



# The RELAY)))

APRIL  
2021

The **Weather Issue**

The Official Publication of the Arrowhead Radio Amateur Club

A.R.A.C. Inc. P.O. Box 7164 Duluth MN 55807-7164 <http://www.thearac.org> Dues: Member \$20/Family \$25

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## EYES ON THE SKIES

### SPRING & SUMMER WEATHER SPOTTING

April is here, and with the warmer temperatures comes the sometimes volatile weather of Northland springtime. This is when the National Weather Service usually holds the first free 2-hour **Skywarn Weather Training** of the year to train volunteers in the community to help identify and report, as official Skywarn spotters, severe weather such as large hail, damaging winds and tornadoes. Spotters are **not** storm chasers, who are typically meteorologists traveling toward storms to study and document severe weather in order to advance the science of predictive modeling. Though we talked about weather spotting last year in the April 2020 issue of the Relay, we're closely revisiting this again, with important updated info on the National Weather Service's current iteration of Skywarn training.

Since the 1970s, SKYWARN® spotters have helped the National Weather Service issue timely and accurate warnings in their region to protect lives and property. As the National Weather Service says, "There can be no finer reward than to know that their efforts have given communities the precious gift of time, the seconds and minutes which can help save lives." Who can be a spotter? Well, anyone who spends time outdoors will benefit from Skywarn training, and because ham radio operators play an important role in public safety, we are strongly encouraged to become Skywarn spotters and attend training every 4 years to refresh.

*Continued on page 19*



## Spring 2021



Join us on  
facebook!

Co-Editors:

Kim & Steve Waller

Kim - KEØNQS ● Steve - KEØNQT

KEØNQS.mn@gmail.com  
KEØNQT@gmail.com



Free Storm Clouds Image Courtesy GetWallpapers.com

# ARAC Board Meeting Minutes - March 2, 2021

## PRESIDENT



**NØVRM**  
Gene Ellefsen  
371Ø Chambersburg Ave  
Duluth, MN 55811  
218-39Ø-3272  
lspitech@mail.com

## VICE PRESIDENT



**NØPDG**  
Mike Lovold  
386Ø Birchwood Rd  
Downtown Arnold, MN  
558Ø3  
lovoldm@gmail.com

## SECRETARY



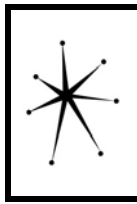
**NØCALL**  
Robin Davis  
  
218-391-3Ø77  
davisfam2858@yahoo.com

## TREASURER



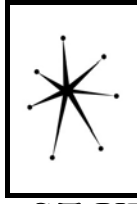
**KEØNIT**  
Bruce Carlson  
9Ø6 Anderson Rd  
Duluth, MN 55811  
763-315-2967  
carlsbr@gmail.com

## 3RD YEAR BOARD



**AAØME**  
Randy Johnson  
  
randy@nsw4x4.com

## 2ND YEAR BOARD



**KD9ABS**  
Gary Minter  
1621 N 26th St  
Superior WI 5488Ø

## 1ST YEAR BOARD



**AAØAC**  
Dave Davis  
  
218-348-6649  
aaØac@outlook.com

Present: Gene Ellingsen-NØVRM, Mike Lovold-NØPDG, Bruce Carlson-KNØNUL, Robin Davis, Gary Minter-KD9ABS, Randy Johnson-AAØME, Dave Davis-AAØAC, Grant Forsyth-KCØWUP, Randy Wabik-KRØB, Kim Waller-KEØNQS, Steve Waller-KEØNQT, Doug-AAØAW

Meeting called to order at 6:31 pm by President Gene-NØVRM

Silent Key – Jim Dall-WDØGVW

### Minutes:

Minutes posted in newsletter and on the web site. Motion to accept by Bruce-KNØNUL, seconded by Gary-KD9ABS, motion passed

### Treasurer's Report:

Checking .....	1,693.39
Savings .....	2,173.73
Subtotal Cash.....	\$3,867.12
Winter CD .....	1,724.37
Summer CD .....	0.00
Subtotal CD .....	\$1,724.37
Assets Total .....	\$5,591.49
Outstanding Checks:	
Mahtowa Repeater .....	-1,100.00
Bob Boyd-KDØLYN Memorial .....	-1,020.00
Reserved Funds .....	-\$2,120.00
Grand Total .....	\$3,471.49

Membership is about 180 paid members including single and family. Getting close to record membership numbers

When was the last time we made a donation to the Church (First Methodist) for the use of the facility? Do we need to acknowledge the fact that ARAC has the generous use of the building? Gene-NØVRM asked Bruce-KNØNUL to send a letter with the check to the church several months ago. We want to keep our relationship up, looking forward to when we can get back together. Donation of \$150.00, looking forward to being open and hosting your meetings again was their response. We're keeping up our end of the relationship and they are too. Money well spent. Just like WDSE - \$4-8.00 a vertical foot per month is average rental on a tower like WDSE and we have relationship with WDSE

Move to approve by Mike-NØPDG, seconded by Randy-AAØME, motion passed

### Committee Reports:

#### Repeater:

No report. It is working. Gene-NØVRM texted Randy-NØBZZ and he said he would get on it next week, kind of forgot about it lately. There is a new antenna at the 31 site, company out of Bemidji, Nextel hub. We'll see what happens. Bruce-KNØNUL would like to close out that check soon because the work is done.

Continued on Page 3

# ARAC Board Meeting Minutes , continued

*Continued from page 2*

## Testing:

Tested one young man, who got his Technician and gave the General a stab. He'll be back to try it again. Two (2) new requirements - need EIN as you can no longer use a Social Security Card. You also have to have a valid email address. When you pass, they will send you a link to download and print your license via email. Interested in testing? Let Doug-AA0AW know and something can be set up to test one (1) or several candidates. Next test is April 20, 2021, last week of current Tech class.

When is the last time we made a donation to the church (House of Refuge) and how much should we donate to the church for the use of their building for testing? Spirit Valley Amateurs made a donation recently, using the testing monies. Suggestion to donate \$100.00 from ARAC. Suggestion to do it in December each year at a minimum. We use it for testing and when Sammy's was closed, we also held the board meetings there. Motion by Mike-N0PDG, seconded by Gary-KD9ABS, to donate \$100.00 to the church with thanks

## Ham Fest:

Twenty (20) tables paid for at the Ham Fest. Gene-N0VRM also talked to John Cavanaugh-KC0AFE about renting the whole building the last Saturday in September if we cannot hold the Ham Fest in May again this year. John-KC0AFE had already reserved the whole building in anticipation. Will we hold our Ham Fest? Someone are planning to attend, others not because of COVID. Suggestion to review the current COVID restrictions. Mike-N0PDG will contact Bob Schultz-KC0NFB to see what he knows about the plans. Grand Prize? \$500.00 cash prize? Probably not this year but Bob Boyd-KD0LYN's's 718 Radio that would be a good Grand Prize. Mike-N0PDG will also ask John Kruk-N9UPC about donating a radio as a prize for the Ham Fest. Anything else? 718 Radio as Grand Prize, donated radio as second prize, \$50.00 cash as 3rd. Mike-N0PDG will contact DX Engineering about a prize or prizes for the Ham Fest as well

## Newsletter:

Newsletter info? Mike-N0PDG would like to update the Nets as some are obsolete as listed in the Newsletter and on the Web Page. People have moved away from the area or are no longer available to serve as Net Control. We also need more Net Control operators

## Grandma's Marathon:

It is happening and it is full. There will be 4,000 full marathon runners, the same for the half marathon and 1,500 runners for the 5K. They have hired a National Coordinator, who has worked with this type of conditions. They will start everyone with social distancing, and get it done within an hour. You can buy T Shirts, caps, etc., online if you want

## Monthly Program:

April Club meeting has usually been Skywarn by the National Weather Station. There is a zoom meeting ready for the March 20, 2021, training by the National Weather Station. More information to follow

Motion to adjourn by Mike-N0PDG, seconded by Gary-KD9ABS, motion passed





# ARAC Club Meeting Minutes

March 11, 2021

**Present:**

President Gene Ellefsen-N0VRM  
Vice President Mike Lovold-N0PDG  
Treasurer / Membership Bruce Carlson-KN0NUL  
Secretary Robin Davis  
First Year Board Dave Davis-AA0AC  
Second Year Board Gary Minter-KD9ABS  
Special Events – Open / Gene Ellefsen-N0VRM acting  
Ham Fest / Education Bob Schultz-KC0NFB  
Testing Doug Nelson-AA0AW

**Absent:**

Third Year Board Randy Johnson-AA0ME  
Chaplain (Visiting) Rolland Bockbrader-KB0CK  
Parliamentarian Grant Forsyth-KC0WUP  
Property / Picnic Scott Ahlgren-N0VYU  
Newsletter / Historian Kim Waller-KE0NQS  
Newsletter Steve Waller-KE0NQT  
Repeater Randy Wabik-KR0B  
Repeater David Pyrlík-K0DJP  
Repeater Derek McCorison-W0DNF  
Repeater Randy Haglin-N0BZZ  
Web Site Thomas Dorr-KE0RHA

Meeting called to order by President Gene-N0VRM at 7:01 pm via 94 Repeater

Silent Key Jim Dall-WD0GVW Celebration of His Life March 22, 2021, Faith United Lutheran Church, 11:00 am visitation, 12:00 pm service

**Minutes:**

Minutes posted in newsletter and on the web site. Correction to Scott Ahlgren’s Call to N0VYU. Motion to accept by Joe Meese-W0LWU, seconded by Bruce-KN0NUL, motion passed

**Treasurer's Report:**

Checking.....	1,693.39
Savings.....	2,173.73
Subtotal Cash .....	\$3,867.12
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Bob Boyd-KD0LYN Memorial .....	-1,020.00
Reserved Funds .....	-\$2,120.00
Grand Total.....	\$3,471.49

Sent a donation check to the church (United Methodist) and received a letter in return. They are interested in maintaining relationship with ARAC. They will let us know when the Bishop lifts restrictions and we can resume in person meetings.

*Continued on Page 5*



## ARAC Club Meeting Minutes, *continued*

Any questions about the Treasurer's Report? Motion to approve by Mike-N0PDG, seconded by Jim Anderson-N0JWA, treasurer report accepted. Nice to know we still have money

### **Committee Reports:**

#### Picnic:

Reserved Chambers Grove for August 1, 2021, Ham Club picnic, by Scott-N0VYU. Mark your calendars

#### Ham Fest:

Twenty-five (25) tables reserved, number of inquiries about the Fest, closer to the time we'll have more information, get your reservation in, flyer on Web Page and on Facebook Page

#### Education:

Nothing new until fall of 2021. Testing at the end of the class, April 20, 2021. Get it in before the fees increase

#### Testing:

Set up for April 20, 2021, and May 1, 2021, at the Ham Fest. These are the next test sessions

#### Grandma's Marathon:

It is going to happen. We had a medical meeting last night via Zoom. The MN Dept. of Health will be meeting with the MN Twins as they are asking for a MN Opener, increasing the number of people allowed at a gathering. They would like some of the restrictions removed and if they do, it will trickle down. All volunteers for Grandma's Marathon will have to register on Grandma's web page. Olivia Nelson is the volunteer coordinator and she will be tracking all of this. More information to come from Grandma's. If you have never volunteered before, you will be placed with a seasoned pro. It is a good time

#### FCC Update:

FCC has been proposing an increased fee to \$35.00 fee for upgrades, licenses, test fees, etc. Currently, it is \$15.00. Testers need an FRN number along with a current email address. They will not accept Social Security Number any longer. Current licenses have the FRN number on the bottom

#### Skywarn:

Paul Dallavia-KC0WDQ shared that April would normally be the Skywarn Program. The training is online, virtual, a webinar. Basic Skywarn class will be held April 7<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, and 21<sup>st</sup>. Advanced Skywarn class will be available April 27<sup>th</sup>, 28<sup>th</sup>, and 29<sup>th</sup> for the Advanced. Info at: [weather.gov](http://weather.gov)-Skywarn. Pre-registration is required. There will be a recorded version available after the Basic and Advanced Skywarn classes have been completed online

Any old or new business?

#### Program:

Bill Mitchell-AE0EE, new Section Manager for MN ARRL, will be our Speaker tonight along with Holly Cox-K0HAC, ARRL Affiliated Club Coordinator. Well worth the money to belong to the ARRL. They defend our band rights. Private enterprise is always trying to get the rights to the Ham bands for profit. Program on PSK Software, FT 8 Program, etc.

Motion to adjourn by Mike-N0PDG, Joe-W0LWU seconded, motion passed at 7:23 pm



## Prez Sez...

**Good News|: Hamfest is on!!!**

**I spoke to the Douglas County Health Dept. today (Monday March 29) and they gave us the OK to proceed.**

**That means in the coming days we will be reaching out for help from you, the Club members. We will need help as always with setting up tables on that Saturday May 1. I could use help getting the grocery items for the Kitchen. Also we will need volunteers for the Kitchen .**

**Door prizes will be needed so please do some shopping between now and Hamfest. Any questions contact me at [lspitech@mail.com](mailto:lspitech@mail.com)**

**Looking forward to seeing you all there !!!**

**73 Gene Ellefsen NØVRM**

***P.S. It appears we may be able to start having our monthly meetings back at the Church I will put out an announcement when that can happen !!!***



# Arrowhead Radio Amateur Club **HAM FEST!**

**Sat. May 1st, 2021 9:00am – 1:00pm**

**HEAD OF THE LAKES FAIRGROUNDS – MULTI  
PURPOSE BUILDING**

**4700 Tower Ave. (Wisconsin Hwy 35) Superior, WI 54880**

Fairgrounds are located next to the Superior Airport.

**Admission: \$7.00 (12 & under FREE!)**

Free parking for most vehicles.

*Used and like new radios, supplies, equipment, and computer related items including software and hardware! Personalized Ham items also available!*

<<< QSL card checking for ARRL awards program by Mike Cizek W0VTT >>>

Mike's email: [mgcizek@gmail.com](mailto:mgcizek@gmail.com)



This is an A.R.R.L. sanctioned event.

**Talk-in on W0GKP Repeater:**  
146.940(-) [103.5] Duluth  
147.000(-) [103.5] Mahtowa  
146.940(-) [114.8] 2-Harbors

**Testing on site!**

**10:00 AM 4-H Building**  
**Contact: Doug Nelson**  
**AA0AW / 218-391-5874**  
**aa0aw@arri.net**

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**Dealer / Vendor Tables:**  
**4 foot table: \$5.00**  
**8 foot table: \$10.00**  
**Vendor setup starts at: 7:00am**

**Table Reservations:**

**Robert Schulz, KC0NFB**  
**115 Eden Lane**  
**Duluth, MN 55805-1533**  
**218-481-7458**  
**arac\_hamfest@charter.net**

# Hourly Drawings!



## U.S. AIR FORCE MILITARY AUXILIARY RADIO SYSTEM

Minnesota State MARS Director  
Reginald B. Cass / AFS5MN

Gene Ellefsen  
NØVRM

Thank you for your time and interest.

Air Force MARS membership could be for you. We do hope that it is.

If you have the following interests, and capabilities, we are interested in recruiting you to become an Air Force MARS member. Completion of the following on line training is mandatory:

Personally, Identifiable Information (PII) <https://iatraining.disa.mil/eta/piiv2/launchPage.htm>  
Cyber Awareness [https://iatraining.disa.mil/eta/disa\\_cac2018/launchPage.htm](https://iatraining.disa.mil/eta/disa_cac2018/launchPage.htm)

If you have completed: [Incident Command System](#) (ICS) -100, 200, 700, and 800 training, and have obtained certification for Air Force MARS or are willing to obtain this training, again, Air Force MARS could be for you.

You must be interested in joining a group of individuals that are dedicated to amateur radio, emergency communications, and willingness to learn and used military communications procedures for voice and digital communications.

You must have equipment that will meet the minimum requirements for voice and digital operation. The equipment will be: transmitter, receiver, (transceiver) modified to operate out of amateur radio bands, computer, modem, and antenna's that are designed to operate on military assigned frequencies. (The best antennas will be a dipole cut to the operational frequency. NVIS antennas work best. You will not need a linear amplifier, however if you have one that will operate on out of amateur radio bands that will be a plus)

You must go through and complete training. You are allowed up to 180 days to do so.

Air Force MARS operation's and procedures are based upon "MARS Operating Instruction", (MOI). The MOI manual uses as its basis for instruction a series of Allied Communications Publications (ACP's), Department of Defense Directives, Department of Defense Instructions, and Department of Defense Manual.

If you already belong to a MARS program and would like to consider Air Force MARS, please contact one of the recruiting team members.

Our recruitment team is as follows:

AFA5XK Dave, WB7DRU [wb7dru@gmail.com](mailto:wb7dru@gmail.com)

AFA5ZV Randy, KRØB [afa5zv@gmail.com](mailto:afa5zv@gmail.com)

AFA5JY Reg, KAØRJY [reg\\_cass@msn.com](mailto:reg_cass@msn.com)



# CW Abbreviations

AR End of Message	AS Pse QRX	BK Back to You	SK End of Contact
TU Thank You	PSE Please	K Invite to Transmit	
QST Calling all Amateurs	QRL Are You Busy?	QRU Have anything for me	
QRV Are You Ready?	QRX Standby	QRS Transit Slower	

A	●■■■	M	■■■■	Y	■■■■●
B	■■■■●	N	■■■●	Z	■■■■●●
C	■■■■●●	O	■■■■■	1	●■■■■■
D	■■■■●●●	P	■■■■●●	2	●●■■■■■
E	●	Q	■■■■●●●	3	●●●■■■■■
F	●●■■■■	R	■■■■●●	4	●●●●■■■■
G	■■■■●●	S	●●●	5	●●●●●
H	●●●●	T	■■■	6	■■■■●●●●
I	●●	U	●●■■■	7	●●●●●●
J	■■■■■■■	V	●●●■■■	8	■■■■●●●●
K	■■■■●●	W	■■■■●●●	9	■■■■■■■●
L	■■■■●●●	X	■■■■●●●	0	■■■■■■■■



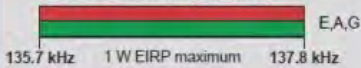
## US Amateur Radio Bands

### US AMATEUR POWER LIMITS

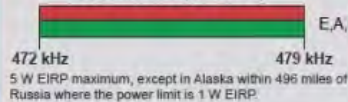
**FCC 97.313** An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

On March 28, 2017, the Federal Communications Commission adopted rules that will allow Amateur Radio access to 472-479 kHz (630 meters) and to 135.7-137.8 kHz (2,200 meters). However, amateurs cannot use these frequencies until 30 days after the Report and Order is published in the Federal Register and the final procedures for registering stations with the Utilities Telecom Council (UTC) have been approved and announced. At the time this chart was created, the Report and Order had not been published and the UTC online registration site is not yet available. Follow ARRL news for further information. New charts will be published at [www.arrl.org/graphical-frequency-allocations](http://www.arrl.org/graphical-frequency-allocations) when the bands are fully available for use.

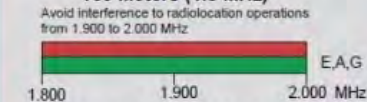
#### 2,200 Meters (135 kHz)



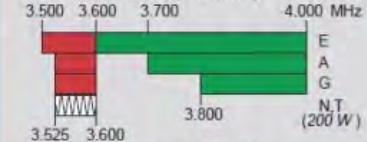
#### 630 Meters (472 kHz)



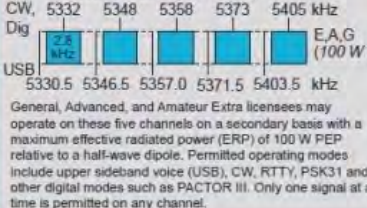
#### 160 Meters (1.8 MHz)



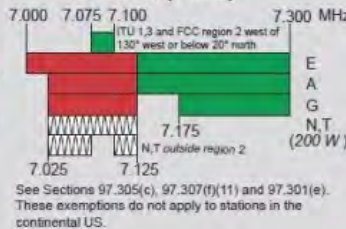
#### 80 Meters (3.5 MHz)



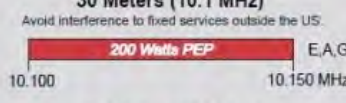
#### 60 Meters (5.3 MHz)



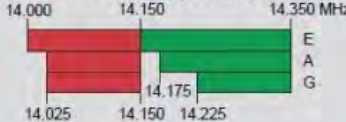
#### 40 Meters (7 MHz)



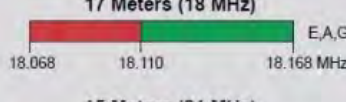
#### 30 Meters (10.1 MHz)



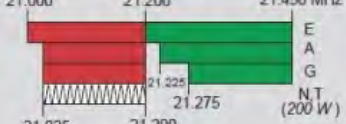
#### 20 Meters (14 MHz)



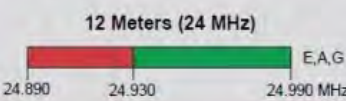
#### 17 Meters (18 MHz)



#### 15 Meters (21 MHz)



#### 12 Meters (24 MHz)



Effective Date for  
2,200 and 630 Meters  
to be announced



**ARRL** The national association for  
**AMATEUR RADIO**

### KEY

- Note:**  
CW operation is permitted throughout all amateur bands.  
MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.  
Test transmissions are authorized above 51 MHz, except for 219-220 MHz.
- = RTTY and data
  - = phone and image
  - = CW only
  - = SSB phone
  - = USB phone, CW, RTTY, and data
  - = Fixed digital message forwarding systems only
- E = Amateur Extra  
A = Advanced  
G = General  
T = Technician  
N = Novice

See **ARRLWeb** at [www.arrl.org](http://www.arrl.org) for detailed band plans.

### ARRL We're At Your Service

ARRL Headquarters:  
860-594-0200 (Fax 860-594-0259)  
email: [hq@arrl.org](mailto:hq@arrl.org)

Publication Orders:  
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Toll-Free 1-888-277-5289 (860-594-0355)  
email: [orders@arrl.org](mailto:orders@arrl.org)

Membership/Circulation Desk:  
[www.arrl.org/membership](http://www.arrl.org/membership)  
Toll-Free 1-888-277-5289 (860-594-0336)  
email: [membership@arrl.org](mailto:membership@arrl.org)

Getting Started in Amateur Radio:  
Toll-Free 1-800-326-3942 (860-594-0355)  
email: [ncwham@arrl.org](mailto:ncwham@arrl.org)

Exams: 860-594-0300 email: [vec@arrl.org](mailto:vec@arrl.org)

\*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.

All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ‡	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

‡ No pulse emissions

# NETS

Have a favorite HF/6m/2m/1.25m/70cm net that you check into or listen in on? Also, please send corrections and we will add it to the list below - Kim KEØNQS at my email KEØNQS.mn@gmail.com.

- **Northland Weather Group Net:** Mondays 2000 on the ARAC repeater (146.940 MHz with a tone of 103.5 and standard offset).
- **Minnesota D-Star Net:** Sundays at 19:30 on Reflector 53A
- **Minnesota Section Net** 1200 and 1730 on 3.860 [Net Manager: NØYR] [http://www.mn-section.org/dept\\_stm.html](http://www.mn-section.org/dept_stm.html)
- The non-non-net: Evenings 2000 144.200 USB except for Sunday evenings.
- Badger WX Net: 0500-0715 on 3.985. Give 24 hour high/low/current temperature, precipitation and snowfall.
- **PICONET:** 3.925 from 0900-1100 CT Mon-Sat and 1600-1700 CT Mon-Fri. Info at: <http://www.piconet3925.com>
- Michigan Upper Peninsula Net: 1600 (CST) on 3.921 MHz Sun-Sat and 1200 Sun. Info: <http://www.michupnet.com>
- Great Lakes Marine/Maritime Mobile Net: Morning 07:30 - 3.932; 08:15 - 7.261 MHz and evening 18:30 - 3.1730927; 19:15 - 7.268 MHz. Weekend extra net: 10:00 - 7.261/7.268 MHz. All CST, LSB and +/- QRM. See: <http://www.sailblogs.com/member/glimmnet/>
- MIDCARS: 07:30-13:00 - 7.258 MHz. See: <http://www.midcars.net>
- Iowa snowbird net on 14.257MHz, M-W-F at 10:00 am Local Time. This is an open net.
- Spider Web Net (Marco Island FL) on 14.347 every morning at 0730 CST/CDT: <http://www.spiderwebnet.net>
- Maritime Mobile Service Network: Daily at 1100—2100 Central on 14.300. <http://mmsn.org> and <http://www.14300.net>
- RV Radio Network: Every day at 1900 Central on 7.265 MHz. Web site: <http://www.rvradionetwork.com>
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Wisconsin Sideband Net: Daily @ 5:15 PM – 3985 [or 3982.5] KHz LSB
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Hobby Helpers Net - Tuesday @ 8 PM – 28.330 MHz USB (Isanti MN) LSB [Net Manager: WOØA].
- Northstar Trader Net: 3.908 +/- at 0830 CST Sundays
- WARFA: 3.908 +/- Sun/Tue/Thu nights at 2200 CST, <http://warfa.org/>
- Youth Net: 14.320-14330 Sundays 1800-1900 UTC, Net Control: AC8PI
- YACHT: Saturdays 1900 CST on EchoLink #481872, <http://yachthams.webstarts.com>
- Northwestern Ontario ARES Net: Evenings at 20:15 (Central) on +/- 3.750Mhz
- The Iron Range Net: Saturdays at 0800 Central time on or near 3.919 Mhz. Look them up on Facebook!
- FORX Net: Mondays at 1900 Central at 3.941 Mhz +/- QRM. WAØJXT — Grand Forks, North Dakota
- HF CW: Fridays 08:00 CST, 7.112 MHz. Informal slow speed CW Net. W8IRT NCS. Email: [w8irt@aol.com](mailto:w8irt@aol.com)
- Minnesota ARES Digital Net: Thursdays at 2000 CST, 3.5835 MHz USB +/- QRM, Mode: Olivia 8/500.
- SARA Digital Net: Sundays at 1900 Local, 3.582.150 MHz USB +/- QRM, Mode: BPSK31/BPSK63
- Spider Web Net (Marco Island FL): 14.347 every morning at 0730 CST/CDT: <http://www.spiderwebnet.net>
- Broadcaster Net: 7.231 or 3.855 M/W/F @ 1500 UTC. 14.255 M-F @ 2130 UTC. <http://www.cbsretirees.com/ham.htm>
- Old Military Radio Net: 7.268 +/- nightly at 0200z. Other times/Frequencies too. See: <http://www.mrca.ar88.net/>
- Rag Chew Crew/Tailgaters/Freewheelers Nets: 3.916 +/- nightly at 1900 CST, <http://www.tailgatersnet.com>
- North South Net: 7.214.6 +/- at 0700 CST, Monday-Saturday



## Next ARAC Board Meeting

Tuesday, April 6, 2021

@ 6:30 p.m.

Sammy's Pizza

### Next ARAC Club Meeting

Thursday,  
April 8, 2021  
7 p.m.

on the 94 Repeater

Join us on Zoom immediately  
following the club meeting!

### April 8th Zoom PROGRAM

### HF Signal Propagation PSK REPORTER DISPLAYING FT8

*You do not need a Zoom  
account to participate!*

*Interested in providing a pro-  
gram, or have an idea for one?*

Contact Mike NØPDG at  
[lovoldm@gmail.com](mailto:lovoldm@gmail.com)

### Amateur Radio License Testing Sessions!

Tuesday April 20, 2021  
3 p.m. & 5:30 p.m.

House of Refuge  
115 W Myrtle St, Duluth

- ◆ Please contact Doug Nelson AA0AW at [aa0aw@arrl.net](mailto:aa0aw@arrl.net) to sign up for your test session time if possible
- ◆ Walk-ins always welcome, with no prior reservation!

### ARROWHEAD RADIO AMATEUR CLUB HAMFEST '21

May 1st, 2021

9:00am - 1:00pm  
Superior Curling Club

Food & Refreshments available  
Admission \$7.00 / Age 12 & under FREE

#### MANY HOURLY DRAWINGS

Used and like new radio and computer  
equipment

#### Amateur testing on site.

Contact: Doug Nelson AA0AW  
218-391-5874

Email: [aa0aw@arrl.net](mailto:aa0aw@arrl.net)

#### Dealer/Vendor tables available

4 ft. \$5.00 / 8 ft. \$10.00  
Setup at 7:00 a.m.

#### For info/tables contact:

Robert Schulz KC0NFB at  
[arac\\_hamfest@charter.net](mailto:arac_hamfest@charter.net)

SEE COMPLETE EVENT DETAILS ON PAGE 7!

# Duluth Area Repeaters



## ARAC System WØGKP

Freq. Offset Tone Location

146.940	minus	103.5	Duluth
146.940	minus	107.2	Lakeside (rcv)
146.940	minus	151.4	Two Harbors (rcv)
146.940	minus	100.0	Gary-New Duluth (rcv)
146.940	minus	123.0	Solway (rcv)
146.940	minus	110.9	Cloquet (rcv)
147.000	minus	103.5	Mahtowa
444.100	plus	103.5	Duluth UHF Link

## N9MMU/N9QWH System (WI)

145.310	minus	110.9	Duluth
145.490	minus	110.9	Solon Springs
147.255	plus	110.9	Hayward
145.110	minus	110.9	Rice Lake
147.345	minus	136.5	Holcombe
145.230	minus	110.9	Eau Claire

## WECOMM – WI Statewide Linked System WE9COM

147.075 plus 110.9 Meteor Hill (closest repeater to Duluth)

## LSAC System #1

147.330	plus	151.4	Proctor
147.330	plus	103.5	Duluth (rcv for Proctor)
147.330	plus	156.7	Duluth (North) (Fish Lake)
147.270	plus	114.8	Two Harbors
147.270	plus	103.5	Wales
147.090	plus	114.8	Silver Bay
145.410	minus	114.8	Finland
147.300	plus	114.8	Isabella
145.150	minus	103.5	Washburn, WI
146.700	minus	103.5	Bayfield, WI
443.850	+5.00	none	Bayfield, WI
147.165	plus	110.9	Hurley, WI
146.640	minus	151.4	Ely
443.500	+5.00	141.3	Gilbert
147.060	plus	103.5	Virginia
147.360	plus	162.2	Cook
147.165	plus	114.8	Coleraine
443.925	+5.00	110.9	Brainerd
443.200	+5.00	114.8	Tamarack
147.360	plus	203.5	Aitkin
146.865	minus	146.2	Giese
147.570	simplex	146.2	Hinckley
444.575	+5.00	146.2	Hinckley
443.325	+5.00	146.2	Isanti

## NARC System NAØRC

145.45Ø	minus	1Ø3.5	Solway Twp
145.45Ø	minus	114.8	Park Point (rcv)
147.135	plus	114.8	Park Point (rcv)
147.135	plus	1Ø3.5	Knife River

## Stand Alone Repeaters

145.21Ø	minus	11Ø.9	Clam Lake, WI
146.88Ø	minus	123.Ø	Grand Rapids
146.91Ø	minus	146.2	Duxbury, MN

## Fusion and D Star

Fusion (Analog has tone and C4FM digital with no tone)

147.15Ø	plus	151.4	NTØB Gilbert Fusion Rptr
145.17Ø	minus	11Ø.9	WA9KLM Superior –
Douglas County RACES/ARES Fusion Repeater			
443.1ØØ	+5.ØØ	1Ø3.5	KBØYHX Cloquet –
Carlton County RACES/ARES Fusion Repeater			
444.3ØØ	+5.ØØ	1Ø3.5	NØEO Spirit Valley Amateurs Fusion
Repeater WIRES-X NØEO (Analog only) Fusion Room 40494			
147.375	plus		NØEO D Star
442.2ØØ	plus		NØEO D Star

Repeater list compiled by Dr. Frequency—KCØWDQ

### ST. Louis County Department of Emergency Services Net Control Roster

N9DMG	Scott Swanson	NØVRM	Gene Ellefsen
AAØAW	Doug Nelson	KCØWDQ	Paul Dallavia
WØNWO	Dave Miller	WØDIO	Dennis Anderson
KØDSL	Diane Saunders	AAØME	Randy Johnson

Sunday Nights at 21ØØ on the ARAC System  
(See Calendar for net control schedule)

### Ten Meter SSB Net Control Roster

AAØAW	Doug Nelson	WØLWU	Joe Meese
NUØW	Gary Hanson	K9KDK	Al Babcock
WØDIO	Dennis Anderson	NØVRM	Gene Ellefsen
AAØME	Randy Johnson	KØDSL	Diane Saunders

Sunday Nights at 2ØØØ on 28.45Ø MHz USB

### Ten Meter CW Net Control Roster

AAØAW	Doug Nelson	NØPDG	Mike Lovold
-------	-------------	-------	-------------

Sunday Nights at 193Ø on 28.125 MHz

### Northland Weather Group Net Control Roster

KCØMKS Jeff Nast

Monday Nights at 2ØØØ on the ARAC System

### Douglas County Net

Tuesday Nights at 2ØØØ on 145.49Ø (N9QWH System)

### Central Carlton County Net

Tuesday Nights at 2Ø3Ø on the ARAC System

### Lake County RACES/ARES Net

2nd & 4th Wednesday Nights at 19ØØ on the LSAC 1 System

# Elmers

El-mer / el-mær/ [el-mer]

1. a male given name: from Old English words meaning "noble" and "famous."
2. an adhesive used to bond like or unlike materials
3. An experienced ham radio operator who mentors new and prospective hams.

<u>Name</u>	<u>Call</u>	<u>Expertise</u>
Jeff Nast	KCØMKS	APRS, EchoLink, WinLink, Fusion, Contesting
Bob Schulz	KCØNFB	Contesting
Jim Anderson	NØJWA	QsoNet
Doug Nelson	AAØAW	HF, VHF/UHF, Contesting, Packet, APRS, Morse Code, VE testing, Echolink, Allstar, EmCom...

# Membership E-mail Directory

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Contact Kim or Steve Waller to include your name in this listing!

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Wulf Gar WU1FGR  
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Members, please check your name and email address for accuracy. If you are not on this list and want to be on the list, contact us with your info. If you need to make a change, please let us know at KEØNQS.mn@gmail.com Or KEØNQT@gmail.com

Co-Editors,



**SUNDAY NIGHT NETS**  
 1930 - CW - 28.125 MHz USB-CW  
 2000 - USB 28.450 MHz  
 2100 - Southern St. Louis County  
 Emergency Services Net  
**MONDAY NIGHT NETS**  
 2000 - Northland WX Net - ARAC Repeater



# APRIL

## CLUB EVENTS

**TUESDAY NIGHT NETS**  
 2000 - Douglas Cty 145.490 MHz  
 2030 - Central Carlton County  
**WEDNESDAY NIGHT NETS**  
 1900 - Lake County - LSAC1  
 2nd & 4th Wednesdays  
 2100 - BWAR

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
 CW 1930 AA0AW USB 2000 AA0AW ES 2100	5 WX 2000 KC0MKS	6 ARAC BOARD MEETING Sammy's Pizza 6:30 pm DC Net 2000 CC Net 2030	7 2100 - BWAR	 ARAC Club Meeting 94 Repeater 7 pm	9	10
11 CW 1930 N0PDG USB 2000 W0LWU ES 2100 AA0ME	12 DC ARES/ RACES Mtg 1900 DC EOC WX 2000 KC0MKS	13 DC Net 2000 CC Net 2030	14 Lake County ARES/RACES Meeting 1800 Lake County Net 1900 2100 - BWAR	15	16	17
18 CW 1930 AA0AW USB 2000 K9KDK ES 2100 K9DMG	19 WX 2000 KC0MKS	20 DC Net 2000 CC Net 2030	21 St. Louis County ARES/ RACES Mtg 1630 Pike Lake EOC 2100 - BWAR	22	23	24 Club Breakfast @ The Chalet 0800-0900
25 CW 1930 N0PDG USB 2000 AA0AW ES 2100	26 WX 2000 KC0MKS	27 DC Net 2000 CC Net 2030	28 Lake County Net 1900 2100 - BWAR	29 Carlton County ARES/RACES Meeting 1900 CC EOC	30	

Get this newsletter *faster*  
via email!  
Email Doug AAØAW at  
[aa0aw@arrl.net](mailto:aa0aw@arrl.net)

Next Meeting: Thursday,  
*April 8, 2021 - 7 pm*  
On the 94 Repeater

## ARAC Committee Chairs



**Club License Trustee:**

Ray Barnes KEØZN

**Control Operators:**

AAØAW - NØKXT - KCØNFB

**Newsletter/Historian:**

Kim KEØNQS & Steve KEØNQT  
Waller

**Education Chair:**

Bob Schulz KCØNFB

**Hamfest Chair:**

Bob Schulz KCØNFB

**Chaplains:**

**Visiting Chaplain:**

Denny Anderson WØDIO

**Parliamentarian:**

Grant Forsyth KCØWUP

**Website:**

Thomas Dorr KEØRHA

**Membership:**

Bruce Carlson KEØNIT

**Property Chair:**

Wulf Gar WU1FGR

**Testing:**

Doug Nelson AAØAW

**Field Day:**

Dennis Anderson WØDIO

**Picnic Chair:**

Scott Ahlgren, NØVYU

**Repeater Chairs:**

Randy Haglin NØBZZ  
Randy Wabik KAØJZV

**Contest Calendar** at [www.contestcalendar.com](http://www.contestcalendar.com)

**National Contest Journal** at [www.ncjweb.com](http://www.ncjweb.com)

**QSO Party Note:** State/Province/National QSO Parties are abbreviated with the 2 or 3 letter abbreviation for the state/province/national designation followed by QP for QSO Party:

Examples: Minnesota QSO Party is MNQP  
British Columbia QSO Party = BCQP

**QRZ** web site at [www.qrz.com](http://www.qrz.com)

**VHF Propagation** site at [www.aprs.mountainlake.k12.mn.us](http://www.aprs.mountainlake.k12.mn.us)

**Reminder:** The Contest Corral monthly listing of contests can be found in each issue of QST. ARRL sponsored contests can be found in Contest Corral, highlighted, or on the ARRL's web site at [arrl.org](http://arrl.org).

# FOR SALE



Our thanks to the family of Bob Boyd KDØYLN, who have graciously donated Bob's ham shack equipment to the ARAC.

Bob became a silent key on May 31, 2020 & was serving the club as a 1st Year Board Member. N0PDG found sales for 3 items totaling \$970 thus far.

The Board has voted to earmark all proceeds from Bob's equipment toward replacement of our aging repeater.

## THE FOLLOWING ITEMS ARE AVAILABLE FOR SALE:

We are taking offers on non-priced items & will present offers for discussion on all items for consideration as appropriate. Contact N0PDG at [lovoldm@gmail.com](mailto:lovoldm@gmail.com) to make offer.

**YAESU 767GX**, built in power supply. Comes with matching speaker (no cables to hook up the speaker). This radio has an issue with all the lights coming on all the time. Sometimes they come on, sometimes not.

**MAKE OFFER**

**KENWOOD TS-940S** Receives Great! No mic, built in power supply, power button missing. Unit powers up by pushing the display button, likely had work done to it. Unknown on power output.

**MAKE OFFER**

**ICOM 718 RADIO** with mic and power cord. No manual. New are selling for \$625.

**ASKING \$400**

**Morse code book with a cd for learning. Also oscillator, no keyer.**

**ASKING \$20**

**ICOM IC-Z1A Handheld dual band.** Comes with manual. Unknown if works as there is no power cord or charger. Worked fine when gifted to Bob by Randy Johnson AA0ME.

**MAKE OFFER**

**ADDITIONAL ITEMS FOR SALE ON PAGES 17 & 18!**



# FOR SALE



Larry Mattfield KEØPJW, of Bovey, Minnesota became a silent key July 25, 2020. NØVRM was contacted by Minton Miller NØNWO who is handling the sale of the radio equipment benefiting Larry's wife of 48 years, Betsy.

Please contact Minton Miller NØNWO at [mdfamily@mchsi.com](mailto:mdfamily@mchsi.com) or 218-256-6708 with questions or offers on the following items:

Icom 7300 \$935.00

Icom sm30 desk mic \$119

Samlex sec1235m \$110.50

LDG AT 600 Prow II auto tuner for Icom \$ 314.50

Yaesu 857d hf/vhf/uhf \$680

Yaesu ft70d 2m ht \$148.75

Yaesu SBH-28 rapid charger \$25.50

Yaesu SBR-24Li batteries (2X) \$34 each or \$68 for both.

MFJ 941E manual antenna tuner \$119

Ameritron ALS 500m mobile 500 watt amp \$850

Ameritron ALS 500 rc mobile amp remote \$55.25

Ameritron SPS 75MV switching power supply \$246.50

vantage pro 2 weather station. \$990.25

diamond 2m/440 X50A bass antenna \$80.75

Solarcon A 99 cb antenna with GPK-1 Ground Plane \$123.25

Alpha Delta DELTA 4b coax switch. \$89.25

**MORE ITEMS  
FOR SALE on p.18!**

# FOR SALE

Denny Burt KB0SPA has a close friend—Lynn Johnson KB9PFF of Siren, WI—who became a Silent Key. KB9PFF's radio equipment is now located in Barnum at the house of KB0SPA.

For those interested in the following items, please send texts to KB0SPA  
at **218-341-4033**

1. a pair of uniden frs or gmrs radios, with cradle charger 20.00
- 2.lafayette swr field strength meter. with box. 30.00
- 3.radio shack 2 meter mobile radio model htx-242 60.00
4. ic-2000 2 meter mobile lcom, 65.00
- 5.ic-2100 2 meter mobile icom 65.00
- 6.Yaesu 2800 2 meter mobile 65.00
7. yaesu 2900 2 meter mobile 75.00
8. Kenwood ts-480 200 watt radio hf-6 meters. 500.00
- 9.palamar tx-100 3-30 mhz mobile hf amp 50.00
10. hygain 2.5 amp power supply 15.00
11. yaesu 757gx hf radio 200.00
12. astron ss-25m with meters built in, 45.00
- 13.kenwood at-200 tuner. 60.00
14. astron rs-20a power supply. 65.00
15. mirage 35 watt 2 meter fm amp 30.00
- 16.uniden 40 channel cb radio 10.00
17. sears roadtalker base mic 30.00
18. realistic pro 2023 scanner 10.00
19. mfj 259 analyzer 150.00
20. mfj 862 144/220/440 swr watt meter.25.00
- 21.realistic 2024 scanner 10.00
22. bc60xlt handheld scanner x2 of these 20.00 a peace.
- 23.tv antenna rotor with 3 wire wire. 35.00
24. realistic pro 2003 scanner. 15.00
25. 2 vintage regency scanners crystal operated. 10.00 each.
26. auto rotator tra rotor with control box 45.00
27. lil tarheel screwdriver 225.00
28. 50 feet raw coax on a spool 10.00
29. 1/4 inch guy wire cable 80-100 feet. 20.00

## Eyes to the Skies, Continued from Page 1

For 2021, ALL classes will be held online in a virtual format. Classes are offered on different days of the week and at different times, but if none of the class times work for you, a recorded version will be available as well. If you sign up for a class and miss it, they'll send you the recording and you can still register as a spotter.

### HOW TO SIGN UP FOR A VIRTUAL SKYWARN CLASS:

1. Go to <https://www.weather.gov/dlh/skywarn>
2. Click the class you would like to attend, [Basic Class Registration](#) or [Advanced Class Registration](#), and it will show the registration link.
3. Complete the registration form. If more than one person will be watching, you don't need to register more than once - they'll send you an email about how to register as a spotter and get your certificate after the class.

Once registered, you will receive an email with a link to join. Before the class, be sure to visit the [GoToWebinar System Check](#) on the link provided and try a test session to make sure your computer, tablet, or smartphone is ready to attend the class! If you do not have a strong internet connection, you will have the option to call in by phone to listen to the audio. And if you end up having technical problems, you will receive a link to a recording after the class.

At the end of the **Skywarn Spotter course**, learners should be able to:

- Describe the role of the SKYWARN Spotter
  - Identify examples of proper safety while spotting during specific spotting scenarios
  - Identify reportable events and criteria for reporting
  - List the seven required pieces of information to communicate when making a spotter report
  - Demonstrate how to make clear and succinct spotter reports
- Identify from a photo or video important visual features to report

**AccuWeather** meteorologist Meghan Mussoline wrote an excellent article entitled **Survival Guide: Recognize Which Clouds Mean Danger**. She says:

*"During severe weather outbreaks, conditions can change rapidly and the weather can turn volatile quickly. It is crucial to follow severe weather and tornado-related watches and warnings during episodes of severe storms. Keeping a weather radio nearby, with extra batteries handy, is a must. If you are out on the open road, staying tuned to severe weather alerts and being able to read the clouds for severe weather can help save your life."*

Here's a breakdown of ominous-looking clouds and whether there is imminent danger associated with them:

#### Cumulonimbus Clouds

Rapid vertical growth in these cauliflower-looking cumulonimbus clouds shows that there is a mature thunderstorm, likely producing heavy rain. Abundant moisture and instability due to cool air aloft and heating at the surface set the stage for cumulonimbus to develop.

A lifting mechanism, such as a cold front, can help trigger these clouds to form.

Heavy rain, frequent lightning, strong winds and hail can be threats associated with cumulonimbus clouds.



Continued on Page 20



### **Scud Clouds**

Scud clouds may appear to be ominous as they hang vertically below a cumulonimbus cloud. Sometimes, scud clouds are mistaken for funnel clouds.

However, these clouds are benign and non-rotating. They often have a ragged appearance that sets them apart from the usually smooth funnel clouds.

### **Shelf Clouds**

Shelf clouds often form at the leading edge of a gust front or outflow boundary from a thunderstorm or strong winds flowing down and outward from a storm.

The outer part of a shelf cloud is often smoother with a notable rising motion exhibited by a tiered look (hence, the name shelf cloud). Underneath, a turbulent, unsettled appearance is often the case.

A shelf cloud should be seen as a harbinger of strong winds, so take caution.

*Continued on Page 21*





### Wall Clouds

A wall cloud is a cloud that is lowered from a thunderstorm, forming when rapidly rising air causes lower pressure below the storm's main updraft.

"Wall clouds can range from a fraction of a mile up to nearly 5 miles in diameter," according to the National Weather Service.

Wall clouds that rotate are a warning sign of very violent thunderstorms. They can be an indication that a tornado will touch down within minutes or even within an hour.

### Funnel Clouds

A funnel cloud is a rotating column of air (visible due to condensation) that does not reach the ground.

If a funnel cloud reaches all the way to the ground, it is then classified as a tornado.

When out on the road, funnel clouds should be treated as tornadoes, since they could touch down.



### Tornadoes

A tornado is a rotating column of air, reaching all the way to the ground. Strong tornadoes are one of the most destructive forces of nature on a small scale, the strongest of which can level entire towns.

A roaring noise, often compared to that of a train, can be heard in many cases when a tornado touches down.

Vehicles are **NOT** a safe place to be if there is a tornado nearby.

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### Thunderstorm Anvil Clouds

Anvil clouds are the flat top of a thunderstorm, or cumulonimbus cloud.

They can spread up to "hundreds of miles downwind from the thunderstorm itself," according to the National Weather Service.

Lightning can strike from anvil clouds, even far away from a thunderstorm. Lightning described as striking "from out of the blue" is usually from an anvil cloud that has drifted from a thunderstorm.

### Mammatus Clouds

Striking mammatus clouds can sometimes be seen below thunderstorm anvil clouds.

The rounded and smooth look of mammatus clouds captivates onlookers.

They are often found underneath anvil clouds of severe thunderstorms; however, they can form underneath clouds associated with non-severe thunderstorms as well.



### Asperatus Clouds

An abundance of heat in the atmosphere is needed to produce enough energy for the dramatic, rolling formations of asperatus clouds. Another factor is the interaction of very moist air (often on the fringes of thunderstorm complexes) with very dry air.

The darkness of the clouds is likely due to the large amount of water vapor.

Asperatus clouds are not necessarily accompanied by stormy weather. In fact, they have often been observed without the development of thunderstorms.

Go for walks outdoors to observe our weather with "eyes to the skies". As you walk, you might want to go to the University Corporation for Atmospheric Research's **UCAR Center for Science Education** website on your phone at <https://scied.ucar.edu/learning-zone/clouds/cloud-types> for great photos and descriptions of "everyday clouds".

Be sure to take photos of the clouds you observe & send your favorites to [ke0nqs.mn@gmail.com](mailto:ke0nqs.mn@gmail.com). We'll select a few to show off in next month's **Relay**. "See" you then! ★

# Contest Calendar - April 2021

+ CWops Mini-CWT Test	0300Z-0400Z, Apr 1
+ RTTYOPS Weeksprint	1700Z-1900Z, Apr 1
+ SARL 80m QSO Party	1700Z-2000Z, Apr 1
	1800Z-1900Z, Apr 1 (CW) and
	1900Z-2000Z, Apr 1 (SSB) and
+ NRAU 10m Activity Contest	2000Z-2100Z, Apr 1 (FM) and
	2100Z-2200Z, Apr 1 (Dig)
	1900Z-2100Z, Apr 1
+ SKCC Sprint Europe	0100Z-0230Z, Apr 2
+ QRP Fox Hunt	0145Z-0215Z, Apr 2
+ NCCC RTTY Sprint	0230Z-0300Z, Apr 2
+ NCCC Sprint	2000Z-2100Z, Apr 2
+ K1USN Slow Speed Test	1000Z, Apr 3 to 0400Z, Apr 4
+ PODXS 070 Club PSK 31 Flavors Contest	1400Z-2200Z, Apr 3 and
	1400Z-2200Z, Apr 4
+ Florida State Parks on the Air	1400Z, Apr 3 to 0200Z, Apr 4
+ Mississippi QSO Party	1400Z, Apr 3 to 0200Z, Apr 4
+ Louisiana QSO Party	1500Z, Apr 3 to 1500Z, Apr 4
+ SP DX Contest	1600Z, Apr 3 to 1600Z, Apr 4
+ EA RTTY Contest	0000Z-0400Z, Apr 4
+ North American SSB Sprint Contest	0000Z-0100Z, Apr 5
+ K1USN Slow Speed Test	1500Z-1730Z, Apr 5
+ DARC Easter Contest	1630Z-1729Z, Apr 5
+ OK1WC Memorial	1900 local - 2300 local, Apr 5
+ 144 MHz Spring Sprint	0100Z-0159Z, Apr 6
+ Worldwide Sideband Activity Contest	0100Z-0300Z, Apr 6
+ ARS Spartan Sprint	1700Z-1900Z, Apr 6
+ RTTYOPS Weeksprint	0230Z-0300Z, Apr 7
+ Phone Weekly Test - Fray	1300Z-1400Z, Apr 7
+ CWops Mini-CWT Test	1700Z-2000Z, Apr 7
+ VHF-UHF FT8 Activity Contest	1900Z-2030Z, Apr 7
+ RSGB FT4 Contest Series	1900Z-2000Z, Apr 7
+ CWops Mini-CWT Test	2000Z-2100Z, Apr 7
+ UKEICC 80m Contest	0300Z-0400Z, Apr 8
+ CWops Mini-CWT Test	1700Z-1900Z, Apr 8
+ RTTYOPS Weeksprint	0145Z-0215Z, Apr 9
+ NCCC RTTY Sprint	0230Z-0300Z, Apr 9
+ NCCC Sprint	2000Z-2100Z, Apr 9
+ K1USN Slow Speed Test	

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## Contest Calendar - April 2021, Continued

+ QRP ARCI Spring QSO Party	0000Z-0600Z, Apr 10
+ JIDX CW Contest	0700Z, Apr 10 to 1300Z, Apr 11
	1200Z-1700Z, Apr 10 (20m-10m) and
	0700Z-0900Z, Apr 11 (80m) and
+ DIG QSO Party, CW	0900Z-1100Z, Apr 11 (40m)
	1200Z, Apr 10 to 1800Z, Apr 11
+ IG-RY World Wide RTTY Contest	1200Z, Apr 10 to 2400Z, Apr 11
+ SKCC Weekend Sprintathon	1200Z, Apr 10 to 1200Z, Apr 11
+ OK/OM DX Contest, SSB	1200Z, Apr 10 to 1200Z, Apr 11
+ FTn DX Contest	1300Z, Apr 10 to 0100Z, Apr 11 and
	1300Z-2200Z, Apr 11
+ Nebraska QSO Party	1400Z, Apr 10 to 0200Z, Apr 11
+ New Mexico QSO Party	1800Z, Apr 10 to 1800Z, Apr 11
+ North Dakota QSO Party	1800Z, Apr 10 to 0359Z, Apr 11 and
	1400Z-2359Z, Apr 11
+ Georgia QSO Party	2100Z, Apr 10 to 2100Z, Apr 11
+ Yuri Gagarin International DX Contest	1000Z-1400Z, Apr 11 and
	1700Z-2100Z, Apr 11
+ WAB 3.5/7/14 MHz Data Modes	1500Z-1600Z, Apr 11
	1900Z-2030Z, Apr 11
+ Hungarian Straight Key Contest	0000Z-0100Z, Apr 12
+ RSGB RoLo SSB	0000Z-0200Z, Apr 12
+ K1USN Slow Speed Test	1630Z-1729Z, Apr 12
+ 4 States QRP Group Second Sunday Sprint	1900Z-2030Z, Apr 12
+ OK1WC Memorial	0100Z-0159Z, Apr 13
+ RSGB 80m Club Championship, CW	1700Z-1900Z, Apr 13
+ Worldwide Sideband Activity Contest	1900 local - 2300 local, Apr 13
+ RTTYOPS Weeksprint	0030Z-0230Z, Apr 14
+ 222 MHz Spring Sprint	0230Z-0300Z, Apr 14
+ NAQCC CW Sprint	1300Z-1400Z, Apr 14
+ Phone Weekly Test - Fray	1700Z-2000Z, Apr 14
+ CWops Mini-CWT Test	1900Z-2000Z, Apr 14
+ VHF-UHF FT8 Activity Contest	0300Z-0400Z, Apr 15
+ CWops Mini-CWT Test	1700Z-1900Z, Apr 15
+ CWops Mini-CWT Test	0145Z-0215Z, Apr 16
+ RTTYOPS Weeksprint	0230Z-0300Z, Apr 16
+ NCCC RTTY Sprint	2000Z-2100Z, Apr 16
+ NCCC Sprint	2100Z, Apr 16 to 2100Z, Apr 17
+ K1USN Slow Speed Test	
+ Holyland DX Contest	

Continued on Page 25



# Contest Calendar - April 2021, Continued

+ ES Open HF Championship

+ Worked All Provinces of China DX Contest

+ YU DX Contest

+ CQMM DX Contest

+ VERON PACCdigi Contest

+ Texas State Parks on the Air

+ Michigan QSO Party

+ EA-QRP CW Contest

+ Ontario QSO Party

+ Feld Hell Sprint

+ ARRL Rookie Roundup, SSB

+ Run for the Bacon QRP Contest

+ K1USN Slow Speed Test

+ OK1WC Memorial

+ Worldwide Sideband Activity Contest

+ RTTYOPS Weeksprint

+ Phone Weekly Test - Fray

+ CWops Mini-CWT Test

+ CWops Mini-CWT Test

+ 432 MHz Spring Sprint

+ RSGB 80m Club Championship, SSB

+ CWops Mini-CWT Test

+ RTTYOPS Weeksprint

+ NCCC RTTY Sprint

+ NCCC Sprint

+ K1USN Slow Speed Test

0500Z-0559Z, Apr 17 and

0600Z-0659Z, Apr 17 and

0700Z-0759Z, Apr 17 and

0800Z-0859Z, Apr 17

0600Z, Apr 17 to 0559Z, Apr 18

0700Z, Apr 17 to 0659Z, Apr 18

0900Z, Apr 17 to 2359Z, Apr 18

1200Z to 2359Z, Apr 17

1400Z, Apr 17 to 2000Z, Apr 18

1600Z, Apr 17 to 0400Z, Apr 18

1700Z-1800Z, Apr 17 (10m) and

1800Z-1900Z, Apr 17 (15m) and

1900Z-2000Z, Apr 17 (20m) and

2000Z-2100Z, Apr 17 (40m) and

2100Z-2300Z, Apr 17 (80m) and

0700Z-0900Z, Apr 18 (40m) and

0900Z-1000Z, Apr 18 (20m) and

1000Z-1100Z, Apr 18 (15m) and

1100Z-1200Z, Apr 18 (10m)

1800Z, Apr 17 to 0500Z, Apr 18 and

1200Z-1800Z, Apr 18

1800Z-2159Z, Apr 17

1800Z-2359Z, Apr 18

2300Z, Apr 18 to 0100Z, Apr 19

0000Z-0100Z, Apr 19

1630Z-1729Z, Apr 19

0100Z-0159Z, Apr 20

1700Z-1900Z, Apr 20

0230Z-0300Z, Apr 21

1300Z-1400Z, Apr 21

1900Z-2000Z, Apr 21

1900 local - 2300 local, Apr 21

1900Z-2030Z, Apr 21

0300Z-0400Z, Apr 22

1700Z-1900Z, Apr 22

0145Z-0215Z, Apr 23

0230Z-0300Z, Apr 23

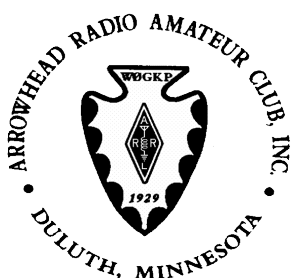
2000Z-2100Z, Apr 23

*Continued on Page 26*

# Contest Calendar - April 2021, Continued

- + 10-10 Int. Spring Contest, Digital
  - + QRP to the Field
  - + SP DX RTTY Contest
  - + Helvetia Contest
  
  - + Florida QSO Party
  
  - + International Vintage Contest HF
  - + BARTG Sprint 75
  - + K1USN Slow Speed Test
  - + QCX Challenge
  - + OK1WC Memorial
  - + QCX Challenge
  - + Worldwide Sideband Activity Contest
  - + QCX Challenge
  - + RTTYOPS Weeksprint
  - + SKCC Sprint
  - + Phone Weekly Test - Fray
  - + CWops Mini-CWT Test
  - + CWops Mini-CWT Test
  - + UKEICC 80m Contest
  - + CWops Mini-CWT Test
  - + RTTYOPS Weeksprint
  - + RSGB 80m Club Championship, Data
  - + NCCC RTTY Sprint
  - + NCCC Sprint
  - + K1USN Slow Speed Test
- 0001Z, Apr 24 to 2359Z, Apr 25
  - 0800-1800 local, Apr 24
  - 1200Z, Apr 24 to 1200Z, Apr 25
  - 1300Z, Apr 24 to 1259Z, Apr 25
  - 1600Z, Apr 24 to 0159Z, Apr 25 and  
1200Z-2159Z, Apr 25
  - 1200Z-1800Z, Apr 25
  - 1700Z-2059Z, Apr 25
  - 0000Z-0100Z, Apr 26
  - 1300Z-1400Z, Apr 26
  - 1630Z-1729Z, Apr 26
  - 1900Z-2000Z, Apr 26
  - 0100Z-0159Z, Apr 27
  - 0300Z-0400Z, Apr 27
  - 1700Z-1900Z, Apr 27
  - 0000Z-0200Z, Apr 28
  - 0230Z-0300Z, Apr 28
  - 1300Z-1400Z, Apr 28
  - 1900Z-2000Z, Apr 28
  - 2000Z-2100Z, Apr 28
  - 0300Z-0400Z, Apr 29
  - 1700Z-1900Z, Apr 29
  - 1900Z-2030Z, Apr 29
  - 0145Z-0215Z, Apr 30
  - 0230Z-0300Z, Apr 30
  - 2000Z-2100Z, Apr 30

## The ARAC RELAY



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