



Ø-BEAT

Volume 67 Issue 11

November 2016

Activities/Meetings

- HAM breakfast will be at: Daniel's Taco Shop, 6815 Space Village Ave Saturday, 5 November, Join us anytime between 8:00-9:30 AM All are warmly invited
- PPRAA Board Meeting Monday, 7 November
- PPRAA Club Meeting, Wednesday, 9 Nov IHOP 5749 Stetson Hills Blvd
- 10 Meter/2 Meter net Every Thursday 7:00 pm 28.390 MHz—USB 144.200 MHz-USB
- PPRAA Elections October club meeting

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November Meeting: Proposed grow light interference legislation

County Commissioner Larry Bagley will discuss possible legislation to protect Amateur Radio

operators from radio frequency interference from grow facilities, both legal and otherwise, in El Paso County.

Jamboree On The Air 2016

PPRAA participated in the BSA Pikes Peak Council's 100-year anniversary celebration in Calhan, CO. Members of the club set up 5 operating locations allowing Scouts to experience various operating modes. Discuss emergency communications, or review the ARES display.



This was quite a successful event with a constant stream of Scouts and Scouters (adults) stopping by the JOTA area. Also, we had a good number of amateur radio licensed Scouts carrying their HT's stopping by to say "hi".

Contesting

There are a lot of Amateur radio contests available for your enjoyment or annoyance. Contests are sponsored by amateur radio societies, clubs, and magazines. The sponsoring group publishes the rules, collect logs, cross-check the logs and will generate a score for each station. The scores determine standings within the various categories.

During a contest, amateur stations contact other stations and exchange information required for that contest. Some examples of the exchange include the operator name, state or province, signal report, or the state's county the station is located. The contact needs to be correctly logged to include the worked stations call sign as well as the "exchange", band/frequency, and date/time.

At the end of the contest, the logs are sent to the sponsor who checks them for accuracy. The sponsor may decrease or increase the score due to miscalculations or incorrect information in the exchange. Contests generally offer multiple entry categories allowing many winners.

There are regional contests like the European HF Championship or regionally focused like the Colorado QSO Party. The CQ World Wide DX Contest is worldwide as you can tell by the name, this contest attracts tens of thousands of participating stations each year. In large contests, the number of people taking part is a significant percentage of radio amateurs active on the HF bands, although they in themselves are a small percentage of the total amateurs in the world.

HF contests use one or more of the amateur bands. VHF contests use all the amateur radio bands above 50 MHz. Some contests may be restrictive to a single band but have worldwide participation such as the ARRL 10 Meter Contest.

Contests are available for any mode you are interested in. There are CQ World Wide WPX contests where the phone-only contest is in March, and the CW-only contest is in May. For the CQ WW WPX contest, you gain multipliers or each unique call-sign prefix worked.



PPRAA Officers and Board of Directors

PPRAA Board of Directors consists of four elected officers, seven board members, as well as the past president (time limit dependent). The Ø-Beat editor is a board appointed position and is also a member of the board.

Officers include:

- ⇒ President
- ⇒ Vice-President
- ⇒ Secretary
- ⇒ Treasurer

To send board member's email, browse to the officers section of our website: <http://ppraa.org/about-ppraa/officers>

President	Raleigh Holcomb	N4HYF
Vide-President	Mike Anderson	WV7T
Secretary	John Wishart	NGØI
Treasurer	Jim Madson	K3ILC
Board Member	John Bloodgood	KDØSFY
Board Member	Glenn Brodt	N3ULW
Board Member	Dan Huber	KNØMAP
Board Member	Frank Roger	KB3PDT
Board Member	Jim Rader	KDØNQM
Board Member	Pam Scott	WØPRS
Board Member	Virgil Yost	NØXRS
Ø-Beat Editor	Dan Scott	WØRO
Webmaster	Doug Nielsen	N7LEM

Online Resources

PPRAA Website

<http://ppraa.org>

The PPRAA website is the cornerstone for club related information, events, and technical information.

In addition you can register, pay dues, and submit donations. Donations to the PPRAA college scholarship fund are managed by FAR Scholarship Committee

Facebook / Google+

Follow activities as they unfold, or get reminders of upcoming events.

Links to both Facebook and Google+ social media sites can be found on the PPRAA.org.

Or from each social media site search on: Pikes Peak Radio Amateur Association.

PPRAA Forums

The PPRAA forums are intended to allow users to exchange ideas, ask and answer amateur radio related questions, and plan/discuss upcoming events.

This is a fantastic, but underutilized, tool. Check it out and register at:

PPRAA.Forumotion.net



Monthly Activities

Membership Meeting

Held the 2nd Wednesday of the month starting at 7:00.

IHOP
5749 Stetson Hills Blvd
(Just west of Powers Blvd)

NOTE: Many show up at 6 pm for kibitzing and grub.

Board Meeting

IHOP
5749 Stetson Hills Blvd
Colorado Springs, CO 80906

6:30pm—8:00pm
On the Monday preceding the membership meeting.

Board Meetings are open to all members.

Ham Breakfast

Location changes monthly: Check ppraa.org or table of contents, page 1 for the breakfast meeting location.

10 Meter/2 Meter Net

Every Thursday at 7pm
Starts on 28.390 USB then transitions to 2 Meter SSB at 144.200 USB.



Contesting (continued from page 1)

The many contests attract a variety of contesters. Before a contest read the rules to determine strategies to maximize multipliers earned. A casual contester may work certain contests and rarely operate in others, or compete with less seriousness.

A good source for finding out about upcoming contests is to follow the link to WA7BNM under "Amateur Radio" on the left side of the PPRAA.org homepage.

For a quick glance at upcoming contests check out the lower right side of the PPRAA.org

Celebrating your club's Elmers might encourage others

Sam, W5KF, recently sent me a link to the Elmers' page on the Norman, OK South Canadian Amateur Radio Society (SCARS) website. Not only is it a listing of the club members who have stepped forward to Elmer new members, but also provides ways to honor current and past Elmers.

This is from the SCARS newsletter:

"Elmer List on the W5NOR.org website

"This week we talk about a brand new feature on the W5NOR website. In the amateur radio community, an experienced amateur radio operator who mentors a new or prospective ham is commonly called an "Elmer". In our hobby, that seems to be a great way for knowledge to be transferred.

"Yes, we all have taken an FCC test to receive our license, however, that's only the starting point. Remember that person that helped you set up your first radio, or gave you the courage to press the PTT button, or answered endless questions about a radio, or an antenna? That's the kind of thing we're talking about.

"Thanks to a great suggestion from Gary Skaggs WB5ULK [not sure it was my idea. – Editor], we've created the SCARS Elmer Page, located at <http://w5nor.org/elmers>, for us to celebrate Elmers; past, present, and future. We provide a place for Elmers to list their specialty and contact information, which allows new hams to find someone they can ask questions of.

"Since this is a new section of the website, this list is rather short. If you're willing to help others on a given topic, send a message to n5hzz@arrl.net and you will be added to the list. Right now we need lots of different categories, like antennas, radio setup, HT programming, contesting, satellite operation, high power operation, test gear, building your own gear, repairing radios, APRS, D-Star, DMR, CW, logging, etc. oh well, you get the idea.

"You don't need a Ph.D. to be listed here. You just need a willingness to help others in a given area. It's OK to be a new ham and be listed here. You may have just struggled through your first

space contact, but you'll have infinitely more knowledge than the person who's been a ham for 40 years, and has never tried that portion of the hobby.

"Also, there is a link to the "ARRL Elmer Award" page of the American Radio Relay League's website. Here, you can enter your favorite Elmer's name and callsign. The ARRL will print a nice certificate, and mail it to the address you enter. Yes, for FREE! This certificate can either be mailed to your favorite Elmer, or you can mail it to yourself so you can present it to them personally. Feel free to order an Elmer certificate, and present it to your Elmer at an upcoming SCARS meeting. Talk with one of the officers before the meeting to get your place on the agenda. What a great way to recognize these people for their extra efforts.

"Finally, we've got a place to list YOUR favorite Elmer in our SCARS Elmer Hall-of-Fame. This is the place to memorialize your Elmer, whether they are SCARS members, Silent Keys, or not. I've already listed a few Elmers on the list from my own travels through the hobby. We'd love to list the people that help us all succeed.

"So, please help make this page useful, visit the SCARS Elmer page at <http://w5nor.org/elmers> and be listed as an Elmer, and list your favorite Elmers."

I think this is a wonderful idea, and I hope that you will consider doing something similar in your club. A little recognition could go a long way, and we need all the Elmers we can muster. And, if you're already doing this, please send me a link. I'll add that link to my website, KB6NU.Com.

When he's not Elmering new hams, you'll find Dan building kits and working CW on the HF bands. He is the author of the "No Nonsense" amateur radio license study guides, and blogs about amateur radio at KB6NU.Com. You can contact him by e-mailing cwgeek@kb6nu.com.



**Dan Romanchik
KB6NU**

Dan, KB6NU, is the author of the "No Nonsense" amateur radio license study guides, and blogs about amateur radio at KB6NU.Com, and you can contact him by e-mailing cwgeek@kb6nu.com. When he's not pondering the vagaries of the U.S. licensing system, you'll find him working CW on the HF bands



PPRAA Board Meeting Minutes 10 October 2016

PPRAA Board Meeting Minutes
10 October 2016

Present: Raleigh Holcomb, John Wishart, Mike Anderson, Rich Milligan, Jim Bishop, Pam & Dan Scott, Frank Rogers, John Bloodgood, Virgil Yost, Doug Nielsen, Frank (the mystery guest).

The meeting was called to order by President Raleigh Holcomb at 6:28 PM at the IHOP Restaurant at Powers & Stetson Hills.

Silent Keys: Mike Manes W5VSI

The previous meeting's minutes were approved as published in the Zero Beat.

Treasurer's Report

Rich Milligan reported that we had \$12783.01 in our accounts as of 30 September 2016. We also received our first check from the use of King Soopers gift cards.

Committee Reports

Club Station - Raleigh got some training from Ed on raising/lowering the new tower. Jim Bishop and Raleigh participated in a Simulated Emergency Test (SET) exercise at the site conducted by the state ARES organization. Warning tapes & lights are being attached to the guy wire stakes and wires. The storage building was cleaned up.

Education - Mike has no report.

JOTA - Jamboree on the Air - Boy Scouts

This event will be held October 15, 2016, at the El Paso County Fairgrounds events complex (the Swink building) in Calhan. Our call sign for the event will be 'W0J'. Contact Virgil Yost to assist with operating.

Special Events stations will be conducted at the club station on Nov 11 (Veterans' Day) and Dec 7 (Pearl Harbor Day).

ARES Report

John Bloodgood reported on upcoming events. ARES sent 4 people down to the Beulah Hill fire. ARES also participated in the recent SET event.

Elections

These will be coming up at our next meeting on Wednesday, October 12. Nominees are being sought for all positions. The board will be the nominating committee.

Jim Bishop gave a presentation on our club station to the Garden of the Gods Radio Club.

Next PPRAA Board meeting: Monday, November 7, 2016, 6:30PM at the IHOP at Powers & Stetson Hills.

PPRAA Business Meeting Minutes 12 October 2016

The meeting was called to order at 7:01 PM by President Raleigh Holcomb at the IHOP Restaurant on Stetson Hills near Powers Blvd. Approximately 30 members and guests were present.

Silent Keys: Mike Manes W5VSI

Minutes Approval

September meeting minutes were approved as published in Zero Beat.

Treasurer's Report Rich Milligan reported that we had \$12,753 in our bank accounts as of 30 September 2016.

First check for \$355.70 has arrived from King Soopers for the gift card program. Please continue to use the cards!

Committee Reports

Club Station - The winch for our new tower is in the trailer. Raleigh (or Ed) can provide operational training for its use. Warning lights and flags have been installed on the tower guy wire stakes.

ARES Report

John Bloodgood reported that the local ARES group participated in the recent October SET activity.

Education

Mike Anderson reported that he has one student has completed training and several more in training.

JOTA Event

This will be held at the El Paso County Fairgrounds in Calhan in Swink Hall. We will be operating several stations on Sat. More operators are needed. Bring your radio and antenna. Also be listening for and respond to these stations on the air this Saturday, 9AM-5PM. Our JOTA call sign will be W0J.

CMRG Annual Meeting

This event will be held Saturday, 10AM - Noon, Oct 29, at Falcon Police Substation.

Elections

Elections were held on October 12. The following positions were vacant: VP, treasurer, board members (0 to 2). Nominations were taken for all positions.

Election Results:

President - Raleigh Holcomb N4HYF
 Vice President - Mike Anderson WV7T
 Treasurer - Jim Madson K3ILC
 Secretary - John Wishart NG0I
 Board Member - Dan Huber KN0MAP
 Board Member - John Bloodgood (current member)
 Board Member - Glenn Brodt (current member)
 Board Member - Frank Rogers (current member)
 Board Member - Pam Scott (current member)
 Board Member - Virgil Yost (current member)

Motion made/seconded to obtain a plaque for IHOP for hosting our club meetings. Passed.

Program

Elections

Upcoming Events

Next Board Meeting: 6:30PM, Monday, October 10, 2016, at IHOP Restaurant at Powers & Stetson Hills.

Next PPRAA regular meeting: 7PM, Wednesday, November 9, 2016, also at the IHOP Restaurant.

Christmas Party, Dec 14 club meeting (2nd Wed). Preferences are Golden Corral, Thunder & Buttons. Location is TBD at this writing.

The meeting was adjourned at 8:15 PM.

Respectfully submitted,
 John Wishart NG0I
 PPRAA Secretary





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THE Q OF AN ANTENNA SYSTEM

What is the "Q" of a circuit? Q means quality factor. In a circuit or antenna, it is a consideration of the reactances (X) and the pure resistance (R) of the circuit.

An antenna is a tuned circuit at the end of the coax or feedline. The design and size of the components affect the Q of the circuit.

The higher the Q, the narrower the bandwidth or frequency response the circuit has. The lower the Q, the wider the circuit reacts.

Q is affected by the amount of pure resistance a circuit offers.

To get an idea of the Q, it should be measured at the exact resonant point of the antenna or circuit. At this point, either the inductor or capacitor value need to be known. Then, it can be looked up on a reactance chart as to the amount of reactance or resistance it offers at the resonant frequency. It will be the same for either component.

The Q equals the reactance value in ohms divided by the series resistance of the circuit.

$$Q = X/R$$

What does this mean?

In a series resonant circuit, if X

= 350 ohms and R = 5, then the Q = 70. This will mean that a current of I at resonance will drop to .1 in only 8% deviation from the resonant point. At this point, the loss is 90% of the current that would be at the resonant point.

Does this mean the antenna is a poor radiator? No, at the resonant point it may be good, but a small deviation would mean loss.

Antennas that have lower Q's and wider bandwidths will have more resistance to give it the lower number. It will also increase bandwidth. Does this mean an antenna with a wider bandwidth is less efficient? Not always, to get an idea of what Q is doing, you can liken it to the energy passing over the conductor of the circuit a number of times as the Q. Therefore, if the Q is 10, it passes through the conductors 10 times before radiating. Does this hurt performance?

Maybe, to determine resistance, you just do not measure the ohm value of the wire. At RF (HF) the energy only uses about .0006 inch of the conductor diameter due to "skin effect". This drastically reduces the amount of conductor it uses. If this amount of conductor develops 5 ohms, then it is like 50 ohms with a Q of 10.

Measuring Q and efficiency can be quite involved and obscure. There are antennas with very wide bandwidths that are very efficient. This is not due to high resistance in the conductors.

Therefore, it is not a good analysis to determine if an antenna performs well by a "Q" value it measures. There are other factors beyond the scope of this article and me too. The bottom line is, are you being heard and are you hearing?

73,

Ralph WD0EJA

Nov. 2016

BILAL COMPANY

137 MANCHESTER DR.

FLORISSANT, CO. 80816
U.S.A

PH/FX: 719/687-0650

wd0eja@isotronantennas.com

Rehab for the KØNR Repeater

Posted on 5 October 2016 by Bob KØNR — No Comments ↓

My UHF repeater has been operating on 447.725 MHz here in Monument for a couple of decades now. It started out as a classic “pet repeater” project and has been operating from my basement all this time. Over time it has picked up additional users and has turned into the de facto hangout for our local radio club.

The repeater system has gone through a number of revisions over the years, including the RF transmitter and receiver. I wanted to retire the pair of Motorola Mitrek mobile radios I have been using when they started to exhibit a few loose connections. Really, though, I thought it was time for some

synthesized, modern RF gear in a compact package.

k0nr-repeater3 When Yaesu offered an attractive price on their DR-IX Fusion repeater, I jumped at the chance. Initially, I put it on the air in a mixed analog-digital mode with the repeater automatically switching modes to handle either analog FM or C4FM digital. I used the internal controller of the DR-IX which is quite simple and has limited functionality. (The SCOM 7K controller got put on the shelf for a while.) The DR-IX supports using an external controller but implementing the mixed analog-digital mode is... well...challenging. (Various people have figured out ways to do it with modifications to the DR-IX or using additional hardware.) After 10 months of operation, I decided to reinstall the full

-featured SCOM 7K controller, enabling quite a few features including a 2m remote base, synthesized speech, automatic scheduling and weather alerts. This does mean giving up the C4FM mode but usage was minimal anyway.

The SCOM 7K repeater controller has been in service for decades, handling multiple receivers and transmitters, very configurable with

programmable macros. SCOM has long since moved on to a newer, improved model but my 7K just keeps on ticking. The 7K has the voice synthesis and autopatch options installed, so, yes the repeater has an autopatch (not that anyone cares). A Yaesu FT-7800R is used as a 2m remote base and the duplexer is a classic Decibel

Products. Not shown in the photo is a Bearcat WX100 weather receiver that is used to transmit weather information when an alert occurs in our area.

I've documented the wiring diagram and configuration used here: [k0nr-repeater-construction-notes \(http://www.k0nr.com/wordpress/wp-content/uploads/2016/10/K0NR-Repeater-Construction-Notes.pdf\)](http://www.k0nr.com/wordpress/wp-content/uploads/2016/10/K0NR-Repeater-Construction-Notes.pdf)

This was a good opportunity to clean up some of the cabling and physical mounting that had degraded over time. (A kluge here, a kluge there and entropy takes over.) I am happy with the result.

73, Bob KØNR

For additional interesting articles and a good amateur radio blog, please visit “[The KØNR Radio Site](#)”. The KØNR Weblog, a blog about ham radio and other topics by Bob Witte. Please consider browsing to his site leaving a comment or two.

Bob, is a long time member to PPRAA,





VE Testing & Education—Colorado Springs (PPRAA)

Pikes Peak Radio Amateur Association (PPRAA)

When:
Monthly
2nd Saturday at 9:15 AM

Location:
C21 Library,
ENT Conference Center
1175 Chapel Hills Dr
Colorado Springs, CO
80920

Directions available at:
ppraa.org/ve-testing
or contact:
Richard Milligan
VE@PPRAA.org



Mike Anderson, WV7T does personal and small group training for all license classes.

Mike also does Morse code training.

Mike can be reached at:
719-229-8610
vv7t@aol.com

VE Testing Woodland Park (MARC)

MOUNTAIN AMATEUR RADIO CLUB (MARC)

When:
Jan, Mar, May, Jul, Sep, Nov
1st Saturday at 10 AM

Location:
Woodland Park
Woodland Park Library-
Community Meeting RM
218 East Midland Avenue

Directions:
<http://www.nx0g.org/ve.html>
or contact
Wes Wilson (KØHBZ)
k0hbz@arrl.net
Call (719) 687-8758



Applicants will need the following items:

1. A valid PHOTO ID, driver's license preferred (if you do not have a valid photo ID, please call for alternative identification requirements).
2. Your FRN or SOCIAL SECURITY NUMBER (now required - this includes children).
3. Your CURRENT ORIGINAL amateur radio license (if any) and a PHOTOCOPY for the VE Team to keep.
4. The CURRENT ORIGINAL CSCEs you have and a PHOTOCOPY for the VE Team to keep.
5. MARC Only: Cash, Check or Money Order for \$15 (standard ARRL VE Fee). Checks and money orders should be made out to ARRL. This covers all exams you wish to take at this VE session. There is not cost for the PPRAA tests.

NOTE: PPRAA and MARC VE Team policy, as with many VE Teams, is to not allow same day retests on failed exams.

PPRAA – Colorado Springs testing only:

Anyone passing their Technician Class examination at a PPRAA test session will receive a free year's membership to the Pikes Peak Radio Amateur Association

First amateur radio in geosynchronous orbit

First amateur radio in geosynchronous orbit will aid disaster communications

December 22, 2015

BLACKSBURG — Researchers at the Ted and Karyn Hume Center for National Security and Technology are preparing to send an amateur radio transponder into a geosynchronous orbit in 2017.

“Seven days a week, 24 hours a day, 365 days a year, a new ham band will be available for the Americas,” said Robert McGwier, a research professor in the Bradley Department of Electrical and Computer Engineering and the Hume Center’s director of research. “It will allow rapid deployment to disaster areas and support long-haul communications for first responders.”

This would be the first amateur or “ham” radio payload in a geosynchronous orbit, and would significantly enhance communications capabilities for amateur radio operators, in particular following natural disasters or other emergency situations. The Hume Center team met with Federal Emergency Management Agency Administrator Craig Fugate in September to discuss the project.

There are more than 2 million amateur radio operators around the world, and the community has a long history of assisting with emergency communications when traditional communications networks collapse because they typically rely on cell towers and the Internet. Ham radio signals require only compact, mobile equipment that can be easily transported to an emergency site.

“Hams show up at every disaster, no matter what,” said McGwier, referring to amateur radio operators. After events like Hurricane Katrina and the Indian Ocean tsunami, “for days, the only way that people communicated out of those communities was amateur radio.”

In fact, the Federal Emergency Management Agency signed an agreement in 2014 with the American Radio Relay League, also known as ARRL, that describes how the two organizations will work together to provide disaster relief, and the Federal Communications Commission has specific regulations authorizing the use of amateur radio in situations which threaten life or property. But even amateur radio isn’t always available. Currently, most amateur radio operators communicate by bouncing their signals off the ionosphere. Solar flares, geomagnetic storms, and other events that change the condition of the

ionosphere can affect the efficiency of radio signal propagation, making it unpredictable.

Sending radio signals to a satellite, instead, would be much more dependable, allowing radio operators to help emergency personnel reliably access supplies, logistical support, and medical assistance. The key is to ensure that the satellite would always be accessible to the radio operators — which is why the geosynchronous orbit is critical.

A geosynchronous orbit has the same period as the Earth’s rotation — just under 24 hours. A satellite in such an orbit is easy to locate and access. In this case, the satellite will always be within a band of longitudes over the Americas, continually accessible to any amateur radio operator there, including the students and researchers at the Virginia Tech Ground Station.

The satellite itself will be operated by Millennium Space Systems on behalf of the United States Air Force; the Radio Amateur Satellite Corporation, also known as AMSAT, will operate the radio, which will be designed and built by Virginia Tech students — making this project a unique collaboration among the university, nonprofit organizations, private companies, and the federal government.

The Hume Center team is also engineering a ground terminal that emergency personnel could use to relay their own existing communications channels through the satellite. This setup could be deployed through the American Radio Relay League and the Radio Amateur Satellite Corporation as a key part of a robust national emergency response system, allowing trained operators to reliably mobilize to disaster areas in the first critical hours after a devastating event.

Organized under the umbrella of the Institute for Critical Technology and Applied Science, and with operations at the Virginia Tech Research Center – Arlington and the Corporate Research Center in Blacksburg, the Hume Center leads Virginia Tech’s research, education, and outreach programs focused on the communication and computation challenges of the national security community.

From: <http://www.vtnews.vt.edu/articles/2015/12/122215-ictas-humegeoradio.html>



Hume Center Director of Research Robert McGwier (right) and research associate Zachary Lefke are building radio antennas that will be used in the Virginia Tech Ground Station.

Article reposted with permission Virginia Tech.
<http://www.hume.vt.edu/geo/>

**PIKES PEAK RADIO
AMATEUR
ASSOCIATION**

Send membership application to:

Pikes Peak Radio Amateur PO
Box 16521
Colorado Springs, CO
80935-6521

General Questions:
ppraa@ppraa.org

ØBeat:
zerobeat@ppraa.org



ppraa.org

Get Radio Active, get on the air!

Membership Application:

Date: ___ / ___ / ___ New Membership: Yes / No

Name: _____

Address: _____

City/State/Zip: _____

Call: _____ Class: ___ Phone # (____) _____

Email: _____

Are you a ARRL member: Yes / No

Additional Family Members:

Name 1: _____ Call: _____ Class: ___ ARRL Member: Yes / No

Name 2: _____ Call: _____ Class: ___ ARRL Member: Yes / No

Name 3: _____ Call: _____ Class: ___ ARRL Member: Yes / No

___ \$15.00 Full Member

___ \$10.00 Full Member over 65

___ \$18.00 Family Membership

___ \$12.00 Family Membership over 65

\$___ Membership Amount

\$___ Scholarship Fund Donation

\$___ PPRAA General Fund Donation

\$___ Total

2017 Scholarship Fund

This last year the donations to PPRAA Scholarship Fund have been slipping.

The scholarship is for a hard science or math related field of study. Those fields of study are, or are similar to, Physics, Chemistry, Math, Electrical Engineering, Bio Engineering, etc.

There are many ways to make your tax deductible donation to this fund. Contributions may be made via:

⇒ [PPRAA website \(http://ppraa.org\)](http://ppraa.org)

⇒ Part of your membership renewal,

⇒ Club meetings and event.

⇒ Directly to the fund at:
FAR Scholarship Committee
P.O. Box 911
Columbia, MD 21044

**Make checks to:
PPRAA Scholarship**

Ø- Beat Banner

This photograph of Pikes Peak from Rockrimmon, Colorado Spring, CO was taken by Pam W0PRS, October 6th 2016.

The theme of the banner is Pikes Peak Region which include PPRAA activities.

If you would like to submit pictures for the Ø-Beat banner, please send them to:

zerobeat@ppraa.org

Please Include "[Ø-beat]" as part of the subject line.