



*“Ham”-ster says, “Merry Christmas!”
Don’t miss our Christmas Party this month!*

The Aero Aerial

The Newsletter of the Aero Amateur Radio Club
Middle River, MD
Volume 14, Issue 12
December 2017

Editor Georgeann Vleck KB3PGN

Officers

President	Joe Miko WB3FMT	Repeater	Phil Hock W3VRD Jerry Cimildora N3VBJ
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		Contests	Bob Venanzi ND3D Charles Whittaker KB3EK

Committees

Website: <http://w3pga.org>

Facebook: <https://www.facebook.com/pages/Aero-Amateur-Radio-Club/719248141439348>

About the Aero Amateur Radio Club

Meetings

The Aero Amateur Radio Club meets at 7:30 pm on the first and third Wednesdays of the month at Essex SkyPark, 1401 Diffendall Road, Essex. Meetings begin at 7:30 p.m. local time. Meetings are canceled if Baltimore County Public Schools are closed or dismiss early.

Repeaters

W3PGA **2 M :** INPUT : 147.84 MHz, OUTPUT : 147.24 MHz, PL 123.0

W3PGA **70 Cm:** INPUT : 444.575 MHz, OUTPUT : 449.575 MHz, PL123.0

W3JEH **1.25 M:** INPUT : 222.24 MHz, OUTPUT : 223.84 MHz

Club Nets

Second Wednesday Net – 10 Meters (28.445 MHz) @ 8 p.m. Local Time

Fourth Wednesday Net – 2 Meters (147.24 MHz Repeater) @ 8 p.m. Local Time

Fifth Wednesday Net – 70 Centimeters (449.575 MHz Repeater) @ 8 p.m. Local Time

Radio License Exams

The Aero Amateur Radio Club sponsors Amateur Radio License Exams with the ARRL VEC. Examination sessions are throughout the year. Walk-ins are welcome; arrive no later than 30 minutes after start time. \$15 charge.

2017-18 Examination Schedule

Time:	1:15 pm	
Dates:	Sunday, January 14	
Where:	White Marsh Library	

White Marsh Library, 8133 Sandpiper Circle, White Marsh, MD

Contact: Patricia Stone AC3F, email: ac3f@juno.com, landline: 410-687-7209

LOCAL AREA NETS

Day	Time	Freq. (MHz)	Net Name
Daily	9 – 10 am	145.330	Oriole Net
Daily	6 pm	3.820	Maryland Emergency Phone Net
Daily	6:30 – 7 pm	145.330 no PL	Balto. Traffic Net (b/u 146.670 PL 107.2)
Daily	7 pm & 10 pm	3.643	MD/DC/DE Traffic Net
2 nd Tue	7:30 pm	146.670	Baltimore County RACES Net
2 nd Wed	8 pm	28.445	Aero ARC Net
4 th Wed	8 pm	147.240	Aero ARC Net
5 th Wed	8 pm	449.575	Aero ARC Net
Fridays	7:30 pm	145.330	Back in the Day Net
When activated by NOAA		147.030	SkyWarn (primary)



Aero Club Annual Christmas Party

Wednesday, December 20, 2017

Bring some goodies to share

From the President's Desk

Official Field Day 2017 Results

It's December and the ARRL has published the official results for the 2017 Field Day activities.

During FD 17 there were more than 37,700 participants with about 1.3 million contacts. The contacts were made in CW, Phone, Digital all modes had increases over 2016. The CW contacts were up by 10% while Phone and Digital modes were both up 20%.

In the Maryland District of Columbia Section (MDC) there were 58 entries, the Aero Radio Club was a 5A class. Nationwide there were 75 stations in the 5A class, we came 50 out of 75 entries. The highest 5A entry had 14,918 points with 4,109 contacts the lowest 5A entry had 1,026 points and 66 contacts. *Per "QST December 2017 pgs 74 – 87."*

Our score of 2,684 with QSO of 1,034 and Bonus Points of 1,650 with 445 contacts was much more than that. We had 25 AERO members participate, 4 Guest and 9 visitors join us at the Essex Skypark as well as a number of people who took tests at the VEC session.

During the 24 contest hours we made 445 contacts, 65 CW, 7 Digital and 373 on Phone. We were able to contact 42 States, Canada, Puerto Rico and Great Britain. I am looking forward to FD18 the weekend of June 23rd and 24th.

73,
Joe M.

NET REPORTS

11-8-17: 28.445 MHz, 20:00 to 20:50 local.

W3PGA Joe Essex, HC3HXL Joel Essex, KB3JVP Ken Middle River, KC3FNN Rob Middle River, W3JEH Ron Perry Hall

5 members on the net

11-22-17: 147.240 MHz

Report unavailable.

11-29-17: 449.575 MHz, 20:00 to 21:03 local

W3PGA NCS Joe Essex, KC3FBM Franklin Parkville, KC3HXL Joel Essex, W1ASA Israel Baltimore City, KB3JVP Ken Middle River, KB3VAE Rich Middle River, K3TEL Arnold Towson

7 Aero members on the net

Upcoming Second Meeting Presentations

<i>Date</i>	<i>Topic</i>	<i>Presenter</i>
12/6	Ham Radio in the Modern Age	Keon KE3HAY
TBA	Contest Logging with N1MM	Bob ND3D
TBA	The Acu-rite Weather Station	?Kelly KC3APF

These presentations will be given at the Essex SkyPark FBO building after the business meeting.

Any questions call Joe Miko at 443-956-0197. Presenters who wish to submit a description of their talk may email it to Georgeann at KB3PGN@reagan.com for inclusion in the Aerial.



VE CORNER

by Pat Stone, AC3F

Our next test session will be held at 1:15PM on Sunday, January 14, 2017 at the White Marsh Library.

Reminder: VE Testing Snow Plan

If Baltimore County Libraries are closed for a testing day (Saturday or Sunday) the VE Testing session for that day will be canceled. Testing applicants that have pre-registered will be notified by phone. Due to the scheduling requirements of Baltimore County Library, we can't schedule a makeup session. Testing will resume on the next scheduled testing date. VE's will be notified by phone in the event of a closure.

UPCOMING HAMFESTS and EVENTS

2017 SKYWARN RECOGNITION DAY

2017 SKYWARN Recognition Day will be held on the first Saturday in December. The date and time is December 2, 2017, from 0000 UTC until 2400 UTC.

SKYWARN Recognition Day was developed in 1999 by the National Weather Service and the American Radio Relay League.

It celebrates the contributions that SKYWARN volunteers make to the NWS mission, the protection of life and property. Amateur radio operators comprise a large percentage of the SKYWARN volunteers across the country.

The Amateur radio operators also provide vital communication between the NWS and emergency management if normal communications become inoperative.

During the SKYWARN Special Event operators will visit NWS offices and contact other radio operators across the world.

For more information, see <http://www.wrh.noaa.gov/mtr/hamradio>

Source: MDC Section News, Vol. 12, No. 11, November 13, 2017

Glenn L. Martin Aviation Museum

All Aboard! Next Stop, Martinville – in the Gallery



The Martinville train crew has been working nonstop on the museum's fourth train garden.

This year's will be the biggest yet—we will be running four trains over the river and through the woods, or should we say over the hills and through the mountains. New this year we've added two mountain tunnels. There is also a set of tracks that goes over a trestle and runs completely around the garden. Of course, the airport is still with us.

Look for us in our new home—the museum's Gallery. For 2017, head engineer is Charlotte Radu, and her crew is: Jeff Michael, Janet Kivett, Joan Kramer, Rick Spacek, Ted Cooper, Joe Corteal, James Hayes, Dorsey Boyle, Fred Fahdt, Robert Meier and William Herting.

[Note: Last day of the Train Garden is Jan. 13, 2018. Check website for days and times.]



If it's called Martin, it has to have a seaplane.



Charlotte Radu, Joe Corteal work on landscaping.

Source: *Glenn L. Martin Maryland Aviation Museum, The Maryland Flight Log, Winter 2017-2018, p. 1.*

Hamfests

Saturday, December 9, 2017 : Second Annual American Legion PGCERA SantaFest

American Legion Youth Camp, 9201 Surratts Rd., Cheltenham, MD 20623

Website: pgares.org/santafest/

Sponsor: American Legion and Prince Georges County Emergency Repeater Association

Talk-In: 145.230 (CTCSS: 110.9 Hz), K3ERA repeater, Greenbelt

Contact: Charles Hallock, AA3WS, 16203 Manning Rd., West Accokeek, MD 20607 , Phone: 301-535-1666, E-mail: selbynet@hotmail.com

Saturday, April 21, 2018: Delaware State Convention (Delmarva Amateur Radio & Electronics EXPO)

Cheer Community Center, 20520 Sand Hill Rd., Georgetown, DE 19947

Website: www.radioelectronicsexpo.com

Sponsor: Sussex Amateur Radio Association

Type: ARRL Convention

Talk-In: 147.090 (CTCSS: 156.7 Hz), Sussex County ARES® Primary Repeater, Millsboro, DE

Contact: Herb Quick, KF3BT, PO Box 1431, Seaford, DE 19973, Phone: 302-629-4949, E-mail:

herb@hamiltongraphics.com

Saturday, June 30, 2018: Harrisburg Radio Amateurs Club Firecracker Hamfest

Harrisburg Area Community College, 3599 Industrial Road, Harrisburg, PA 17101

Website: <http://www.w3uu.org>

Sponsor: Harrisburg Radio Amateurs' Club

Talk-In: 146.76 (CTCSS 100.0 Hz)

Contact: Tim Lehman, KB3OZA, PO Box 453, Hummelstown, PA 17036, Phone: 717-461-3398, Email:

kb3oza@arrl.net

You may view upcoming Hamfests at: <http://www.arrl.org/hamfests-and-conventions-calendar>

Feature Article

Watts a Matter? It Doesn't Work!

by Joe Miko WB3FMT

In a recent project to find out how long a battery pack w/ inverter would run lights I ran into a time problem. I did not want to sit in my shed with a stop watch and a string of white Christmas tree lights to see how long they ran. Solution -- have the wife get me an electric alarm clock (from Amazon w Prime), the kind you have on a night table. Using a 3 way plug, plug the lights and the clock into the inverter and press ON. I ran the test using 19 watt string of lights and 3 watt clock they ran for 1 hr and 40 minutes. I could not understand why the time was so short; I figured it should run for a much longer time. I was only running 22 watts at the most. What was going wrong?

Going to the internet and using the ARRL Handbook, I found out that inverters are power hogs.

**Inverters 12 DC to 120v AC Rule of thumb 1 amp DC for each 10 watts of AC
For 24 volt systems 1 amp DC for 20 watts - Inverters are about 80% efficient.**

If you are running 70 watts, the battery is using 7 amps of DC. An Inverter rated at 350 watts will draw 35 amps of current from the battery, using the 50% rule you need at battery capacity of 70 amps.

Note – If this 150 amp is drawn from the battery for one hour, 150 amp hour (AH) of battery power will be used. To support 150 amp hours of battery power, 300 amp hour of battery capacity is required. (Vanner Power Conversion)

The inverter voltage alarm starts at 11 volts, the inverter stops at about ten volts.

Power Factor - In AC circuits, the power factor is the ratio of the real power that is used to do the work and the apparent power that is supplied to the circuit. The power factor can get values in the range from -1 to 1. When all the power is reactive power with no real power (usually inductive load) – the power factor is 0.

There are three basic Circuits or Load.

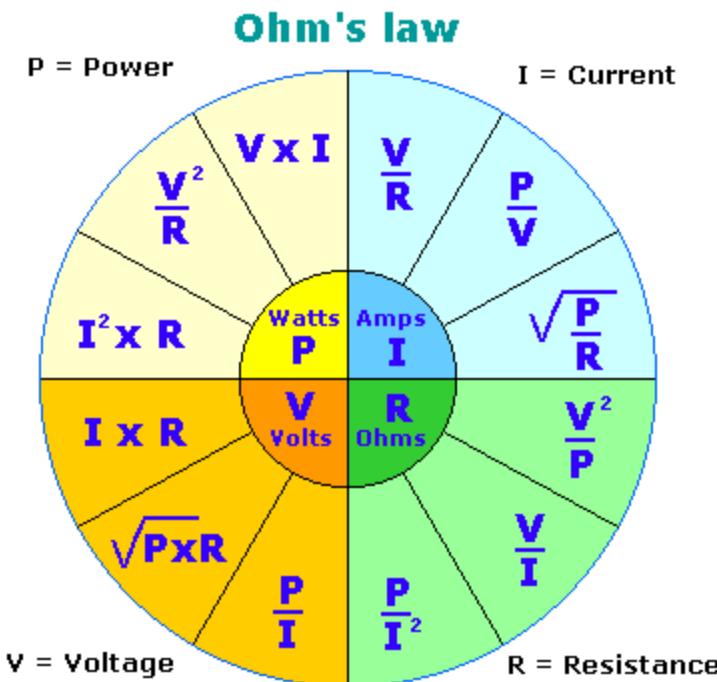
1. Resistive – Incandescent Lamps, Resistance heat
2. Inductive load types - Motors- Contractor Coils – Relays
3. Capacitive – Capacitors – Start Capacitors – Correction Capacitors

Or any combination –

Resistive Inductive
Inductive Capacitive
Resistive Capacitive
Resistive Inductive Capacitive

In the absence of detailed knowledge of the intended load characteristic it is advisable to select an inverter with volt-ampere product or stated wattage capability of 25% or more above the expected load.¹

Using the following calculations, remember OHM's Law?



Above is a handy chart showing all of the inter-relationships between power, current, voltage, and resistance in which:

V is measured in **Volts**.

R is measured in **Ohms**.

I is measured in **Amps**.

P is measured in **Watts**.

Amps to Watts using 120 volts Single Phase

$$P_w = PF \times I_a \times V_v$$

W= watts, PF = Power Factor, A = amps, V = volts

$$192 \text{ w} = .80 \times 2 \times 120$$

Watts to Amps

$$I_A = P_w / (PF \times V_v)$$

$$.5208 \text{ A} = 50 \text{ watts} / (.8 \times 120\text{v})$$

Battery Capacity Battery Life is estimated at 50%

$$\text{Time} = AH_a / I_a$$

$$2\text{hrs} = 10 / 5$$

Time = Battery Life

AH = Battery capacity in Amps

I = Current draw in amps

The faster a battery is drained, the less overall amperage is available. The battery's AH rating goes down the faster you use it. This is not the same thing as saying you use up what is available faster, but you actually decrease the total overall capacity itself. To ensure that ratings are given in a realistic way, lead-acid batteries have a few parameters on how they get that 'AH' rating.

In order to get an AH rating, the battery that is being tested has to be drained down to 0 over the course of a specified amount of time. The amount of amperage that it took to get it down to zero, over that specified amount of time constitutes the AH rating. Because of the Peukert effect (aka, the faster a battery is drained, the less overall amperage is available), if you discharge a battery over the course of 100 hours, the AH rating looks higher than if you discharge that same battery over the course of 1 hour. So, there has to be a standard.

For deep cycle batteries the standard rating is 20 hours. So, if a battery has a rating of 100AH @ 20 Hr rate, then that battery was discharged over 20 hours with a **5 amp load**. Starting batteries on the other hand, are typically rated at 10Hr rate, because they are used faster, so the 20Hr rate is not as important. So, that weird 20Hr rate that you see after the AH rating on batteries, that tells you that the rating in question is the realistic, common rating; rather than an over-inflated number to make the battery look better than it really is.²

For example, an average automotive battery might have a capacity of about 70 amp-hours, specified at a current of 3.5 amps. This means that the amount of time this battery could continuously supply a current of 3.5 amps to a load would be 20 hours (70 amp-hours / 3.5 amps). But let's suppose that a lower-resistance load were connected to that battery, drawing 70 amps continuously. Our amp-hour equation tells us that the battery should hold out for exactly 1 hour (70 amp-hours / 70 amps), but this might not be true in real life. With higher currents, the battery will dissipate more heat across its internal resistance, which has the effect of altering the chemical reactions taking place within. Chances are, the battery would fully discharge some time *before* the calculated time of 1 hour under this greater load.

Approximate amp-hour capacities of some common batteries are given here:

- Typical automotive battery: 70 amp-hours @ 3.5 A (*secondary cell*)
- D-size carbon-zinc battery: 4.5 amp-hours @ 100 mA (*primary cell*)
- 9 volt carbon-zinc battery: 400 milliamp-hours @ 8 mA (*primary cell*)

A problem that we encounter when using batteries or inverters is normally not the current but the drop in voltage. In using mobile rigs there is an operating voltage that must be maintained. For example the Yaesu FT-8900 Quad Band FM Transceiver requires an operating voltage of 13.8 volts DC + or - 15%, negative ground. The 15% is a + or - 2.07 volts from 13.8, which is an operational low of 11.73 up to 15.87 volts. Typically running on a car or portable battery you will run out of volts before you run out of current. As shown above you run out of voltage while the battery still has 30% of its charge remaining. Using the 50% rule of thumb for required capacity if you want to run a radio such as the FT-8900 with a current drain of between 8 and 8.5 amps per hour for transmitting or .5 amps for receiving, you would need at least a 16 amp hour battery.

This of course is an over simplification because unless the radio is used as a cross band repeater with continuous usage, your application of 10% to 20% usage will increase your battery usage.

If you are using an Inverter to produce 120 volts AC using a vehicle battery, the rule of thumb is 1 amp for each 10 watts of inverter load. A simple 100 watt light bulb would consume 10 amps of battery current, if you run a 100 watt bulb at home it only takes 0.83 amps. A lot of overhead using inverters, but they are convenient and easy to use. Some inverters come with jumper cables so that you don't melt or fry internal circuits in your vehicle.

The following table will allow conversion of the readings obtained to an estimate of state of charge. The table is good for batteries at 77°F that have been at rest for 3 hours or more. If the batteries are at a lower temperature you can expect lower voltage readings.

Battery State of Charge Voltage Table

Percent of Full Charge 12 Volt DC System 24 Volt DC System 48 Volts DC System

100%	12.7	25.4	50.8
90%	12.6	25.2	50.4
80%	12.5	25	50
70%	12.3	24.6	49.2
60%	12.2	24.4	48.8
50%	12.1	24.2	48.4
40%	12.0	24	48
30%	11.8	23.6	47.2
20%	11.7	23.4	46.8
10%	11.6	23.2	46.4
0%	<=11.6	<=23.2	<=46.4

As a note deep cycle batteries are the ones that are expected to be routinely discharged to 20% of its capacity and then recharged.

To save time and aggravation do some simple planning on what you want to run, how long and include any associated equipment such as lights or whatever.

1 ARRL 2018 Handbook "Power Sources DC-AC Inverters" 7.45

2 BatteryStuff.com "What does 20 Amp Hr rate mean?"

From the Skies over Mt. Essex

SKY Events for December 2017

Dec 3rd - Full Moon “**Cold Moon**” for the Traditional American and the “**Oak Moon**” for the English Full Moons, biggest Moon in 2107.

Dec 4th – Earliest end of evening twilight.

Dec 7th – Earliest sunset., Regulus is 0.7° S of the Moon.

Dec 10th – Last Quarter Moon

Dec 14th – The Geminids meteor shower peaks, Moon before FQ, approx 120 per/hr.

Dec 18st - New Moon

Dec 21st – Shortest day of the year (9hr 20m) at 40°N Lat. Winter Solstice at 11:28a.m. EST

Dec 22nd – Ursids meteor shower Moon past New, ≈ 10 per/hr.

Dec 26th - First Quarter Moon

Dec 27th – Johannes Kepler born in 1571

Dec 30th - Aldebaran 0.8° S of Moon at 19:00 EST

Planet Lookout at mid-Month

Sunrise 07:19 EST and Sunset 16:44 EST

Mercury In the Sun’s glare.

Venus In the Sun’s glare.

Mars Dawn, rises 03:12, mag 1.6 and 4.6 arc sec.

Jupiter Dawn, rises 04:01, mag -1.8 and 32.3 arc sec

Saturn Eve sets 17:05, mag 0.4 size 15.1 arc sec.

Uranus Eve sets 02:30, mag 5.8, size 3.6 arc sec.

Neptune Eve sets 22:52 5, mag +7.9 size 2.2 arc sec.

Terms used in Lunar and Planetary topology.

We are all familiar with the most common terms used to describe lunar feathers. The common features are craters, maria, oceanus, rays, and sinus. The other features that we have all seen and maybe did not know their technical names. So here goes...

Catena - a string of closely spaced depressions.

Cavus – irregular steep-sided depressions

Chasma – chasm

Dorsum – ridge

Fossa – narrow trench

Lacus – lake

Mensa – flat topped elevation

Mons - mountain

Palus – swamp

Planitia – low plain

Planum – plateau

Promontorium – extension of lunar mountains into mare

Rima – channel

Rupes – cliff face

Scopulus – cliff

Terra – highlands

Vallis – valley

Naming of Luna Features.

Craters – deceased scientist, astronauts and cosmonauts.

Lacus, Maria, Paludes, Sinis, Oceans – weather and other abstract concepts.

Montes – deceased outstanding scientist

Dorsa – Geoscientists