[Note: The March Club meeting has been cancelled due to concerns about the COVID-19 status]

March Club Meeting Presentation [Postponed to another time]

Our speaker this month will be our vice-president, Bob Houghton AD6QF. Bob has recently discovered the Parks on the Air program and will share his recent experiences learning about the program and “activating” his first four parks. Bob will talk about the rules of the program, ways that “park activators” let “chasers” know when and where they will be operating, as well as the equipment he uses for park activations.
Bob will also discuss some of the new initiatives that ARRL is rolling out in order to encourage new hams to become active members of the amateur radio community as well as trying to give some insight into where younger hams are going to get their information. Hint: For the most part it isn’t traditional clubs...

We're always looking for speakers to talk about things they are interested in, and it doesn't have to be amateur radio. Please let us know if there's anything you'd like to talk about. We'd like to see you at the meeting!

Going into late spring and summer, there are a few club events coming up. Gene Thorpe, KB6CMO, will be leading the communications team at the Donate Life event at CSU Fullerton on April 25. He still needs communicators; if you can help please contact him by email (see the list of directors of the club elsewhere in this newsletter). On May 9th, we will be doing Antennas in the Park, where Joe Moell, K0OV will be teaching us all about transmitter hunting. We will hide some transmitters in the park for everyone to find. And on the weekend of June 27-28, we will be having Field Day. We'd love to see you there!

PLEASE remember to renew your membership for 2020. Your $20 goes towards the costs the club incurs each year: Postal Service charges, Club Insurance, gifts for the holiday dinner, and government fees that are required to keep the club incorporated. Send your check to Gene Thorpe at the club PO Box or follow this link https://fullertonradioclub.org/application-renewal-form/. Thank you!

73,
Tom, WB2LRH
CORONA VIRUS INFORMATION UPDATE

We were going to prepare a guideline for identifying risks and risk management related to the community spread of the CORONA virus (COVID-19) for all club members. But the situation changes too rapidly for us to keep up, sometimes daily. Sooo...we've chosen to just list websites for finding this data from a reliable source, and let you decide at what risk level you are, and what mitigation you should consider. Here's a list, as of today (March 14, 2020).


Activity Reports of the Fullerton Radio Club (Technical Advisory Group) for March 2020

Bill Webb was first up with a Power Point presentation on Chinese electronics quality. This has to do with Chinese modules which include ICs not made in China. One example was of a microcomputer where the USB part didn’t work. It seems that the Chinese make cheap knock-offs of cheap Chinese knock-offs.

He brought a $40 oscilloscope (which he showed us last month) this time with a holder he created with his 3D-printer. The picture below is of Dick Bremer holding Bill’s scope. The blue part is what was made by Bill.

Bob Houghton has been traveling in Texas with his wife, and related a story about an injury and the problems associated with medical care so far from a city.

Tom Gaccione shared with us some interesting science going on such as GPS path recorders on local seagulls and their addiction to fast food. Then there was a chocolate 3D-printer to make complex edible structures. The longest discussion was on the history of video satellites (Hughes Aircraft) and the role of satellites in the past and the future. It was started by Tom’s reporting to us about the demise of Direct TV. It seems that whoever bought DirectTV thought they could milk a bit of profit out of its inevitable doom, but all they got was a mailing list of dissatisfied users.

Tom Fiske Had to leave early to lend his tenor voice to the Presbyterian church which is just two blocks from Walter’s house.

Tom Curlee responded to Walter’s plea for more electronic junk. This junk is for an artist friend of Walter’s who takes old electronic parts and imbeds them in thick latex paint to make science fiction themed art.

David Curlee, Tom’s son, recently got married. He has a job with Edison and living happily ever-after. David rarely shows up to our meetings but is an important asset to the club as the maintainer of the website for many years. Bob Houghton is now doing that.
Dick Bremer talked about a power supply he repaired using the ESR meter he bought on line for next to nothing. In the picture above, Dick Palmer is trying out Dick Bremer’s ESR on a 330 \( \mu \)F capacitor. That led to a discussion on the use of ESR meters in the repair of equipment that use electrolytics, or any high value capacitors. The neat thing about ESRs is that --while they don’t measure capacitance-- they can indicate a bad capacitor without removing the capacitor from the circuit. Tom Gaccione explained to us that it measures the reactance to a 100 K Hz signal. That is usually much less than an ohm if it is good. A number like 10 is a bad capacitor.

Larry McDavid brought in a fan from his Davis weather station which he finds he has to replace once in a while. He brought it in for Bill Webb to evaluate (whether a fan is worth while or not) in his weather station. As it was passed around, Bob Houghton gave it a tug which fixed it. (There for a second, Bill thought he lost his chance at the fan. Turns out, Larry already has the new one installed, so Bill got a good one for free.)

Walter Clark has done nothing in the way of electronics but was quite the hero in the snack he provided for the group. It was a semi-frozen fruit dessert from a new Brazilian Juice Bar on Harbor near the Court House. The featured ingredient is an ice cream (parfait maybe) made of the berry called Acai, which is in the name of the place. Unlike all previous treats, all guest participated. In the picture, is a third of the dirty dishes Walter washed afterword.

Dick Palmer brought in his latest play-pretty a $375 scope (he bought used for $70.) What is remarkable about this is what is starting to show up in the more expensive scopes like Agilent. It is the automatic setting of both time-base and amplitude. Just connect it. Of course that removes most of the fun for those of us who have scopes for a hobby.
Activity Reports of the Fullerton Radio Club
(Technical Advisory Group) for February 2020

This is the first meeting of the year, so it may be appropriate to talk about our purpose. TAG or Technical Advisory Group (TAG) is an adjunct to the main meeting of the Fullerton Radio Club. It was started about 1994 by Bill Preston, KZ3G and for most of those years it was at Dennis Kidder’s house when he lived in Fullerton.

The main activity is going around the room where each person talks about their projects or anything that would be of interest to amateur scientists with an electronics background. For those of us sharing progress on our projects, it gives a kind of purpose to our work. For those that merely want to talk about something in the news or otherwise of interest, it is also a matter of sharing. To share something is kind of what makes us human. It is a joy as basic as telling a joke and finding the telling as much fun as hearing it for yourself the first time. Wikipedia is perhaps the clearest example of the need to share. The contributions are unpaid, except for the joy of sharing ideas. Think of TAG as a hands-on Wikipedia which brings up the other purpose of TAG; to go there for help. For example: “How can I count people using a park that has no fence, let alone a single gate with a turnstile.”

Walter as the host, manages the discussion so it ends at or before 9:30. He judges when a particular discussion has reached a natural end and asks the next person what’s new. He also tries to be a diplomat in stopping side discussions.

A cable is dragged into the meeting room which is connected to a multi-band VHF antenna. A variety of instruments and power supplies are also available, but most important is a digital projector and screen for those that bring a flash drive presentation.

Of interest to the main Fullerton Radio Club members is that at these meetings we inspire or conspire each other into turning one of those interests or projects into a talk for the main club.

Tom Gaccione First up for the February meeting was Tom Gaccione. He brought a power point presentation on the new networking at his house in Huntington Beach. What he wanted to do was allow ethernet like speeds to every room using the existing RG-6 which he had previously installed in every room of his two-story house. He found that even a WiFi repeater wasn’t adequate and so he studied ways to use the existing RG-6 to provide ethernet throughout the house. Central to the overall design is that the handheld remote that controlled what to watch on his big screen TV was that of the DVD player, not the computer or the TV set itself. But key to the electronics was using MOCA amplifier through the RG-6. He did some research on MOCA; the multimedia over-cable alliance, and shared that with us too.
Tom Fiske shared three things with us. An incredibly affordable oscilloscope (less than $40), a Baofeng transceiver and a frequency meter. The frequency meter looks just like the Baofeng transceiver already pictured. Tom also showed an E-bay photograph of an inexpensive scope with a built-in Smith Chart for analyzing antennas. The Baofeng discussion was quite long and was mostly about how cheap and powerful these units are. They seem to indicate a trend in Ham radio toward small, inexpensive units that make measuring and communicating much easier.
Tom Curlee answered the question about activity posed to him when Walter introduced him. He’s been spending quite a bit of time chasing DX-235 countries worked in the last 2.5 years. If you drive by his house you will see that he's added some new low band antennas - a Hex beam that covers 20M through 6M and tri-band droopy dipole / inverted vee for 80M, 40M, and 30M. David, his son (KE6IPY), is now with Southern California Edison and he told his dad about an Edison Program that is marvelous but not very widely known. Edison will loan test equipment for just about anything; not just the 117 V power used in your house. O-scopes, data loggers, solar analyzer, sound level meters, thermal imagers, digital tachometers, and a whole lot more. You can check out the equipment for 2 weeks and the service is completely free. The Edison equipment lending library web page can be found at: https://www.sce.com/business/consulting-services/energy-education-centers Look about 2/3 of the way down the page to Tool Lending Library then click on Search the Library to see the catalog.

Brooks Kachner is famous for his on-going battery evaluations which took a setback in a fire where much data was lost. What's different about his evaluation of commonly available AA batteries is that he is measuring their cost effectiveness for light loads. Normally data is published for loads that are more than the charging current. His evaluation is for loads that take months to discharge. This discussion led to an almost unanimous agreement that Duracell has changed their formulation so that now “as a rule” they will eventually leak; even unopened in their blister pack. He also shared with us a couple of units bought on Banggood; two meter/440 transceivers. These inspired a discussion on the different bands – GMRS, FRS, NURS-- used by most of the customer for these. He claims the sound quality is better than his Kenwood. There was also discussion on Banggood compared to eBay and most of it was good.

Bill Webb brought two things, a $17 oscilloscope and a handheld VNA. The oscilloscope is cheaper than Toms but has almost as many features as Toms. Here is the link to buy one for yourself: https://makeradvisor.com/jyetech-dso150-digital-oscilloscope-review/. Bill also brought a NanoVNA. In the picture below he’s holding a green box that he made on his 3D printer from software provided by the maker of the VNA. That's a slide that exposes connectors that are needed to use the network analyzer.
Bill gave a 10 minute PowerPoint presentation on the NanoVNA. This presentation is available by merely clicking on this link: https://1drv.ms/p/s!AmXKgAywyCrbxiNwVgXD5GKy2w?e=kcZjoK He has added his own narration so it doesn't work like a normal PowerPoint. Use the tiny arrows at the middle of the bottom. To pause, click on the image of his face in the lower right.

For more on the NanoVNA: http://nanovna.com/

Dick Palmer brought yet another QRP radio. This is number 57 for him; the most elaborate yet. As a reminder to the reader, QRP is low power transmitter (with receiver usually) where the idea is to encourage amateurs to design and build their own. Yea, well, but this one is like $400 and that's just for the kit. We are now approaching the quality of Elecraft, he said. It works all HF bands; 80, 60, 40, 30, 20, 17, 15, 12 and 10. What makes QRP still popular even though the price is getting up there is that with all SDR software that's out there, the displays (that show up on your computer) are as good as the most expensive commercial gear.

Dick Bremer shared with us some 60s technology for amateur radio in the microwave. He's holding a 30 MHz radio he made which is connected to the input as well as the output of a Gunnplexer which he's holding in the other hand. Missing is the microwave horn or dish that concentrates the beam. He talked about the huge improvement the Gunn diode allowed the hobby in the 60s. With affordable Klystrons the power was in the low milliwatts yet required filament and B+ voltage sources. The Gunnplexer was ten times the power with only a single 12 volt source. Dick Palmer was also involved with microwave in those days and pointed out an interesting feature of the Gunnplexer. The transmitting Gunn diode acted as the local oscillator for the received signal. And the received signal acted as the local Oscillator for the transmitted signal which means you can hear yourself without a separate receiver; true full duplex. That might even be the origin of the word Gunnplexer.
Larry McDavid brought with him a sample of volcanic ash from Saint Helens, but far more interesting was his discussion on the PoziDriv and the Japanese version which is called the JIS screw head. He described how these designs were better than the more familiar Phillips. Here's a link to a PoziDriv: [https://www.ebay.com/itm/GearWrench-80084-1-x-3-1-8-Pozi-Insulated-Screwdriver-2pcs-/330607543975](https://www.ebay.com/itm/GearWrench-80084-1-x-3-1-8-Pozi-Insulated-Screwdriver-2pcs-/330607543975) He said that today the Phillips head screws are used predominately only in the USA and that PoziDriv dominates everywhere else, save perhaps only in Japan where the cross-head JIS is common.

Walter Clark described his experience with three versions of GPS recorders to go in his R/C gliders. He uses them to determine glide angle of various airfoils. These are each a couple of years apart in design but the accuracy is the same and the size hasn’t reduced that much either. He also described his minimalist attempt at survival in case of a blackout. The opportunity came a month ago when Edison was to shut down the power before he would normally go to bed. In anticipation of the event, he located some batteries for the Spectrum cable modem and the WiFi router. The laptop has a pretty substantial battery in itself and didn’t need an external battery. He successfully worked Facebook, YouTube eMail and watched an on-line movie in the dark, but this system didn’t last long enough. The lesson-learned it that the router draws a lot of current, something like a quarter of an amp and needs a substantially bigger battery.
RO Water Purification Systems

Several months ago I had to replace my kitchen under-sink Reverse Osmosis RO water purification system; the old system was 30 years old and the automatic back-flush valve was leaking, allowing city water to mix with the RO water. It was simpler to just replace the whole system. Ultimately, I modified the new system to use a "spiral-wrap" RO membrane to get lower Total-Dissolved-Solids RO water from my high-TDS Anaheim city water. My RO system uses two air-bladder water storage tanks supplying my kitchen sink and refrigerator with about 6 gallons of 8 psig RO water. It takes several hours to refill the two tanks from empty.

I flush the RO system monthly by opening the kitchen sink RO-dispense faucet and letting the RO water drip overnight. I measure the TDS of the dripping water and also the tap water the next morning and record the results. With the spiral-wrap membrane, I typically have measured 14 ppm RO water and about 720 ppm tap water. I've seen Anaheim tap water measure as high as 800 ppm. Other Orange County cities often have lower-TDS city water.

State water purity standards recently changed and this has caused many cities to stop using pumped ground water due to one particular contaminant originating from flame retardants. Cities are developing filtration systems to remove this contaminant so they can still use the lower-cost ground water. In the meantime, this has increased the use of imported water that costs more; water utility rates have been increased to compensate for the higher cost.

An interesting side effect of this reduced ground water use is lower TDS of the city water. Ground water typically has more dissolved minerals than imported water, much of which is snow melt. When I measured the RO and tap water TDS this morning, the RO measured 11 ppm and the tap water 652 ppm; compare these to the past typical 14 and 720 ppm readings. The new readings are statistically lower and, I believe, the lowest I've ever seen here in Anaheim.

I'm not sure why the "spiral-wrapped" RO membrane produces lower TDS RO water. My new system first used a standard RO membrane but the RO water produced typically measured 30+ ppm and I complained to the system manufacturer in Brea. When my system was tested in his Brea shop, the RO TDS was much lower; the problem resulted from the higher TDS of Anaheim's tap water. The manufacturer replaced the standard membrane with the "spiral-wrapped" membrane and my RO TDS dropped to the 14 ppm I described above.

The RO membrane cartridges are not all the same! There are high-volume and high-purity versions at least. How much membrane material is used and how it is wrapped evidently makes a difference. These are subtleties not described in the sales literature of these systems. To learn these details and get the RO purity I wanted, I had to visit the manufacturer in Brea and talk directly to the owner. It helped to have a 30 year history with the company!

RO water is not the purest you can achieve but it is likely the lowest-cost for the best purity. Distilled water, if really produced by boiling and condensing steam, always measures zero ppm TDS. Deionized water, from fresh DI resin, always measures zero TDS; but the DI resin beds cannot be recharged and must be replaced at rather high cost. There are always some trace chemicals in both distilled and DI water but the concentrations are very low.

I once had my photovoltaic solar panels cleaned using DI water. Upon first arrival of Solar Maid, I tested their DI water and found the resin bed fully consumed and the water no purer than tap water; I refused to let them clean my solar panels. They returned the next day with a fresh DI resin cartridge and it measured zero ppm TDS. Their DI resin tank was about the size of a SCUBA tank and the resin bed was good for only about 200 gallons. Replacing the DI resin costs about $60, so the DI water is rather expensive.

I use my RO water for cooking and for making coffee and tea. I also do a quick final rinse of hand-washed dishes to eliminate water spots. And, I use it for metal-finishing chemistries.

Do not confuse RO, DI and distilled water with "soft" water. Many have whole-house water softeners or subscribe to a soft water service. These are ion-exchange systems and use sodium chloride salt; that's why folks buy bags of salt for their home whole-house soft water systems. These systems work by exchanging mainly calcium and magnesium salts in the city water for sodium from the salt in the water softener. They actually increase the TDS of the city water and greatly increase the sodium content of the resultant "soft" water. Soft water may not leave water spots but it increases your sodium consumption!

If you wonder about the TDS purity of your house water, you can buy a digital TDS meter from Amazon for about $14 or on eBay for about $8. All these use a coin cell that needs replacement yearly or the reported TDS value of tap water will be low. Complete RO water systems can be purchased at CostCo or Amazon and are typically installed under your kitchen sink. All these systems have replaceable particle filters that should be changed every one or two years; the RO membrane filter cartridges last many years.

Best wishes,

Larry McDavid W6FUB
March 2020 FRC MEETING
Cancelled

April Board Meeting
Open to all Club members
Black Bear Restaurant
(1011 N. Harbor Boulevard, Fullerton
Second Wednesday of each month)
Next Board Meeting
Wednesday, April 8, 2019
QSO and dinner; 5:00 PM
Meeting: 5:30 PM
[Note: this next Board meeting schedule is pending any changes in
CDC recommendations on group meeting restrictions and social
distancing due to COVID-19!]

Note: It’s March already. Time for club
membership renewal (or initial application). But
it’s more than just payment of annual club
membership dues! It should be renewal or
activation of your regular participation.
Attendance at regular club meetings. Perhaps
providing a subject for presentation, either

Community Service

Put it on your calendar! The DonateLife run/walk
event will take place on Saturday, April 25, and
Gene KB6CMO will need 8 to 10 additional hams
as support. It’s fun event with positive outcome.
Please keep the date for this event.
Contact: KB6CMO@juno.com

Antennas In The Park
At this time we are still planning to hold Antennas
In The Park on May 9. Be prepared to set up your
HF/VHF/Microwave or any other rig for
demonstration and actual contacts. As usual, the
featured event will be Joe Moell’s famous T-Hunt.
Burgers and hot dogs will again be available at
minimal cost. Expanded details will be in the April
issue of Smoke Signals.
This event too is subject to modification,
postponement or even cancellation depending on
what happens with the COVID-19 virus control
efforts.

MEMBERSHIP RENEWAL / APPLICATION
Fullerton Radio Club
PO Box 545, Fullerton, CA 92836

(Please Print)
Name #1 ___________________________________ Call: __________________ Class: ___________
Name #2 ___________________________________ Call: __________________ Class: ___________
Address: ___________________________________ City: __________________ State/Zip: ___________
Phone #1: __________________ Phone #2: __________________
Email #1: __________________ Email #2: __________________
ARRL Member  □ Yes  □ No
Special Amateur Radio Interests: _______________________________________________________________

Dues are $20 per member, or $25 per family. Students (full time) $10
Bring your application and dues payment to the next meeting or mail to the above address.