at the end of October. Please contact Chad, KQ6TL, to indicate your interest in this class.

Members who wish to help in the presentation of the classes should also contact Chad. Our classes have been a great success, and benefit to the club. Take advantage of this club benefit. ☐

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South Orange Amateur Radio Association  
P.O. Box 2545  
Mission Viejo, CA 92690



## Meeting: September 15, 2003 at 7:00 PM

☛ **SOARA** meets at the Mission Viejo Community Center, 26932 Veterans Way, Mission Viejo, the third Monday of every month at 7:00 PM. Changes to the meeting time or place are announced in this newsletter and on the two-meter repeater.

☛ **License Exams:** Amateur License Exams are given prior to SOARA meetings. Exams are from 5:00 to 7:00 PM. Walk-in applicants are welcome. For information call Paul Levey, NZ1M, at 949-249-0121.

☛ **Contacting SOARA:** Questions about SOARA? Send e-mail to: [info@soara.org](mailto:info@soara.org), or leave a message at 949-249-1373.

☛ **Web Site:** SOARA maintains a web site with current club information. The URL is: <http://www.soara.org>.

☛ **Repeaters:** The SOARA 2-meter, 70 cm and 224.100 MHz repeaters are open to all licensed hams.

SOARA 2m — 147.645 – (110.9) Laguna Beach

SOARA 2m — 146.025 + (110.9) San Clemente

SOARA 2m — 145.240 – (110.9) Trabuco

SOARA 220 — 224.100 – (110.9) Laguna Beach

SOARA 440 — 445.660 – (110.9) Laguna Beach

The SOARA 220 and HROC 440 repeaters are shared by members of both clubs. Each machine is subject to the operating rules of its respective club. Call KG6GI for details.

SOARA 220 — 224.640 – (123.0) Santiago Pk. (C)

HROC 440 — 447.180 – (131.8) Santiago Pk. (C)

☛ **Nets:** SOARA 2 m repeater open net is held Tuesday 8:00 PM  
40 meter HF net (7.268 MHz +/- for QRM), Sunday 7:30 AM.

### SOARA OFFICERS

*President:* Ray Hutchinson, AE6H . . . . . 949-496-8020  
[ae6h@soara.org](mailto:ae6h@soara.org)

*V.P.:* Malcolm Levy, KO6SY . . . . . 949-951-1882  
[ko6sy@soara.org](mailto:ko6sy@soara.org)

*Secretary:* Mike Mullard, KF6HVO . . . . . 949-249-2846  
[kf6hvo@soara.org](mailto:kf6hvo@soara.org)

*Treasurer:* Mike Rodgers, AC6XL . . . . . 949-348-2627  
[ac6xl@soara.org](mailto:ac6xl@soara.org)

### SOARA DIRECTORS

*Repeater:* Howard Brown, KG6GI . . . . . 949-581-2634  
[kg6gi@soara.org](mailto:kg6gi@soara.org)

*Publications:* Dale Griffith, W8RRV . . . . . 949-830-3767  
[w8rrv@soara.org](mailto:w8rrv@soara.org)

*Membership:* Jim Riedel, KI6HZ . . . . . 949-498-0922  
[ki6hz@soara.org](mailto:ki6hz@soara.org)

*Education:* Chad Edwards, KQ6TL . . . . . 949-493-3063  
[kq6tl@soara.org](mailto:kq6tl@soara.org)

*Technical:* Bob Grant, W6CIC . . . . . 909-780-4788  
[w6cic@soara.org](mailto:w6cic@soara.org)

*Communications:* Paul Robert, ND6Q . . . . . 949-498-0392  
[nd6q@soara.org](mailto:nd6q@soara.org)

### SOARA COMMITTEES

*Activities:* Steve Perluss, KR6CE . . . . . 949-364-6195  
[kr6ce@soara.org](mailto:kr6ce@soara.org)

*Testing:* Paul Levey, NZ1M . . . . . 949-249-0121  
[nz1m@soara.org](mailto:nz1m@soara.org)

*Website:* Chris Reed, KB6FYG . . . . . 949-361-1438  
[kb6fyg@soara.org](mailto:kb6fyg@soara.org)