

How Amateur Radio Station Grounding Violates the National Electric Code (Let's turn an antenna into a lightning rod!)

By Dave Campbell, K8BYP



Monday, May 13, 2019

7:00 p.m.

Board Meeting at 6:45 p.m.

First United Methodist Church

1350 Oak Ridge Turnpike, Oak Ridge, TN

(Entrance to the church is on the north side at the door under the large awning.)

***NOTE:** at this meeting the Club will vote on Bylaw Amendments
that have been emailed to ORARC Members.*

Abstract: Amateur antenna system grounding may cause the Amateur to commit a serious NEC violation. (Art. 250.24 2011). While Art. 800 does refer to grounding communications installations, including Amateur, it implies communications systems on "separately derived power".

Art. 815, including Amateur antenna installation, requires static discharge grounding, not lightning grounding. Grounding a passive Ham antenna system leads to a Code violation when connected to a radio transceiver in a residential station.

President's Overtones – May 2019

by Jim Bogard, KY4L

Two ARRL events in which the club participates, **Kids Day** and **Field Day**, are rapidly approaching. [Kids Day](#) is Saturday, June 15, from 1800 – 2359 UTC (2– 8 p.m. EST). We will operate from our station in the Children's Museum of Oak Ridge from 2:00 until 4:00, when the museum closes.

[Field Day](#) is Saturday and Sunday, June 22-23, beginning at 1800 UTC (2 p.m. EST) Saturday and ending at 2059 UTC (5 p.m.) Sunday. Stations that set up before the start time can operate 24 continuous hours; those waiting until the start time to set up can operate the entire 27-h period. [Rules](#) this year are essentially unchanged from 2018. We are considering a new Field Day location this year, since the Power Squadron building has been unoccupied for some time. Suggestions and offers are welcome.

We are still negotiating with the City of Oak Ridge to mount the 146.97-MHz repeater antenna on the Delaware water tower when refurbishment there is complete. Oak Ridge Public Works carried our request to [Oak Ridge City Manager](#) Mark Watson; but his initial response was not to renew our agreement because of the City's desire to reduce or eliminate use of public facilities by non-governmental entities. Paul Koretko and I met with Mr. Watson last week, explaining the public service aspect of amateur radio, and he is reconsidering the initial response. Still no promises, though.

Our program for May is presentation by Dave, K8BYP, about grounding considerations for amateur radio stations. Voltage transients, particularly from lightning discharges, are a constant concern for stations, whether through external antennas or from house wiring. The more we know about proper grounding strategies and techniques, the more likely we and our equipment are to survive an event. Dave's talk is titled "How Amateur Radio Station Grounding Violates National Electric Code" (subtitled "Lets Turn an Antenna Into a Lightning Rod!"). Sounds like an electrifying topic that every ham should hear.



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Radio outreach at the Children's Museum of Oak Ridge is Sunday, May 19, from 1-4 p.m. in the Discovery Lab. Kids love learning how to send their names in Morse code, and ORARC's permanent station at CMOR immediately allows them the next step of hearing and participating in an over-the-air conversation. Join us in STEM-ulating young minds with an early fascination of radio technology and science.

Don't forget to check in weekly to the **Anderson County ARES net**, which meets on the WA4GBI 147.15-MHz repeater (+600 kHz input offset, 118.8 Hz tone) every Thursday evening

Left: Water Stop
Lima at the 2019
Covenant Health
Knoxville City
Marathon

To be decided at the May meeting: at Monday's meeting, we will vote on the **attached proposed Constitutional amendments**. Please read them Amendments and be ready to vote!

Also to be decided at the May meeting:

I received a letter from the Radio Amateur Club of Knoxville (RACK) offering ORARC a free inside table at the **2019 Knoxville Hamfest & Electronics Exposition** (an ARRL-affiliated hamfest). This hamfest is held at the Kербela Temple in Knoxville on **Saturday, June 15**, from 8:30 am to 3:00 pm. We will determine at Monday's club meeting who is interested in representing ORARC for taking advantage of this offer.



2019 Covenant Health Knoxville City Marathon

By Jamie Wright, W4ABE

Water Station Lima is 19 miles from the start. Runners have about 7 miles left. At this point in the race, runners are pretty spread out and it takes about 4.5 hours for the field to pass by after the first runner arrives. The location is easy to work without too much vehicle traffic to contend with. Although this year was a bit more challenging because of construction at the adjacent State Street Garage and the equipment in what is usually the runner's lane through the area. The team operating the Water Station was Answer Financial, the same team as last year. They do a great job and were complimented more than once about the quality of their Gatorade –“It is the best tasting!” I made sure they received the feedback.

It was cold and this spot adjacent to the James White Parkway seems to be rather windy on March mornings, especially after 9AM. Even at 50F, several layers were needed. I was teamed with KD4GT, Cliff Segar of Rockwood. We reported the runners to Net Control as required and did what we needed to maintain a safe distance between vehicles and the runners. We stayed busy. Cliff and the Operator at Water Station Kilo also relayed to Net Control via Simplex the reports for a Station that was having trouble connecting to the repeater. As far as the runners, we encouraged them, made sure they stayed on the race course, and helped when needed. For example, one female runner came up to me and asked that I retrieve the “green” bar from the pocket in the back of her running vest. I retrieved it as quickly as I could, handed it to her, and sent her on her way, so she wouldn't lose but a few seconds.



I always am trying out something different. I set up an APRS radio and it did what it was supposed to as far as tracking but I didn't have time to stop and send any messages. Oh well, next time. I also set up a dash cam in my truck, connected it to a power supply, and let it run. It recorded the entire race at Water Stop Lima! It is nice to know that it will record for 5 hours in the configuration I had set up.

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Left: Water Stop Lima at the 2019 Covenant Health Knoxville City Marathon

When things were slowing down, Cliff and I started talking about the different races we had worked and the runners. This led us to the discussion of the male runner in the kilt that seems to run most of the marathons. We noted that we hadn't seen him and Cliff provided an amusing tale of a race in which Mr. Kilt ran past Cliff drinking a beer. Well, wouldn't you know it Mr. Kilt came by about 15 minutes later. I said to him, "We were wondering where you were!". To which his face brightened and he smiled, but he started laughing when Cliff asked him, "Where's your beer?!"

We finished up about 1PM without any of the safety, injury or illness issues requiring response by KPD, KFD or EMS. We helped pack-up the Water Station and headed home. Overall, the participation of amateur radio operators is appreciated as expressed in the following comments from Command Staff:

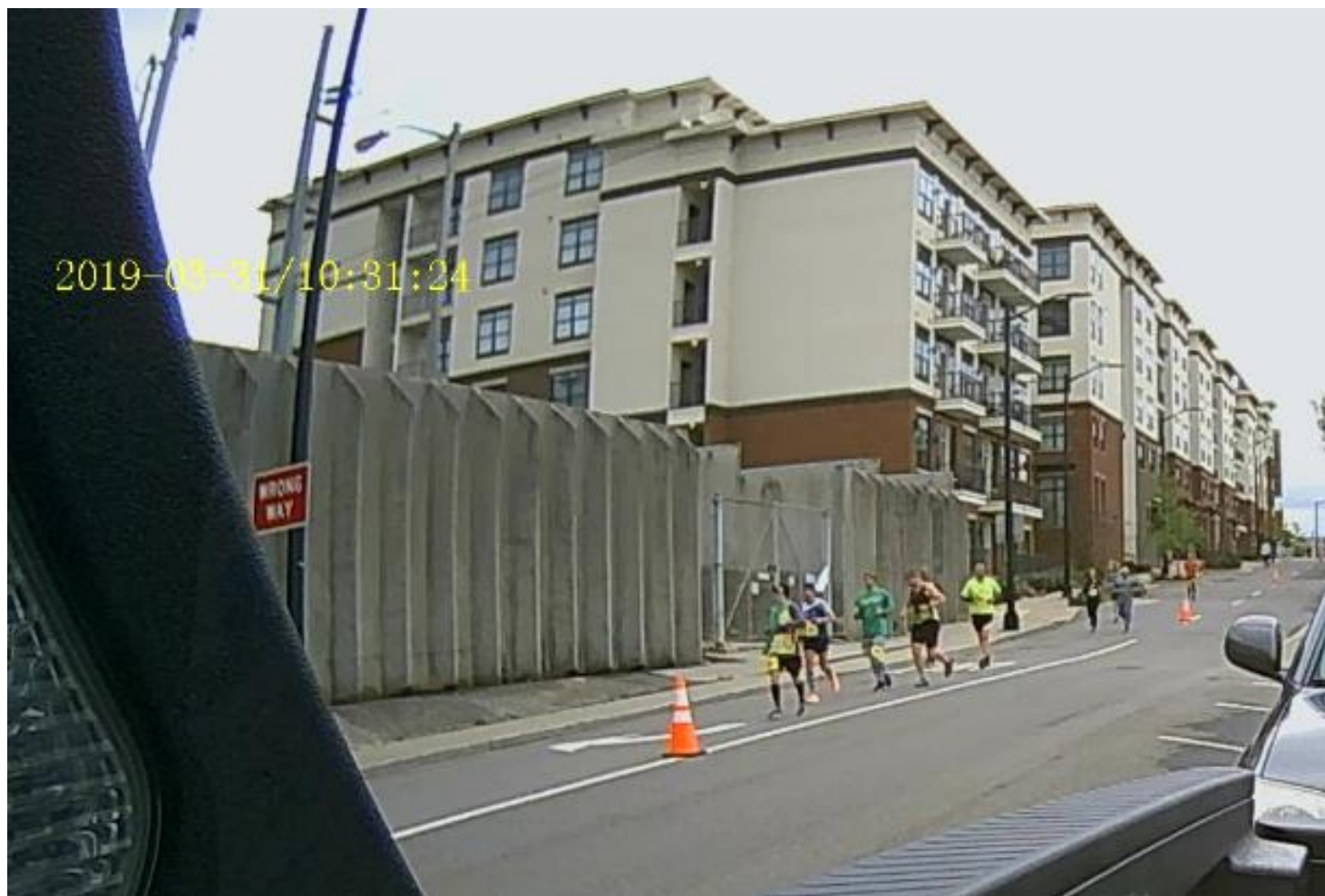
"During the race, I lost track of the number of times the senior officers for KPD, KFD and other agencies commented positively on the service of the volunteer amateur radio operators. Examples of specific citations included the APRS tracking of the race progress, willingness to leave a water stop to locate an off-course hand cyclist and constant improvement of the common operating picture for the EOC and Incident Command staffs through timely status reports and response to their queries. "

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“The quality of your service provided a perfectly self-evident example for use in explaining that the “amateur” in amateur radio service refers to the requirement to not receive remuneration for our service and highlighted the fact that professionalism is required in all facets of the service. You certainly demonstrated that with your service during the Marathon.”

If you haven't supported a marathon or ½ marathon, you might try it. It is rewarding.



Above: Participants captured on the dash cam as they approached Water Stop Lima at the 2019 Covenant Health Knoxville City Marathon

Help to Solve an Antenna mystery

Please email any suggestions to Dave Campbell, K8BYP, at k8byp@yandex.com . Thanks!

-----Original Message-----

From: Dave C [mailto:k8byp@yandex.com]

Subject: Question for the newsletter or Email to Club Members

Topic- antenna mystery / testing. I'm studying an antenna problem and would like to hear from other Hams on it.

40 meters. Half wave dipole, perfectly tuned. LMR 400 low loss coax, about 35 feet vertical, 60 feet lying on the ground, 30 vertical to the shack.

When the coax ring to the radio is loosened and pulled away (the shield connection), leaving only the center conductor in the antenna socket, the noise level jumps significantly, and signal levels drop. The noise often jumps from S5 to + 20.

This doesn't happen the same every time it's tested, sometimes the noise difference is more or less than other times.

Reversing the coax connection (shield to antenna terminal and center of coax to RX ground) results in a higher noise level when the coax center conductor is on the RX ground.

It would seem that the transmission line and antenna, with shield disconnected at the RX end becomes an end-fed antenna, but why does the noise level often become so much greater?

The noise is atmospheric, not a local source in the house.

I haven't found a correlation between rain- dry- wet ground etc.

This happens regardless of which rig is used (Newer Yaesu or Drake TR-3).

It's not AGC action. Happens with AGC turned off.

If the cause can be found, that could be useful in reducing RX noise?

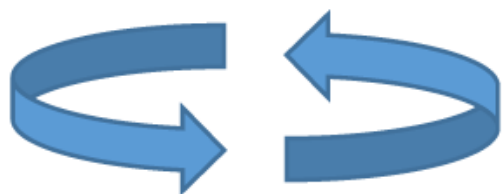
73 Dave

ORARC Swap Sheet Reminder

Send your ad and any pictures to the Swap Sheet Editor, Paul Koretko, WA0BAG:

WA0BAG@ARRL.NET or HGLENT@FRII.COM

After updates, the ORARC Swap Sheet is distributed to members by email with the Reflector.



*Oak Ridge Amateur
Radio Club
Swap Sheet*

2019 ORARC Dues

If you have given your Club dues already this year, thank you!

If you have not sent your dues, please note that dues are now due. Dues are \$20. You can download and print the Application/Renewal form on the Club's website at

http://orarc.net/docs/Membership_application.pdf. Bring your form and \$20 cash or a check made out to "Oak Ridge Amateur Radio Club, Inc." to **Dan Mantooth**, Treasurer, at the upcoming Club meeting. Or send your form and check to P.O. Box 4291, Oak Ridge, TN 37831-4291.

“SLAC develops novel compact antenna for communicating where radios fail” (April 12, 2019)

Contributed by Butch Alline, K8K0



Four inches high!

“Menlo Park, Calif. — A new type of pocket-sized antenna, developed at the Department of Energy’s SLAC National Accelerator Laboratory, could enable mobile communication in situations where conventional radios don’t work, such as under water, through the ground and over very long distances through air.”

Source for title, photo and excerpt: <https://www6.slac.stanford.edu/news/2019-04-12-slac-develops-novel-compact-antenna-communicating-where-radios-fail.aspx>

News from Dave Campbell, K8BYP – Congratulations!

News from K8BYP

I just submitted a Paper to the IEEE Antennas and Propagation Society Magazine in response to a special Call for Papers for an Educational Edition. The Paper title is "Rationalizing antenna characteristics by two-port observations" - it describes antenna theory using L-C network principles. The paper suggests more of a circuit theory basis for antenna analysis instead of just differential equation based math.

If published, it will appear in the 2019 December issue.



IEEE Antennas and Propagation Magazine

Correction to April 17, 2019 ORARC Silent Key Email

From: Doug Campbell, N1CWR. Subject: KR4EP note

A MAJOR GOOF in the note I wrote about Hicklin Harrel. I refer to his family history, and put it as the "Hicklin" clan. Urp. It's of course the HARREL clan...

In writing his family history, Hicklin travelled widely to check out old county records, starting in Virginia, and moving on the KY, IN, IL, etc. His descriptions of his grandfather's (?) efforts to establish Cordele, OK, and the struggles to build the town and attract the railroad (!) were a piece of American history one rarely gets a chance to learn about.

Thanks!, Doug.

Upcoming Events

ORARC Wednesday Lunch in Oak Ridge

Every Wednesday at 11 AM, Shoney's on Illinois Avenue in Oak Ridge, TN

For an email reminder for the lunch, write to Willard Sitton at W4HZD@arri.net

Anderson County ARES Net

Every Thursday evening at 19:00 local time

WA4GBI 147.15 MHz repeater (+600 kHz input offset, 118.8 Hz tone)

ORARC Club Meeting

Every second Monday evening at 7:00 p.m (Board Meeting at 6:45 p.m.)

First United Methodist Church, 1350 Oak Ridge Turnpike, Oak Ridge, TN 37830

Next event is May 13, 2019. Contact: Jim Bogard KY4L, email KY4L@ARRL.NET

Amateur Radio Outreach at the Children's Museum of Oak Ridge (CMOR)

Every third Sunday afternoon at 1-4 PM. Next event is May 19, 2019

ARRL Kid's Day on June 15, 2019 from 2-4 PM.

Contact: Jim Bogard KY4L, email KY4L@ARRL.NET

ARRL FIELD DAY -- ORARC LOCATION TO BE DETERMINED

June 22-23, from 1800 UTC (2 p.m. EST) Saturday to 2059 UTC (5 p.m.) Sunday

Hamfests - save the dates!

May 17-May 19, 2019	Dayton Hamvention in Xenia, OH	https://hamvention.org/
June 1, 2019	Georgia Section Convention, Atlanta Hamfest in Marietta, GA	http://www.atlantahamfest.org
June 15, 2019	Knoxville Hamfest in Knoxville, TN	http://www.w4bbb.org/

Oak Ridge Amateur Radio Club, Inc.

P.O. Box 4291

Oak Ridge, TN 37831-4291

2018 CLUB OFFICERS

President	Jim Bogard KY4L	(865) 806-8069
Vice President	Jim Womack KC4RD	(865) 463-0963
Secretary	Roy Freeman KE4TG	(865) 482-4474
Treasurer	Dan Mantooth KX4CH	(509) 528-7826
Technical Director	Carl Lyster WA4ADG	(865) 588-7120
Publicity Director	Chet Morris W4GEK	(865) 483-1798
Past President	Darrell Cook WA4LNX	(865) 207-4827

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	Roy Freeman KE4TG	(865) 482-4474	Programs	Roy Freeman KE4TG	(865) 482-4474
Education	OPEN		Trustee-W4SKH	Chet Morris W4GEK	(865) 483-1798
Field Day	Roy Freeman KE4TG	(865) 482-4474	Trustee-K4PJ	Charlie Hargis K4LF	(865) 481-3573
Historian	Chet Morris W4GEK	(865) 483-1798	ARES Coordinator	Darrell Cook WA4LNX	(865) 207-4827
			RACES Coordinator	Darrell Cook WA4LNX	(865) 207-4827
			Website Manager	Jamie Wright W4ABE	W4ABE@ARRL.net

Visit our Web Site at www.orarc.net

Club meetings are held at the First United Methodist Church, 1350 Oak Ridge Turnpike, Oak Ridge, TN on the second Monday of each month at 7:00 p.m. Guests, friends, family members, and prospective Radio Amateurs are welcome at all Oak Ridge Amateur Radio Club meetings.

Board meetings are at 6:45 p.m. before each monthly meeting. Members are encouraged to attend.

Annual dues are \$20. Download and print the Application/Renewal form on the Club's website, ORARC.NET. Bring the form and \$20 cash or a check made out to "Oak Ridge Amateur Radio Club, Inc." to Dan Mantooth, Treasurer, at the upcoming Club meeting. Or send the form and check to the Club at P.O. Box 4291, Oak Ridge, TN 37831-4291.

The Reflector is the monthly newsletter of the Oak Ridge Amateur Radio Club, Inc.

Please submit items and announcements for the Reflector on or before the Wednesday prior to the ORARC monthly meeting. Send submissions as Word attachments or as text within an email message, with "REFLECTOR" in the subject line, to Hilary Shreter at orarc.news@gmail.com