Presentation Inspires PSK-31 activity

PSK-31 was the topic of the presentation at the February general meeting. Malcolm, KO6SY, gave a dynamic and informative introduction to this popular digital mode of communications.

Featuring both an illustrated discussion of how PSK-31 fits in with other digital modes and a practical on-the-air demonstration, his presentation sparked the interest of many of those in attendance. In addition to the demonstration with a laptop connected to an HF radio, he attempted to communicate with a second laptop computer via speakers and microphones.

The equipment required for PSK-31 operation is little more than the HF SSB rig and a computer equipped with a sound card. Software is available free over the internet. Although a couple of brands of interface are available to connect the computer to the radio, it is quite possible to build a simple and effective connection with readily available parts.

Software and interconnection information are readily available on the internet. A search on the topic "PSK-31" should locate several programs and sites with information. ☐

QRP Anyone?

The ultimate near-QRP transmission has been recorded. (I'm sure some of you saw it in the newspaper). It achieved no less than 925 million miles per watt of power.

A space probe, Pioneer 10, was launched in 1972 on the first flyby of planet Jupiter. That mission was successful. Since then, the spacecraft continued on away from the Sun, and it is now twice as far from Earth as the planet Pluto (the furthest-out planet in the Solar System). The craft is 7.4 billion miles from Earth.

The craft is atomic-powered but only generates enough power these days to transmit

occasionally. Several days ago, the deep space antenna at Goldstone in California's Mojave Desert sent a command to Pioneer 10 to send back data on its environment. That signal probably packed a lot of punch.

The radio command took 10 hours to get to the spacecraft. The spacecraft received the command and sent out its own signal on an 8-watt transmitter, which then took another 10 hours to return to the 1000-foot wide dish antenna at Arecibo, Puerto Rico (featured in the movie *Contact*).

The signal had arrived at Earth at the power of only one-billionth of a watt -- like the task of reading a book on Earth by a child's night light glowing on the moon!
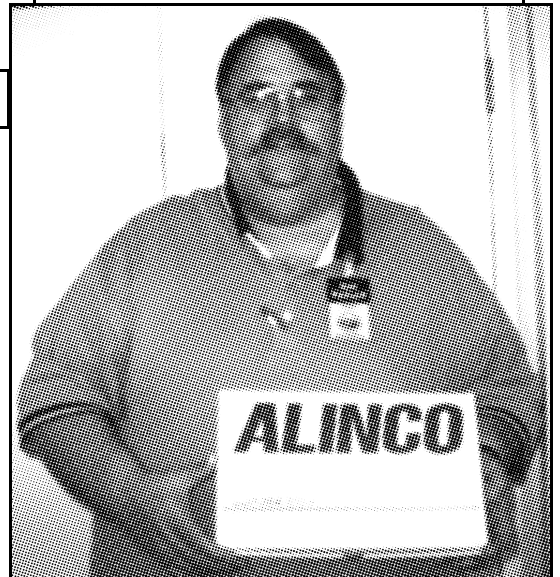
Wonderful QRP story.
Malcolm Levy ☐

New Members

A hearty welcome to SOARA's newest members:

James Riedel	KI6HZ
Mick Donoff	KG6GRC
Scott Byington	KC6MMF
G. Robert Grant	W6CIC

SOARA's web site recently moved to a new host server causing some interruption of services. Most noticeable was the temporary loss of the e-mail reflector function. Things should be back to normal. We regret any inconvenience caused by the temporary loss of service. ☐

And the Winner Is . . .

The proud new owner of an Alinco DR235T (220 MHz) mobile rig is Alan, WA6LEW. Alan, pictured below displaying his new acquisition, had his raffle ticket drawn at the February meeting.

What is fondly referred to as the $5 raffle is a popular part of SOARA's monthly meetings. Our "Raffle-Master", Roger, W6SQQ, selects a big - ticket item and sells tickets at the general meetings. After a sufficient number of tickets have been sold, a ticket is drawn and somebody wears a big smile! The winner does

not have to be present at the drawing in order to win.

Roger also presides over the $1 raffle at the general meetings. A variety of ham radio items are offered for this monthly drawing. Both raffles are popular with SOARA members. It is always enjoyable to obtain a new book, tool, antenna, or gadget for the shack. Be sure to attend the monthly meetings and enjoy the friendly conversations with other members. Who knows, you may go home with a new radio. ☐

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

Linearity

Mathematicians and Engineers love to draw graphs. Graphs certainly give a quicker indication of the behavior of a system than equations or a table of values.

If you measure the voltage across the terminals of a resistor and the current through that resistor for a range of voltages, then you expect the graph (Volts vs. Amperes) to produce a straight line. If it is a straight line, we say that the relationship is "linear." Any deviation from a straight line is said to represent a non-linearity in the behavior of the circuit.

Resistors, capacitors and inductors are expected to be linear. Most amplifiers are probably expected to be linear. In fact, a certain class of RF power amplifiers is given the name "Linear Amplifier."

A Linear Graph

In the case of the input stages of a receiver, non-linearities can give rise to intermodulation (IM or "intermod") — where the undesired mixing (or heterodyning) gives rise to unwanted frequency components which may interfere with the desired signal.

Some components, such as diodes, are inherently nonlinear and are used in circuits where advantage is taken of the nonlinear behavior. Mixers and detectors in radio receivers use nonlinear devices. Still, if the application does not require a specific nonlinearity we strive for near perfect linearity in components and circuits.

Superposition

The principle of superposition is a fancy term for a simple and useful concept. If you were to attempt to calculate the currents and voltages in a complex circuit containing many interconnected resistors and many voltage sources (i.e. batteries) you would use this principle. It states that you could remove all of the voltage sources except one, and

calculate the voltages and currents due to that one source. You could readily calculate the desired voltages and currents with only the one source to drive the entire circuit. Next you pick another voltage source, remove all the rest and do the calculations. After doing this process for each source, you merely add all the voltages for a given node and currents for a given lead, and you have the proper result.

OK, you probably will never have to do that, but the principle is important. And the reason it works is important. It works because the circuit is linear. Ah, did I mention — you can't do that for a nonlinear circuit!

The reason you can use that useful technique is that for a linear circuit the result is directly proportional to the cause. If I increase the voltage across a resistor by 1%, the current will increase by exactly 1% no matter what value the original current was. Well, you do have to stay within its linear range. A small resistor will not withstand the current of a lightning bolt without undergoing a rather drastic change which could only be described as nonlinear.
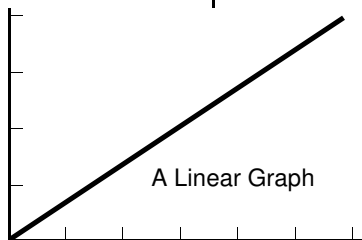
Lets be very clear on this. If you increase the input (voltage or current) to a circuit, the output will respond in a directly proportional manner. It makes no difference where this added input comes from. If you add two signals, lets make them of different frequencies so that we can separate them later (using a filter), then the result still holds. The output consist of the same two signals as did the input.

A Nonlinear Graph

Now the case of a filter is interesting because its response to frequency components of a signal, or we might say, to different frequency signals, varies with frequency. Still, we want our filter to be linear, i.e. its response should not be influenced by the amplitude of the signals.

You certainly want to be able to adjust your antenna tuner using low power so that when you transmit at high power, it will be
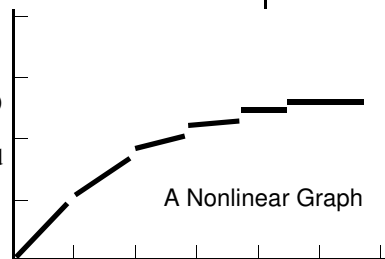
properly tuned. Certainly you would not like for the filter circuits within your receiver to change characteristics in the presence of a strong signal. We have enough trouble with active devices (transistors) which are not nearly as inherently linear as the passive components we use.

Fortunately the media through which our radio transmissions are propagated (air, etc.) are linear (at the power levels we use) so that we don't suffer from "atmospheric intermod." (I made up that term so don't tell your next contact that their signal is suffering from it!) It is because of the linearity and thus the applicability of the principle of superposition that our antenna analysis programs, having first calculated the currents in the elements of an antenna can calculate the signal (at some distant point) due to the current in a small piece of the antenna, repeat the process for all of the small pieces, and sum the results to obtain the result for the entire antenna. And, yes it works just that way in the real world.

Consider that process for a moment. It means that given a current distribution in an antenna, its ability to radiate does not depend on whether it is some special length — such as a half wave length. A half wave center fed antenna does have an advantage: it will accept all of the power from a low impedance transmission line, and the antenna can't radiate power it doesn't accept from the feed line.

If you use a matching network to "match" the antenna to the feed-line, the transmitter power will set up currents in the antenna, and it will radiate that power (less any power lost in the ohmic resistance of the antenna element). If the ohmic resistance is significant compared to the radiation resistance, the efficiency of the antenna will suffer.

One last thought on this idea of superposition. Note that when, for instance, a multiplicity of signals (and noise) are supplied to a circuit, say from the antenna to your receiver, there is at any given instance only a voltage due to all signals. Like the dollars in a collection plate, if you donate $1, we can know how much you donated but not which particular dollar. Only on the basis of frequency or some other characteristic can a particular contribution be identified.

□

Year 2002	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
General Meeting 7:00 PM	28	25	18	15	20 Auction	17	15	19	23	21	18 Auction	No meeting
VEC Testing 5:30 PM	28	—	18	—	20	22	15	—	23	—	18	—
Propagator Deadline												
Board Meeting	2/4	3/4	25	22	27	24	22	26	30	28	25	
Spring Auction					20							
ARRL Field Day						22 - 23						
SOARA picnic								3				
Fall Auction											18	
SOARA Holiday Party												1

Elections in April

Election of SOARA officers will be held soon. A slate of candidates will be presented to the membership at the March meeting. The election will be held in April, and the new officers will take office at the first meeting in May.

Nominations:
President   Open
Vice President   Malcolm Levy, KO6SY
Secretary   Richard Coyne, WW7D
Treasurer   Jerry Di Schino, KN6QK

□

Field Day

Field Day is traditionally an important club event for SOARA. For the past several years we have had a large number of members participating, and we have done very well on the score. the clubs emphasis has been on participation and enjoyment. It has been the enthusiasm of the participants that has given rise to the kind of efforts which bring in a winning score.

Soon the call will go out for volunteers. Steve, KR6CE, who did a tremendous job of organizing last year, will be looking for task leaders and workers to handle every aspect of the weekend. Plan to be there on the weekend of June 22 - 23. It will be a time you will long remember. □

Bob Grant Tapped for Technical Director

It is with a great deal of pleasure that I recently nominated Bob Grant (W6CIC) to the position of Technical Director, fulfilling the remaining 13 months of this position. Bob has worked closely with me for several years as a member of the Technical Committee, responsible for systems and software engineering. Bob has recently become a member of SOARA.
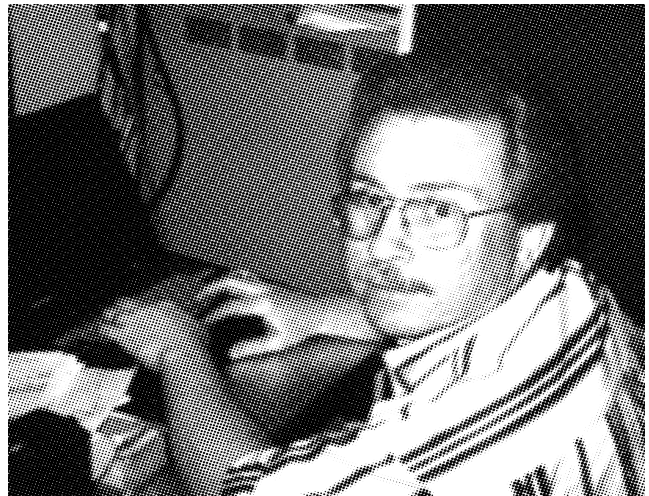
Professionally, Bob is Director of Technology, Computing and Communications at UC Riverside, previously being a Member of the Technical Staff at DEC.

Bob is an excellent systems engineer. He is familiar with Linux, Unix, PERL, etc. He has an interest in GPS technology and is investigating the Totally Accurate Clock (ref TAPR). Both he and I have an interest in Internet Radio Linking Project (IRLP).

Bob is completely familiar with the Advanced Computer Controls RC-850 Repeater Controller which operates four of our five repeaters. He has developed numerous software tools to assist in maintenance of amateur repeaters.

The Board has recently appointed Bob to the position of Technical Director subject to member ratification during the April election.

I know that Bob will be a valuable addition to the SOARA.

Howard G. Brown (KG6GI)
SOARA Repeater Director   □

The **PROPAGATOR**

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

Address Service Requested

Meeting: March 18, 2002 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 every other month. Exams are from 5:30 to 7:30 PM. You must make an appointment at least a week in advance. Call Lou Parker, KA6BJO, at 951-0336. (No calls after 9:00 PM please.)

☞ **Contacting SOARA:** Questions about SOARA? Send e-mail to: i*nfo@soara.org*, or leave a message at 949-249-1373.

☞ **Web Site:** SOARA maintains a web site with current club information. The URL is: **h t t p : / / w w w . s o a r a . o r g.**

☞ **Repeaters:** The SOARA 2-meter and 70 cm repeaters are open to all licensed hams.

SOARA	2m	—	147.645 - (110.9)
SOARA	2m	—	145.240 - (110.9)
SOARA	440	—	445.660 - (110.9)

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	—	224.100 - (110.9)
SOARA	220	—	224.640 - (123.0)
HROC	440	—	447.180 - (131.8)

☞ **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.

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