



# Smoke Signals

## Newsletter of Fullerton Radio Club

### January 2019

#### Not the President's Column - January 2019

At the January FRC Board meeting, the decision was made to discontinue the President's Column and replace it with something else. Here goes something else...

#### Down the TAG Rabbit Hole

When I try to explain a TAG meeting to someone who is not a member of the FRC TAG group, I usually describe a bunch of guys (unfortunately, it is an entirely male group) sitting in Walt's living room taking turns describing what "projects" we (as individuals) are working on. But more importantly, for me at least, TAG serves as a catalyst that gets me (and others) thinking, learning, and exploring new (to me) topics of interest.

What follows is an attempt to describe a small fraction of what transpired after last week's TAG meeting.

I think it started with Tom G's TAG report, where he talked about listening to the newest AMSAT satellite, Fox 1C. Somehow that turned into a discussion about the five phases of AMSAT satellite projects: Phase 1 refers to short-lifespan low earth-orbiting beacons, Phase 2 involves longer-lifespan low earth orbiting repeaters and transponders (like Fox 1C), Phase 3 were satellites with highly elliptical orbits (AO-10 and AO-13), called Molniya Orbits, Phase 4 involves geostationary ham sats (there is only one, called Es'hail), and Phase 5 will be ham satellites that are extra-orbital, going to The Moon or Mars (none yet).

At some point, Tom G mentioned that the satellites used by the Sirius satellite radio broadcasting service where in a Molniya Orbit. A Molniya orbit is a highly elliptical orbit tilted at an inclination of  $63.4^\circ$  to the equatorial plane, with an orbital period of 12 hours (well, 11 hours, 58 minutes and 2.1 seconds, but that is a story for another time). Its advantage is that it covers high latitudes much better than a geostationary satellite. This is why the orbit was developed and used

by the Russians. I was surprised to hear that Sirius used Molniya Orbits because the satellites would spend half their time over Europe and Asia, where Sirius does not do business. (Spoiler Alert: Sirius does not use Molniya Orbits).

This led to a flurry of research (thanks Wikipedia) and about 30 emails in 24 hours between Tom G, Joe M, and myself.

What we discovered:

From 2000 until 2016, Sirius broadcast using 3 satellites that were in a highly elliptical orbit tilted at an inclination of  $63.4^\circ$  but with an orbital period of 24 hours (actually 23 h 56 m 4.1 s), called a Tundra Orbit. In 2016 they migrated to service to two geostationary satellites. They did not use Molniya Orbits and now they don't use Tundra Orbits either!

In the process of answering this question we learned about NASA two-line orbital elements, broadcast satellite CODECS, the fact that satellite radio uses lots of terrestrial repeaters to fill in coverage gaps in urban areas, and that the radio in my Honda has pages and pages of diagnostic menus, including one that lets me see the bit-error-rate of my satellite reception as well as the FM radio signal strength in dB $\mu$ V.

But mostly I was reminded what a wonderful resource Wikipedia is.

After all that use of Wikipedia, I sent them \$20. So the bottom line is that going to TAG can cost you real money.

Bob AD6QF

[Editor: Bob was good enough to write for Smoke Signals this month. We'd like input from other members as well. Maybe you'd like to write something about your ham activities. We'd like to hear from you!]

**Newsletter of  
Fullerton Radio Club  
P.O. Box 545, Fullerton, CA 92836-0545**

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TBD  
(This could be YOU)

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**Show –and–Tell**

Bring something of interest to the meeting to show and share your story. Something old, new, or just of interest to hams.

**Web site: [www.FullertonRadioClub.org](http://www.FullertonRadioClub.org)**

**December Board Meeting**

The December 2018 FRC Board Meeting was called to order at 7:30pm by President Bob Houghton AD6QF. Others present: Treasurer Gene Thorpe KB6CMO; Secretary Linda Endsley KJ6IHB. Directors; Paul Broden K6MHD; Larry McDavid W6FUB; Richard Belansky KG6UDD; Walter Clark; Robert. Member: Cheryl Thorpe KE6TZU, Visitor: Irene Broden.

November minutes were approved.

Treasurer's report: Checking \$4,158.62, savings \$2,607.74

Old Business:

The Christmas dinner will be on December 14 at Marie Callender's.

Need officers for next year.

New Business:

Need candidates for President.

Next board meeting: 2 JAN 2019

Adjourned at 8:15 pm

Submitted by Linda Endsley KJ6IHB

**January Board Meeting**

The January 2019 FRC Board Meeting was called to order at 7:30 pm by President Larry McDavid W6FUB. Others present: Treasurer Gene Thorpe KB6CMO; Secretary Linda Endsley KJ6IHB. Directors; Bob Houghton AD6QF; Paul Broden K6MHD; Richard Belansky KG6UDD; Walter Clark. Members: Cheryl Thorpe KE6TZU; Joe Moell K0OV; April Moell WA6OPS; and Tom Gaccione WB2LRH

December minutes were approved.

Treasurer's report: Checking \$3,762.62, savings \$2,607.78.  
P.O. Box paid for 2019.

Old Business:

Discussed By-laws revision

16 renewals; 1 new membership; Totals 35 paid members, 2 life members

New Business:

Discussed the club web site.

Speaker for February will be Tom Gaccione WB2LRH, the topic will be power.

April 27 – Donate Life Run

May 4 – Antennas in the Park

June 22/23 – Field Day

Next board meeting: 6 FEB 2019

Adjourned at 8:50 pm

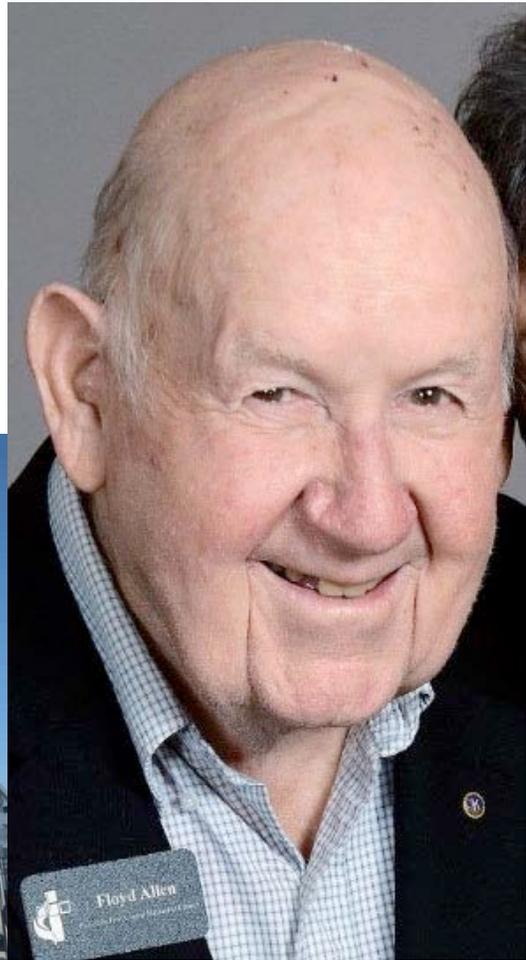
Submitted by Linda Endsley KJ6IHB

## January Meeting Presentation

The January meeting will feature Tom Gaccione WB2LRH doing a presentation on his recent visit to a Los Angeles Department of Water and Power facility in Seal Beach. He'll be talking about the history of the organization, how the power system in Los Angeles works, how the system has dramatically changed in the last 10 years due to renewable energy, and what the future looks like in the industry.



LA Water & Power Facility, Seal Beach



Floyd Allen K6HXO

### Floyd Allen K6HXO Memorial

A celebration of the life of former FRC member Floyd Allen K6HXO will take place at Fullerton First United Methodist Church, corner of Commonwealth and Pomona, at 11 AM on Saturday, February 2. Floyd was born in Miller, South Dakota on July 24, 1929 and passed away October 30, 2018 at St. Jude Hospital of pneumonia and congestive heart failure. He graduated from North Hollywood High School and joined the Air Force where he taught at the radar school in Biloxi, Mississippi for four years. He then studied at UCLA, earning a degree in Electronic engineering. Floyd worked in aerospace for many years, retiring from Hughes Aircraft. He then began his second career as an Enrolled Agent preparing tax returns. Floyd was active in the California Air National Guard for many years, retiring with the rank of Lt. Colonel.

### Community Service

Hello Folks, Yes It is that Time again. Donate Life Run/Walk - Family Festival will be on Saturday **April 27, 2019. Hrs. 0630 - 1130 hrs.** or so. Please update your information and sign up to participate.

First Name: & Last Name:

DOB:

Mailing Address:

Email Address:

Emergency Contact Name:

Emergency Contact Phone Number:

T-Shirt Size:

Have You work with DLRW in the Past? (Yes or NO):

Please send Your Info to: Gene Thorpe @

[KB6CMO@ARRL.NET](mailto:KB6CMO@ARRL.NET)

Thank You for Your Help in the Future Day of this Fun Event.

Gene Thorpe KB6CMO



# Smoke Signals

## Newsletter of Fullerton Radio Club

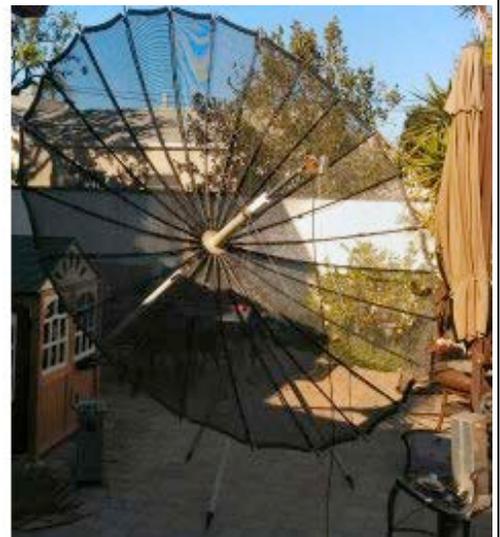
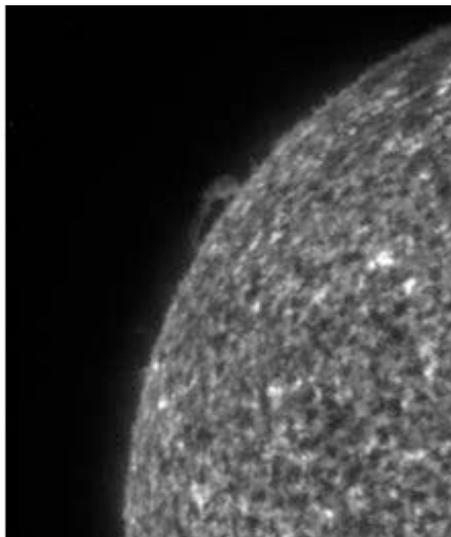
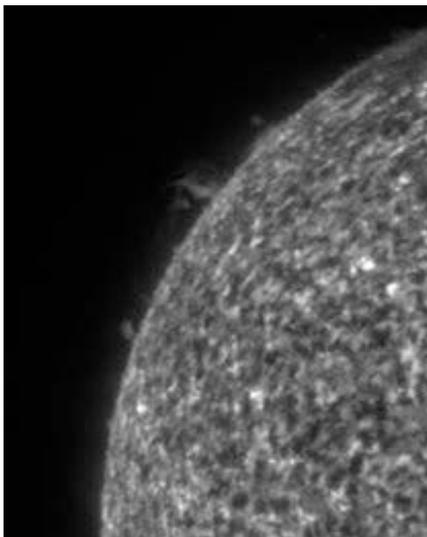
### January 2019

#### Activity Reports of the Fullerton Radio Club (Technical Advisory Group) for January 2019

There were 12 hams at Walt's for the first TAG meeting of the third year at Walter's house. Before that it was at Dennis Kidders house on Marelen also in Fullerton. It was started about 1994 by Kohlenberger. It is appropriate perhaps to review the purpose of the TAG meeting. It is going around the room where each person talks about their projects or anything actually that would be of interest to amateur scientists with a radio background. It gives a kind of purpose to our projects. To share something is kind of what makes us humans. 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. Of interest to the main FRC member is that at these meetings we inspire or cajole each other into turning one of those interests or projects or topics into a talk for the main club. About half of the time, it is hardware that is being discussed. The other half is about some science thing in the news. In both cases, the person whose turn it is dominates the discussion only at first. After a while many people are involved. Walter as the host judges when the discussion has reached a natural end and asks the next person what's new.

**Ed Murashie** is a friend of several of us in SBMS (microwave ham club). He brought his laptop to show us the high resolution downloads of the GOES 16 and 17 spacecraft. He's previously been able to download the low resolution images from those satellites. These images are of the earth in various wavelengths. Ed has been making circuits, antennas and writing software for imaging satellites longer than most people have been alive. He is asked by conferences all over the country to give talks on the subject. Most of his early work were for sun synchronous, but the GOES is the first where the dish doesn't need to track the satellite.

The GOES satellites also have telescopes to monitor the face of the sun. Ed made a short GIF video of the sun for us. For the newsletter I have reduced it to two photos (many minutes apart) that shows a prominence changing shape. He's very proud of his recent purchase of a 9-foot collapsible dish with a figure much better than that needed for the 1.686 GHz signal from space.



**Bill Webb** brought a roll of film from a U-2 and prints he made from it. The airplanes on the airports were American. Most of it was of course very boring and was disappointed in the sharpness of this particular run. He also brought the loveliest of the lithophanes he's been working on. (Picture below on the left.)

Bill spent most of his time leading a discussion on digital mode FT-8. He's had a lot of time on this mode and described a trick to manage people crowding on the same channel.

**Rich Belinsky** purchased via eBay a Sodium Iodide (NaI) crystal to be used as scintillation counter with a photomultiplier tube (PMT) he showed last year. Rich used the word "deliquescent" to describe a characteristic of the crystal that requires it to be encapsulated in an airtight container with a glass window at one end. The photo below is over exposed and shows only the shipping container. The crystal and the air tight container measures an inch and 3/8" and about that long. An advantage of NaI / photomultiplier detectors compared to a Geiger-Muller tube, is that the intensity of the light pulse generated by the absorption of ionizing radiation by the NaI crystal is proportional to the energy of the absorbed particle (e.g. gamma ray). Rich went on to say that when combined with a PMT, the amplitude (voltage) of pulses generated by the PMT can be used to measure the energy spectrum of radiation sources.

**Tom Gaccione** bought pizza for us and gave the longest most difficult to record talk. One subject was a discussion on the New Horizons spacecraft encounter of one of the Kuiper Belt object Ultima Thule. That's the object in the upper right below. When asked about the shape, Tom quoted a report: "The odd shape, which scientists call a "contact binary", indicates it formed as two spherical rocks fused together at the beginning of the solar system". Tom said, the faces are just someone was trying to make an analogy to the face on the moon. It's a form of *apophenia*, which is a more general term for the human tendency to seek patterns in random information. (according to Hey Google.)



Tom also led a discussion (mostly with Bob Houghton and Joe Moell) on the radio part of cellphone technology. There's a company and website called RootMetrics <https://www.rootmetrics.com/en-US/home> which makes money mapping for the various cellphone companies, their signal strength. Tom learned to use that website so he can determine which cellphone company is best for the place he visits. (It was AT&T by the way.)

The most interesting subject Tom led a discussion on, is his participating in Oscar 95. The satellite is up but not yet is it running as a repeater. Fox-1 Cliff <https://www.amsat.org/fox-1cliff-launched-initial-telemetry-received/> Tom heard it on a handy talky and made a recording of it. It appears that the satellite's receiver isn't working right. They haven't given up yet however.

**Larry McDavid** always brings for us an antique scientific apparatus. One of his hobbies is collecting these things. The object he brought was a pop-gun used in physics labs of the 1930s. Probably the famous monkey and gun.

<https://www.youtube.com/watch?v=cxvsHNRXLjw>

Larry is also a machine shop and tools enthusiast. His latest project there is to reduce the mass of a handle on the tailstock feed. It is now plastic so the wheel won't rotate by itself. He also collects scientific art. The piece he brought in to show us was made by a lady who uses CAD, stereo lithography and a lost wax process to turn her works of art into in this case brass which she then colors chemically.



**Bob Houghton** continued the discussion from Tom on AMSATs. He identified five phases where each was more sophisticated than the last. The Germans seem to be the lead on that and are indeed planning on a ham band beacon to follow a NASA spacecraft to Mars. This subject is certainly a future FRC lecture.

Bob also led a discussion on the use of videos in place of tech talks at the FRC meetings. It was well received see-ins-how it is the TAG bunch that do all the tech talking. The first video will probably be the PBS Special Empire of the Air.

[https://en.wikipedia.org/wiki/Empire\\_of\\_the\\_Air:\\_The\\_Men\\_Who\\_Made\\_Radio](https://en.wikipedia.org/wiki/Empire_of_the_Air:_The_Men_Who_Made_Radio)

**Joe Moell** is still working on his 2-meter RDF mobile van. He's very involved with the Floyd Allen estate and will be bringing much of his equipment to the FRC club meeting next Wednesday.

Perhaps the most important discussion of the evening was the FRC taking over some of the activities of the April's Hospital Group. Not the hospital support but activities during Field Day. It looks like FRC is the inheritor of some of the equipment, methods and personnel for two activities: GOTA and working the satellites. GOTA stands for get-on-the-air. It is a radio on a band that is busy that allows those wandering by who are not hams to talk to hams far away in order to get a feel for what hamming is about. Both the satellite work and the GOTA adds points to the contest part of the ARRL sponsored Field Day.

**Walter Clark** our host (and editor of this report) talked about buying eye-not-safe lasers on eBay. There are some bad sellers out there. Here's interesting fact about bogus stuff from China. They are so anxious to not have a bad reputation, they will take your word for it that it is bad, return your money without you sending it back. He also showed and talked about how old hard disks can be used to deflect mirrors in laser light show.

**Dick Palmer** brought in his 57<sup>th</sup> QRP radio. This one made in India and of outstanding quality and features. Everything these days, even kits, seem to be surface mounted with parts placed by machine. It was still a kit in that the board had to be wired to controls on a box. Below is a picture of Dick holding his QRP. The last picture is of Dave Reinhard and Ed Murashie.



**January 2019 MEETING**

**Wednesday, January 16, 2019**

**Chapman Activity Center**  
 2515 San Carlos Drive, Fullerton  
 (Second street east of State College Boulevard  
 off Commonwealth)

Meeting time – 7:00 PM

Visitors are always welcome

**Dinner before the Meeting:**

Black Bear Diner

5:00 PM

**February Board Meeting**

**Open to all Club members**

**Marie Callender's Restaurant**

126 Yorba Linda Blvd., Placentia

First Wednesday of each month.

**Next Board Meeting**

**Wednesday, February 6, 2019**

QSO and dinner; 6:30 PM

**Meeting: 7:30 PM**

**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: \_\_\_\_\_

Email #1: \_\_\_\_\_

Phone #2: \_\_\_\_\_

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.**