ARROWHEAD RADIO AMATEUR CLUB, INC. • DULUTH, MINNESOTA • WØGKP 1929

The RELAY

APRIL 2023

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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SPRING 2023

Join us on Facebook!

FOCUS ON WEATHER:

Observing Air Pressure & Wind

What is weather? Kind of an odd question to ask, but worth reviewing—right back to the basics. The definition of weather, on planet earth, is ***a combination of events that happen in our atmosphere***. Most of those weather events take place in the ***tropo-sphere***, the part of the atmosphere that's closest to Earth's surface. As we know, weather is very different, depending upon where you are in the world. Weather events are generally forecast, observed and recorded in any given region primarily based on a day at a time, and the hours & minutes of that particular day. We also forecast the weather in increments of days for the week ahead, with computer weather models now commonly stretching the forecasts into 10 days or more with relative accuracy.

How is this done? In simple terms, meteorologists typically look at current weather events for a general region. Based on that activity, they form forecasts for smaller, local areas according to estimates of where those events will move, the power and speed of that movement, and the interaction of the events with each other.

The cause of "weather events"? Changes in air pressure. Center for Science Education (SCIED) describes it this way:

"Air pressure is caused by the weight of the huge numbers of air molecules that make up the atmosphere. Typically, when air pressure is high the skies are clear and blue. The high pressure causes air to flow down and fan out when it gets near the ground, preventing clouds from forming. When air pressure is low, air flows together and then

Continued on Page 16

Still our favorite storm cloud image of all time! Free image from GetWallpapers.com

ARAC Board Meeting - March 7, 2023

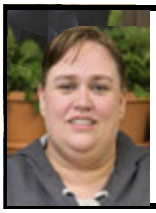
PRESIDENT

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

VICE PRESIDENT

KØDJP
David Pyrlik
david.pyrlik@gmail.com

SECRETARY



KFØGJW
Melinda Nelson

TREASURER

KEØYTM
Sam Frey
ke0ytm@gmail.com

3RD YEAR BOARD

AAØAC
Dave Davis
218-348-6649
aaøac@outlook.com

2ND YEAR BOARD

AAØAW
Doug Nelson
aaøaw@arrl.net

1ST YEAR BOARD

WØDIO
Denny Anderson

Present:

Board Members

Gene Ellefsen – N0VRM, Dave Pyrlik – K0DJP, Sam Frey – KC0YTM, Melinda Nelson – KF0GJW, Dave Davis – AA0AC, Doug Nelson - AA0AW, Dennis Anderson – W0DIO

Board Advisors (Non-Board Members)

Randy Wabik –KR0B, Grant Forsyth – KC0WUP

Guests: Elmer Berg – KC0NGY, Robin Davis, Mike Lovold – N0PDG

Meeting called to order by President Gene – N0VRM at 18:33 (6:33 pm)

Minutes:

Minutes were sent via email. Motion to approve Sam Frey – KC0YTM. Seconded by Doug Nelson – AA0AW, motion passed.

Treasurer's Report:

Checking: $1,791.70
Savings: $1,775.19
Repeater: $3,867.78
Subtotal Cash $7,434.67

Winter CD: $1,736.49
Summer CD: $0.00
Subtotal CD: $1,736.49

Assets Subtotal: $9,171.16

Grand Total $9,171.16

Motion to approve by Doug Nelson – AA0AW, seconded by Dave Davis – AA0AC, motion passed.

Testing:

We had one test and pass last week. Will be doing the big one at HamFest. The new General Testing Pool is out and will go into effect on July 1st. As always if you are looking to test or upgrade, or know of anyone that is interested in testing please contact Doug Nelson at AA0AW@arrl.net

Continued on Page 3

ARAC Board Meeting continued

Swap Fest:

Bob Schulz – KC0NFB we have been approved. $10.00 entry fee, with a $500.00 door prize which needs to still be approved. 21 tables reserved so far, which is about normal. ARRL, DXCC, connector person are all planning on showing up so far this year. Did send out to HRO to see if they are coming. Looking for someone to take over for the Pulled Pork as Robin is stepping out.

Motion made by Doug Nelson – AA0AW to approve $500.00 for the door prize, seconded by Melinda Nelson – KF0GJW. Motion passed.

Motion made by Doug Nelson – AA0AW to approve up to but not exceed $300.00 for kitchen, seconded by Sam Frey – KE0YTM. Motion passed.

Motion made by Melinda Nelson – KF0GJW to approve up to but not exceed $200.00 for the hourly door prizes, seconded by Dave Davis – AA0AC. Motion passed.

Repeater:

Dave Pyrlik – K0DJP was able to talk to the owner and can get the repeater for $3,000.00.

Randy Wabik – KR0B is there a way we can get a service agreement. Something that would bring DSC or Motorola to come in and fix if something goes wrong. There is a warranty that is either 3 or 5 years.

Motion made by Melinda Nelson – KF0GJW to donate $3,000.00 to WLSAR (Western Lake Superior Amature Responders), seconded by Sam Frey – KE0YTN. Motion passed.

New Business:

HamFest – May 6th. $10.00 entry fee. Looking for donations for drawings.

Upcoming HamFest

Brainard – April 15th

Joe and Cheryl Meese donated a bunch of equipment. Gene, Doug, and Dave brought the equipment to St. Cloud HamFest and was able to sell all equipment. They also decided the funds would go to the Repeater Fund. $1,500.00 was donated to the club. Thank you to Joe and Cheryl for the wonderful donation to assist the club.

Motion to adjourn by Doug Nelson – AA0AW, seconded by Dave Davis – AA0AC, motion passed at 19:20 (7:20 pm)

March 9, 2023

Present:
President: Gene Ellefsen – N0VRM
Vice President: Dave Pyrlik – K0DJP
Treasurer/Membership: Sam Frey – KE0YTM
Secretary: Melinda Nelson – KF0GJW
Second Year Board: Doug Nelson – AA0AW
Third Year Board: Dave Davis – AA0AC
Special Events: Open/Gene Ellefsen – N0VRM (acting)
Parliamentarian: Grant Forsyth – KC0WUP
Repeater: Dave Pyrlik – K0DJP
Testing: Doug Nelson – AA0AW
Repeater: Randy Wabik – KR0B
Property/Picnic: Scott Ahlgren – N0VYU
HamFest/Education: Bob Schulz – KC0NFB

Absent:
First Year Board: Dennis Anderson – W0DIO
Chaplin:
Web Site: Thomas Dorr – KE0RHA
Newsletter/Historian: Kim Waller – KE0NQS
Newsletter/Historian: Steve Waller – KE0NQT

Minutes:
Minutes are posted on the website and in the newsletter. Motion to approve by John Cavanaugh – KC0AFE, seconded by Robin Davis. Motion Passed.

Treasurer's Report:
Checking: $1,791.70
Savings: $1,775.19
Repeater: $3,867.78
Subtotal Cash $7,434.67

Winter CD: $1,736.49
Summer CD: $0.00
Subtotal CD: $1,736.49

Assets Subtotal: $9,171.16

Grand Total $9,171.16

Motion to accept as presented by Bob Loubek – N0CLB, seconded by Paul Dallavia – KC0WDQ, motion passed.

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Education:
Nothing until after HamFest.

HamFest:
HamFest will be May 6, 2023. Entry Fee will be $10.00. We are currently sitting at 25 tables. Looking for people to come and help set up. We are looking for Volunteers for the kitchen. Robin is resigning from making the pulled pork so we are looking for someone to take over making this. We are also looking for hourly drawing prizes.
Motion from the board
$500.00 for Door Prize, Edwin Murray – W1ELM, motion passed.
$300.00 for kitchen, Bob Schulz – KC0NFB, motion passed.
$200.00 for hourly door prizes Mike Lovold – N0PDG, motion passed.

Testing:
Doug Nelson – AA0AW Next scheduled one will be May 6th at 10:00 AM during the HamFest. If anyone needs testing contact Doug Nelson at AA0AW@ARRL.net and they will test individually. **Do not forget to get your FRN number prior to testing.** You can go to FCC.gov/uls and register. You will also need an email address going forward.

Repeater:
Dave Pyrlik – K0DJP, Motorola repeater that is a commercial grade repeater for the 94 site. The current repeater is very old and we are looking at something that would upgrade and last about 40 years.
Motion from the board to donate $3,000.00 to WLSAR (Western Lake Superior Amateur Responders). Seconded my Mike Lovold – N0PDG. Motion passed.

New Business:
April meeting will be our annual Skywarn meeting. There will be chairs set up towards the front of the room. Please sit towards the rear of the room as this meeting will be open to the public.
Grandma's Marathon password this year is Ham23.

Silent Key: (Please keep their family in your thoughts)
Joe Meese – W0LWU March 17, 2023.

Door Prize was won by Scott Ahlgren – N0VYU. Donated back to the club.

CLUB REPEATER
WØGKP
146.94 (-)
CTCSS TONE
103.5

Prez Sez ...

Hi Everyone,

We have a busy month ahead of us. The April ARAC Club Meeting on Thursday April 13 will start at 6:00 pm, with Skywarn Training starting at 6:30 pm. This is open to the public, so expect to see some visitors and please make them feel welcome!

Saturday May 6 is the ARAC Hamfest over at the Superior Fairgrounds on Tower Avenue in Superior, Wisconsin. We will need help setting up tables starting at 6:00 AM. as Vendors come in at 7:00 AM and doors open to the public at 9:00 AM.

We could also use some Kitchen help and some Ticket sellers outside. Door Prize donations are needed also. Hope to see a lot of you there. This our Fundraiser for the year so we need your help to make it!

Thanks,
Gene Ellefsen NØVRM

LOOKING for an Amateur Radio License TESTING SESSION?

Schedule your own Testing Session TODAY!

Contact Doug Nelson-AA0AW at aa0aw@arrl.net or 218-391-5874

All Exam Candidates are REQUIRED to have an FCC Registration Number (FRN) before exam day, which will require your email address.

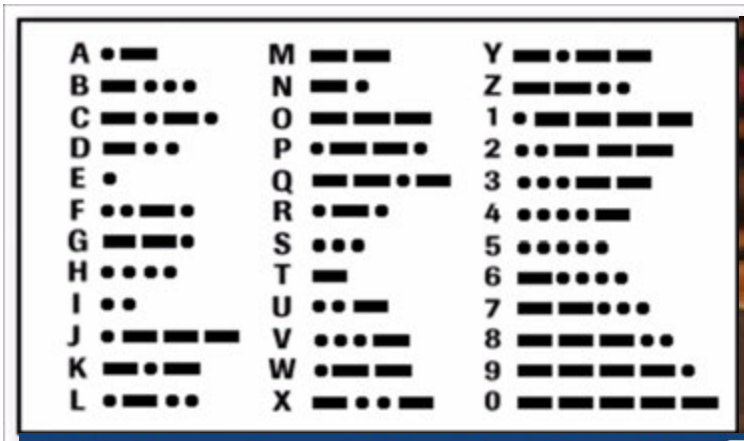
Not Currently Licensed? For New License Candidate FRN registration, go to:
www.fcc.gov/new-users-guide-getting-started-universal-licensing-system-uls

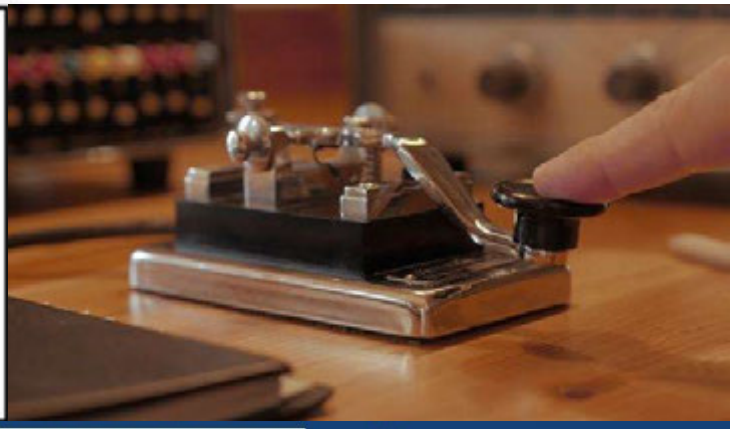
Upgrading to General or Expert Class & not sure you have an FRN number? go to
https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp

UPGRADE CANDIDATES:
Please bring a copy of your current license to the exam session.

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	





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.

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

ARRL The national association for AMATEUR RADIO®

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 Telecoms 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 when the bands are fully available for use.

2,200 Meters (135 kHz)

135.7 kHz — 1 W EIRP maximum — 137.8 kHz; E,A,G

630 Meters (472 kHz)

472 kHz — 479 kHz; E,A,G

5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.

160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz

1.800 — 1.900 — 2.000 MHz; E,A,G

80 Meters (3.5 MHz)

3.500 3.600 3.700 4.000 MHz; E A G; N,T (200 W); 3.800; 3.525 3.600

60 Meters (5.3 MHz)

CW, Dig, USB: 5332 5348 5358 5373 5405 kHz; 2.8 kHz; E,A,G (100 W); 5330.5 5346.5 5357.0 5371.5 5403.5 kHz

General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.

40 Meters (7 MHz)

7.000 7.075 7.100 7.300 MHz; ITU 1,3 and FCC region 2 west of 130° west or below 20° north; E A G; N,T (200 W); 7.175; N,T outside region 2; 7.025 7.125

See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

30 Meters (10.1 MHz)

Avoid interference to fixed services outside the US.

200 Watts PEP; E,A,G; 10.100 — 10.150 MHz

20 Meters (14 MHz)

14.000 14.150 14.350 MHz; E A G; 14.175; 14.025 14.150 14.225

17 Meters (18 MHz)

E,A,G; 18.068 — 18.110 — 18.168 MHz

15 Meters (21 MHz)

21.000 21.200 21.450 MHz; E A G; N,T (200 W); 21.225; 21.025 21.200 21.275

12 Meters (24 MHz)

E,A,G; 24.890 — 24.930 — 24.990 MHz

10 Meters (28 MHz)

28.000 28.300 29.700 MHz; E,A,G; N,T (200 W); 28.000 28.500

6 Meters (50 MHz)

50.1; E,A,G,T; 50.0 — 54.0 MHz

2 Meters (144 MHz)

144.1; E,A,G,T; 144.0 — 148.0 MHz

1.25 Meters (222 MHz)

E,A,G,T; N (25 W); 219.0 220.0 222.0 225.0 MHz

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

70 cm (420 MHz)*

E,A,G,T; 420.0 — 450.0 MHz

33 cm (902 MHz)*

E,A,G,T; 902.0 — 928.0 MHz

23 cm (1240 MHz)*

1240 1300 MHz; E,A,G,T; N (5 W); 1270 1295

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

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 for detailed band plans.

ARRL
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email: hq@arrl.org

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email: membership@arrl.org

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Toll-Free 1-800-326-3942 (860-594-0355)
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

NETS

Have a favorite HF/6m/2m/1.25m/7Øcm 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 2ØØØ on the ARAC repeater (146.940 MHz with a tone of 103.5 and standard offset).
- **Minnesota D-Star Net:** Sundays at 19:3Ø on Reflector 53A
- **Minnesota Section Net** 12ØØ and 173Ø on 3.86Ø [Net Manager: NØYR] http://www.mn-section.org/dept_stm.html
- The non-non-net: Evenings 2ØØØ 144.2ØØ USB except for Sunday evenings.
- Badger WX Net: Ø5ØØ-Ø715 on 3.985. Give 24 hour high/low/current temperature, precipitation and snowfall.
- **PICONET**: 3.925 from Ø9ØØ-11ØØ CT Mon-Sat and 16ØØ-17ØØ CT Mon-Fri. Info at: http://www.piconet3925.com
- Michigan Upper Peninsula Net: 16ØØ (CST) on 3.921 MHz Sun-Sat and 12ØØ Sun. Info: http://www.michupnet.com
- Great Lakes Marine/Maritime Mobile Net: Morning Ø7:3Ø - 3.932; Ø8:15 - 7.261 MHz and evening 18:3Ø - 3.173Ø927; 19:15 - 7.268 MHz. Weekend extra net: 1Ø:ØØ - 7.261/7.268 MHz. All CST, LSB and +/- QRM. See: http://www.sailblogs.com/member/glmmnet/
- MIDCARS: Ø7:3Ø-13:ØØ - 7.258 MHz. See: http://www.midcars.net
- Iowa snowbird net on 14.257MHz, M-W-F at 1Ø:ØØ am Local Time. This is an open net.
- Spider Web Net (Marco Island FL) on 14.347 every morning at Ø73Ø CST/CDT: http://www.spiderwebnet.net
- Maritime Mobile Service Network: Daily at 11ØØ—21ØØ Central on 14.3ØØ. http://mmsn.org and http://www.143ØØ.net
- RV Radio Network: Every day at 19ØØ Central on 7.265 MHz. Web site: http://www.rvradionetwork.com
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.48Ø MHz USB
- Wisconsin Sideband Net: Daily @ 5:15 PM – 3985 [or 3982.5] KHz LSB
- Hobby Helpers Net - Tuesday @ 8 PM – 28.33Ø MHz USB (Isanti MN) LSB [Net Manager: WOØA].
- Northstar Trader Net: 3.9Ø8 +/- at Ø83Ø CST Sundays
- WARFA: 3.9Ø8 +/- Sun/Tue/Thu nights at 22ØØ CST, http://warfa.org/
- Youth Net: 14.32Ø-1433Ø Sundays 18ØØ-19ØØ UTC, Net Control: AC8PI
- YACHT: Saturdays 19ØØ CST on EchoLink #481872, http://yachthams.webstarts.com
- Northwestern Ontario ARES Net: Evenings at 2Ø:15 (Central) on +/- 3.75ØMhz
- The Iron Range Net: Saturdays at Ø8ØØ Central time on or near 3.919 Mhz. Look them up on Facebook!
- FORX Net: Mondays at 19ØØ Central at 3.941 Mhz +/- QRM. WAØJXT — Grand Forks, North Dakota
- HF CW: Fridays Ø8:ØØ CST, 7.112 MHz. Informal slow speed CW Net. W8IRT NCS. Email: w8irt@aol.com
- Minnesota ARES Digital Net: Thursdays at 2ØØØ CST, 3.5835 MHz USB +/- QRM, Mode: Olivia 8/5ØØ.
- SARA Digital Net: Sundays at 19ØØ Local, 3.582.15Ø MHz USB +/- QRM, Mode: BPSK31/BPSK63
- Spider Web Net (Marco Island FL): 14.347 every morning at Ø73Ø CST/CDT: http://www.spiderwebnet.net
- Broadcaster Net: 7.231 or 3.855 M/W/F @ 15ØØ UTC. 14.255 M-F @ 213Ø UTC. http://www.cbsretirees.com/ham.htm
- Old Military Radio Net: 7.268 +/- nightly at Ø2ØØz. Other times/Frequencies too. See: http://www.mrca.ar88.net/
- Rag Chew Crew/Tailgaters/Freewheelers Nets: 3.916 +/- nightly at 19ØØ CST, http://www.tailgatersnet.com
- North South Net: 7.214.6 +/- at Ø7ØØ CST, Monday-Saturday

DULUTH AREA REPEATERS

ARAC System WØGKP

Frequency	Offset	Tone	Location
146.940	minus	103.5	Duluth
146.940	minus	107.2	Lakeside (recv)
146.940	minus	151.4	Two Harbors (recv)
146.940	minus	100.0	Gary-New Duluth (recv)
146.940	minus	110.9	Cloquet (recv)
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 (recv for Proctor)
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

Continued on Page 10

DULUTH AREA REPEATERS, continued

NARC System NAØRC

147.135 plus 103.5 Knife River
145.450 minus 114.8 Park Point (rcv)
147.135 plus 114.8 Knife River - Park Point (rcv)

Stand Alone Repeaters

145.210 minus 110.9 Clam Lake, WI
146.880 minus 123.0 Grand Rapids, MN
146.910 minus 146.2 Duxbury, MN
146.955 minus 146.2 Askov, MN
147.105 plus 110.9 Chaffey, WI
444.850 +5.00 141.3 Cloquet, MN

Fusion

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

147.150 plus 151.4 NTØB Gilbert. MN Fusion Repeater
145.170 minus 110.9 WA9KLM Superior, WI – Douglas County RACES/ARES Fusion Repeater (Digital only) Fusion Room 28373

145.250 minus 103.5 KBØYHX Cloquet, MN – Carlton County RACES/ARES Fusion Repeater

444.300 +5.00 103.5 NØEO Duluth, MN – Spirit Valley Amateurs Fusion Repeater WIRES-X NØEO (Analog only) Fusion Room 40494

444.400 +5.00 103.5 NAØRC Knife River, MN – Wires X Connected to NØEO Room 40494
444.500 +5.00 103.5 NØLCR Two Harbors, MN – Wires X Connected to NØEO Room 40494
444.600 +5.00 103.5 NØLCR Silver Bay, MN – Wires X Connected to NØEO Room 40494
444.800 +5.00 103.5 NØLCR Grand Marais, MN – Wires X Connected to NØEO Room 40494

D-Star

147.375 plus NØEO D Star
442.200 plus NØEO D Star

Rev. KCØWDQ as of 10/1/22 For ARAC Newsletter

Elmers

El-mer / ɛl-mər/ [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.

Name	Call Sign	Expertise
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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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

SUNDAY NIGHT NETS
193Ø - **CW - 28.125 MHz USB-CW**
2ØØØ -**USB 28.45Ø MHz**
21ØØ - **Southern St. Louis County Emergency Services Net**

MONDAY NIGHT NETS
2ØØØ- **Northland WX Net - ARAC Repeater**

APRIL
CLUB EVENTS

TUESDAY NIGHT NETS
2ØØØ -**Douglas Cty 145.49Ø MHz**
2Ø3Ø -**Central Carlton County**

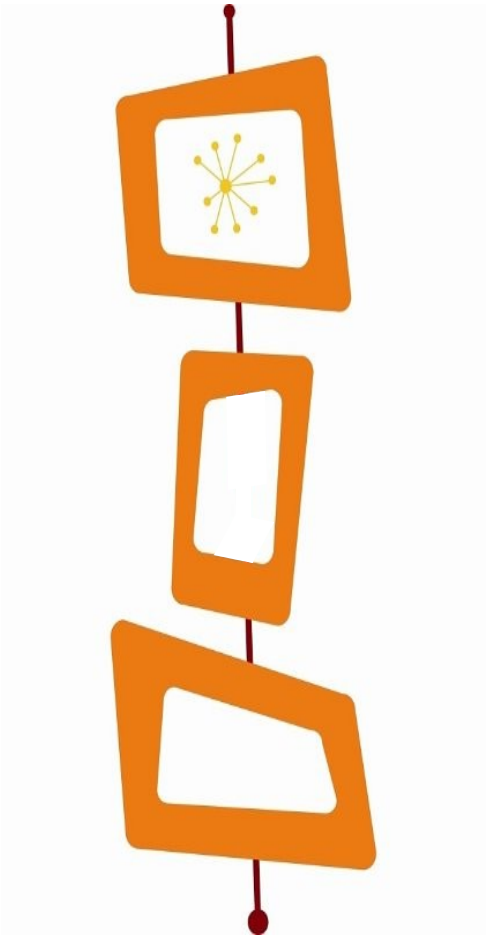
WEDNESDAY NIGHT NETS
19ØØ -**Lake County - LSAC1**
2nd & 4th Wednesdays
21ØØ -**BWAR**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2 CW 1930 AAØAW USB 2000 AAØAW ES 2100 KEØYTM	3 WX 2000 KCØMKS	4 ARAC BOARD MEETING Sammy's Pizza 6:30 pm DC Net 2000 CC Net 2030	5 21ØØ -**BWAR**	6	7	8
9 HAPPY EASTER! CW 1930 NØPDG USB 2000 KB9WLB ES 2100 AAØAW	10 DC ARES/ RACES Mtg 1900 DC EOC WX 2000 KCØMKS	11 DC Net 2000 CC Net 2030	12 Lake County ARES/RACES Meeting 1800 Lake County Net 1900 21ØØ -**BWAR**	13 ARAC Club Meeting Coppertop Church 6:00 PM SkyWarn 6:30 PM	14	15
16 CW 1930 AAØAW USB 2000 K9KDK ES 2100 KD9VKI	17 WX 2000 KCØMKS	18 DC Net 2000 CC Net 2030	19 St Louis County ARES/RACES Meeting 1800 21ØØ -**BWAR**	20	21	22
23 CW 1930 NØPDG USB 2000 NØVRM ES 2100 KCØWDQ	24 WX 2000 KCØMKS	25 DC Net 2000 CC Net 2030	26 Lake County Net 1900 21ØØ -**BWAR**	27 Carlton County ARES/RACES Meeting 1900 CC EOC	28	29 ARAC Club Breakfast The Chalet 4833 Miller Trunk Hwy Hermantown, MN 8 AM
30 CW 1930 AAØAW USB 2000 NØPDG ES 2100 WØNWO						

Get this newsletter *faster* via email!
Email Doug AAØAW at
aaØaw@arrl.net

Next Club Meeting:
Thursday,
April 13th, 2023 - 6 pm
at the Coppertop Church!

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

Chaplain:
Rollie Bockbader KBØCK

Visiting Chaplain:

Parliamentarian:
Grant Forsyth KCØWUP

Website:
Thomas Dorr KEØRHA

Membership:
Sam Frey KEØYTM

Property Chair:
Scott Ahlgren NØVYU

Testing:
Doug Nelson AAØAW

Field Day:

Picnic Chair:
Scott Ahlgren, NØVYU

Repeater Chairs:
Randy Haglin NØBZZ
Randy Wabik KAØJZV

Contest Calendar at www.contestcalendar.com

National Contest Journal at 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
VHF Propagation site at 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.

ARRL NEWS
The national association for AMATEUR RADIO®

ARRL Year-Long Operating Event Recognizing Volunteers

As announced in the January 2023 issue of *QST*, ARRL is celebrating a year-long operating event honoring all ARRL volunteers: Volunteers On the Air.

In similar fashion to the 2014 ARRL Centennial Celebration, and the 2018 International Grid Chase, this event will be exclusively driven only by QSOs uploaded to Logbook of The World (LoTW).

Highlights of the event include:

- **Earning Points for contacting W1AW Portable Stations:** There will be week-long activations of portable W1AW/# stations in all 50 states, and in several US Possessions/Territories, that will generate on-air activity to earn points. Each state will be activated twice. The schedule of when which states will be activated as posted in the ARRL dashboard at https://vota.arrl.org/ and will be updated as changes/additions occur. See the POINTS TABLE for the full list of points.

- **Contacting ARRL Volunteers or Members on the air:** ARRL Officers, Directors, Section Managers (and their appointees), Staff, and even Members domestically (and DX) can be contacted for points. See the POINTS TABLE for the full list of points.

- **Using Logbook of the World** (LoTW - see http://www.arrl.org/logbook-of-the-world) as the QSOs data source, the 2023 Volunteers On The Air event features W1AW activations from all 50 states (twice) and several territories during 2023. Weeks will begin on a Wednesday and end on a Tuesday. Some weeks will be shown as off weeks to avoid other major operating events.

- **Participants will work W1AW portable stat**ions and ARRL volunteers to earn QSO points.

- **Participants do not need to upload to, or participate in LoTW**. Uploads to LoTW by W1AW portable stations and by the volunteers will feed the points scoring system.

- **A Leaderboard will be activated after the event ramps up**, and Certificates will be availble during and after the event concludes. Once the year is completed, a final summary will be released.

ARRL Minnesota Section Manager Bill Mitchell AE0EE gives details on how to participate. He says:

Coming up May 10-16, W1AW/0 will be in Minnesota! Thanks to the hard work of MN Affiliated Club Coordinators Don Kelly, WA6ZMT, and Jim Froemke, K0MHC, and in partnership with Oklahoma section manager Mark Kleine, N5HZR, we are ready to announce the sign-up process.

Continued on Page 15

ARRL NEWS, continued from p. 14

To sign up, you will need: the 6-character Maidenhead grid square where you intend to operate, and to figure out the UTC time when you would like to operate---all sign-up times listed are UTC.

* ON APRIL 1ST, ARRL Affiliated Clubs may begin signing up for time slots (here meaning a specific 2-hour time/band/mode slot). Each day on/after April 1st, clubs may sign up for up to two time slots. Clubs should use the /CLUB suffix on their callsign during sign-up.

* ON APRIL 15TH, ARRL Members may begin signing up for time slots. Each day on/after April 15th, clubs may sign up for one time slot.

ARES and public service clubs are particularly encouraged to consider signing up for voice slots on 2 m and/or 0.70 m (440 MHz) using FM, and to announce those times in advance so local hams know when they might hear W1AW/0. Although repeater contacts are not allowed as part of the event (though you can announce on a repeater that you are operating simplex; satellite is allowed), a W1AW/0 activation following a net could be a fun exercise.

Because accurate and complete logging is essential for the success of this event, all contacts should be logged electronically and ADIF files sent promptly to the coordinators. You will have further instructions on the upload process from them.

More details on the W1AW/0 MN event, the W1AW/P events in general, and the year-long Volunteers on the Air celebration can be found here:
https://www.arrl.org/attachments/view/Group/109778

Minnesota's sign-up page is here: https://ok.arrl.org/w1awmn

Further national information about the events can be found at: https://arrl.org/vota

Affiliated clubs should also check that their information is up to date in the club directory:
https://arrl.org/clubs

If you have questions, contact Don Kelly (arrl_mn_acc@donkelly.biz) and Jim Froemke jim.k0mhc@gmail.com) for help.

On behalf of Don, Jim, and myself, thank you to all the ARRL members, clubs, and volunteers who do so much for the organization and our hobby. We look forward to hearing you on the air!

73,
Bill Mitchell AE0EE

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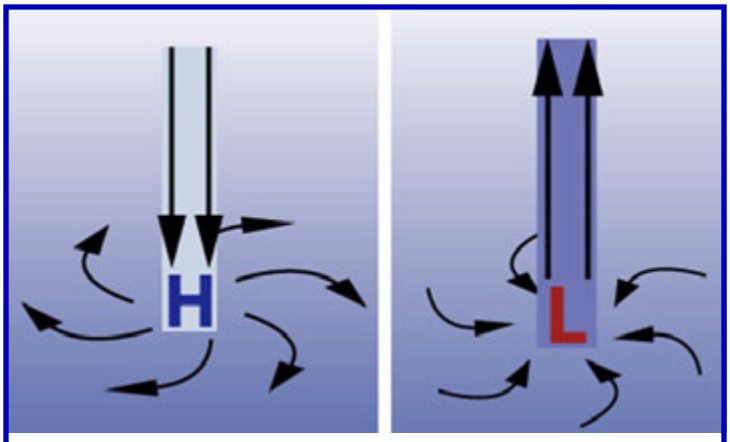
upward where it converges, rising, cooling, and forming clouds. Remember to bring an umbrella with you on low pressure days because those clouds might cause rain or other types of precipitation."

Here's a great air pressure lesson from **SCIED**:

The Highs and Lows of Air Pressure

Standing on the ground and looking up, you are looking through the atmosphere. It might not look like anything is there, especially if there are no clouds in the sky. But what you don't see is air – lots of it. We live at the bottom of the atmosphere, and the weight of all the air above us is called air pressure. Above every square inch on the surface of the Earth is 14.7 pounds of air. That means air exerts 14.7 pounds per square inch (psi) of pressure at Earth's surface. High in the atmosphere, air pressure decreases. With fewer air molecules above, there is less pressure from the weight of the air above.



Air near the surface flows down and away in a high pressure system (left) and air flows up and together at a low pressure system (right).

Image and Caption Courtesy SCIED

Pressure varies from day to day at the Earth's surface - the bottom of the atmosphere. This is, in part, because the Earth is not equally heated by the Sun. Areas where the air is warmed often have lower pressure because the warm air rises. These areas are called low pressure systems. Places where the air pressure is high, are called high pressure systems.

A **low pressure system** has lower pressure at its center than the areas around it. Winds blow towards the low pressure, and the air rises in the atmosphere where they meet. As the air rises, the water vapor within it condenses, forming clouds and often precipitation. Because of Earth's spin and the Coriolis effect, winds of a low pressure system swirl counterclockwise north of the equator and clockwise south of the equator. This is called cyclonic flow. On weather maps, a low pressure system is labeled with red L.

A **high pressure system** has higher pressure at its center than the areas around it. Winds blow away from high pressure. Swirling in the opposite direction from a low pressure system, the winds of a high pressure system rotate clockwise north of the equator and counterclockwise south of the equator. This is called **anticyclonic flow**. Air from higher in the atmosphere sinks down to fill the space left as air is blown outward. On a weather map, you may notice a blue H, denoting the location of a high pressure system.

How do we know what the pressure is? How do we know how it changes over time? Today, electronic sensors in weather stations measure air pressure. These sensors are able to make continuous measurements of pressure over time. In the past, barometers were used and measured how much air pushed on a fluid, such as mercury. Historically, measurements of air pressure were described as "inches of mercury." Today, meteorologists use millibars (mb) to describe air pressure.

Air pressure depends on temperature and density.

When you inflate a balloon, the air molecules inside the balloon get packed more closely together than air molecules outside the balloon. This means the density of air is high inside the balloon.

Continued on Page 17

When the density of air is high, the air pressure is high. The pressure of the air pushes on the balloon from the inside, causing it to inflate. If you heat the balloon, the air pressure gets even higher.

Air pressure depends on the temperature of the air and the density of the air molecules. Atmospheric scientists use math equations to describe how pressure, temperature, density, and volume are related to each other. They call these equations the ***Ideal Gas Law*.** In these equations, temperature is measured in Kelvin.

This equation helps us explain how weather works, such as what happens in the atmosphere to create warm and cold fronts and storms, such as thunderstorms.

Ideal Gas Law

Pressure = Temperature x Density x Constant

Pressure x Volume = Temperature x Constant

Image Credit: www.scied.ucar.edu

For example, if air pressure increases, the temperature must increase. If air pressure decreases, the temperature decreases. It also explains why air gets colder at higher altitudes, where pressure is lower.

All right. We really appreciate the **Center for Science Education**'s great work explaining air pressure. And now we turn to the subject of wind.

What is Wind?

Wind is simply air that is moving from a place that has higher pressure to a place that has lower pressure. This might be in the form of a breeze or huge rush of air that has the potential for great damage and danger.

Wind direction is described as the direction they blow. For example, easterly winds blow from the east, and westerly winds blow from the west. Meteorologists also use the **Beaufort Wind Scale** to assign a wind strength number from zero to twelve (see Beaufort Scale image on page 18). Zero denotes completely calm conditions, while twelve designates hurricanes.

SCIED also has some good descriptions of what they call **Specialized Wind Types:**

"Sometimes wind is very strong but lasts only a short time. For example, thunderstorms can create high winds including microbursts and tornadoes. While the ***wind from a microburst flows down and away from a thunderstorm, wind from a tornado flows up and into a thunderstorm***. Monitoring tools such as **Doppler radar** and the **Low-Level Windshear Alert System** are used to spot microbursts and tornadoes.

"Microbursts form when air, cooled rapidly within a storm, zooms downward at high speeds because it is more dense than the surrounding air. When it gets to the ground it spreads across the Earth's surface as straight-line winds moving at speeds over 100 miles per hour. They only last a few minutes but can be deadly.

"Tornadoes form when there is a difference in air pressure between the center of the tornado and its outer edge. The center has very low pressure and the outer edge has very high pressure, creating winds that can blow at over 200 miles per hour. Exactly what causes tornadoes to form is a topic of ongoing research."

In fact, the **National Center for Atmospheric Research** (**NCAR)** in cooperation with the National Oceanic and Atmospheric Administration, created several field projects called **VORTEX (e.g. Vortex, Vortex 2 Vortex SE),** that chased twisters for about 20 years to figure out how they form. This data is still being studied and applied to computer model forecasting today.

Continued on Page 18

OK. Let's talk a little bit about global wind patterns. Steady winds that always blow in the same direction over the earth are called **Trade Winds**, and these winds have been known of for centuries by sailors.

Why do trade winds always blow in the same direction? It's because of ***the pattern of how air moves through the atmosphere over the entire earth.***

These 2 trade winds are called **Westerlies** and **Polar Easterlies**. The trade winds turn to the right in the **Northern Hemisphere** and to the left in the **Southern Hemisphere** because of Earth's rotation. This is referred to as the **Coriolis Effect**, as mentioned earlier.

Since we can't go into more detail here, definitely look up the **Coriolis Force** in your spare time for lots of fascinating articles about physics and the understanding of the **Coriolis Effect** on our Earth.

One interesting factoid is that tornadoes in the United States almost always (98% of the time) rotate **counter-clockwise**. Though scientists differ in their view of the cause and effect ratio in the formation of tornadoes, the counterclockwise tornado spin is definitely influenced by **Coriolis Force** from Earth's rotation, causing air around low pressure centers to circulate counterclockwise in the Northern Hemisphere. On rare occasions, a tornado in our hemisphere will twist clockwise instead, and this is called an **Anti-cylonic Tornado.**

Tornado rotation is the reverse in the Southern Hemisphere, rotating clockwise. The Southern Hemisphere rarely experiences tornadoes, however. When they do, it is usually in Australia. 75 percent of the world's tornadoes occur right here in the United States. We average 800 tornadoes per year!!! And as we know, they most commonly occur in a central column area known as "Tornado Alley". Tornadoes also occasionally form at the top of Tornado Alley into Canada. These are usually much less powerful than the average U.S. tornado and Canada has about 60 tornadoes annually.

Though tornadoes can happen any time of year, "Tornado Season" is May-July in Tornado Alley. In Minnesota, tornados are statistically most likely in June and July.

Now is a great time to prepare your family with a safety plan for Spring and Summer storms. Here are 3 Key Steps:

1. **Prepare a Storm Safe Room** in your home, preferrably a basement inner room or cellar. If you don't have a basement: an inner room without windows, preferably with a heavy table and/or mattress for cover.
2. **Stock your Safe Room** with bottled water, sealed food like beef jerkey & nuts. Other essentials: An air-horn, flashlights, batteries, fully charged power banks to plug in your phone & handheld radio charger. An extra pair of eyeglasses in a hardcase with first aid items and antibacterial wipes. Hats, boots, raincoats and waterproof sleeping bags. If you have pets, don't forget pet food & dish and a sturdy pet carrier in the safe room as well. Antibacterial plastic garbage bags for waste and a chemical toilet are wise.

BEAUFORT WIND SCALE

Beaufort Number	Description	Wind Speed	Wave Height	Sea Conditions	Land Conditions	Sea Photo	Warning Flag
0	Calm	< 1 knot < 1 mph < 2 km/h < 0.5 m/s	0 ft 0 m	Sea like a mirror	Smoke rises vertically		
1	Light air	1–3 knots 1–3 mph 2–5 km/h 0.5–1.5 m/s	0–1 ft 0–0.3 m	Ripples with appearance of scales are formed, without foam crests	Direction shown by smoke drift but not by wind vanes		
2	Light breeze	4–6 knots 4–7 mph 6–11 km/h 1.6–3.3 m/s	1–2 ft 0.3–0.6 m	Small wavelets still short but more pronounced; crests have a glassy appearance but do not break	Wind felt on face; leaves rustle; wind vane moved by wind		
3	Gentle breeze	7–10 knots 8–12 mph 12–19 km/h 3.4–5.5 m/s	2–4 ft 0.6–1.2 m	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses	Leaves and small twigs in constant motion; light flags extended		
4	Moderate breeze	11–16 knots 13–18 mph 20–28 km/h 5.5–7.9 m/s	3.5–6 ft 1–2 m	Small waves becoming longer; fairly frequent white horses	Raises dust and loose paper; small branches moved		
5	Fresh breeze	17–21 knots 19–24 mph 29–38 km/h 8–10.7 m/s	6–10 ft 2–3 m	Moderate waves taking a more pronounced long form; many white horses are formed; chance of some spray	Small trees in leaf begin to sway; crested wavelets form on inland waters		
6	Strong breeze	22–27 knots 25–31 mph 39–49 km/h 10.8–13.8 m/s	9–13 ft 3–4 m	Large waves begin to form; the white foam crests are more extensive everywhere; probably some spray	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty		
7	High wind, moderate gale, near gale	28–33 knots 32–38 mph 50–61 km/h 13.9–17.1 m/s	13–19 ft 4–5.5 m	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins to be seen	Whole trees in motion; inconvenience felt when walking against the wind		
8	Gale, fresh gale	34–40 knots 39–46 mph 62–74 km/h 17.2–20.7 m/s	18–25 ft 5.5–7.5 m	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind	Twigs break off trees; generally impedes progress		
9	Strong/severe gale	41–47 knots 47–54 mph 75–88 km/h 20.8–24.4 m/s	23–32 ft 7–10 m	High waves; dense streaks of foam along the direction of the wind; sea begins to roll; spray affects visibility	Slight structural damage (chimney pots and slates removed)		
10	Storm,[13] whole gale	48–55 knots 55–63 mph 89–102 km/h 24.5–28.4 m/s	29–41 ft 9–12.5 m	Very high waves with long overhanging crests; resulting foam in great patches is blown in dense white streaks along the direction of the wind; on the whole the surface of the sea takes on a white appearance; rolling of the sea becomes heavy; visibility affected	Seldom experienced inland; trees uprooted; considerable structural damage		
11	Violent storm	56–63 knots 64–72 mph 103–117 km/h 28.5–32.6 m/s	37–52 ft 11.5–16 m	Exceptionally high waves; small- and medium-sized ships might be for a long time lost to view behind the waves; sea is covered with long white patches of foam; everywhere the edges of the wave crests are blown into foam; visibility affected	Very rarely experienced; accompanied by widespread damage		
12	Hurricane-force[13]	≥ 64 knots ≥ 73 mph ≥ 118 km/h ≥ 32.7 m/s	≥ 46 ft ≥ 14 m	The air is filled with foam and spray; sea is completely white with driving spray; visibility very seriously affected	Devastation		

Image Credit: Wikipedia.org

3. **Do Practice Drills**, aimed at getting your family into the safe room within 30 seconds if at all possible.

Now is also a great time to brush up on your storm-spotting skills or become newly certified at the annual **NWS SkyWarn Training** on April 13th at 6:30 pm, following our Club meeting. See you all there! ★

FOR SALE

Estate Sale!

Ameritron AL-1200 amplifier 1500w+ 10-160 3CX1200A7 (current price new $5999.00) **$2495.00** QSK-5 pin diode T/R switching is installed **$379.95** option

Icom IC-7800 200w 10-160+6 meters. Original box and all accessories ($14000 when new) Item is Mint condition, **$2475.00**

Icom SP-20 Speaker **$160.00**

Kenwood TS-590S 10-160+6 meters Original box and all accessories **$795.00**

Kenwood TS-520S 10-80 **$250.00**

Yaesu FT-897D 10-160+6+2m+440, with box, mic, power cord **$575.00**

Call **Gary K0GX 763-561-2836** or contact via email at **k0gx@comcast.net**

ARAC CLUB REPEATER

WØGKP

146.94 (-)
CTCSS TONE
103.5

Contest Calendar - April 2023

+ RSGB FT4 International Activity Day	0800Z-2000Z, Apr 1
+ PODXS 070 Club PSK 31 Flavors Contest	1000Z, Apr 1 to 0400Z, Apr 2
+ Georgia State Parks on the Air	1200Z, Apr 1 to 2359Z, Apr 2
+ EA RTTY Contest	1200Z, Apr 1 to 1200Z, Apr 2
+ Florida State Parks on the Air	1400Z-2200Z, Apr 1 and 1400Z-2200Z, Apr 2
+ Missouri QSO Party	1400Z, Apr 1 to 0400Z, Apr 2 and 1400Z-2000Z, Apr 2
+ Mississippi QSO Party	1400Z, Apr 1 to 0200Z, Apr 2
+ Louisiana QSO Party	1400Z, Apr 1 to 0200Z, Apr 2
+ SP DX Contest	1500Z, Apr 1 to 1500Z, Apr 2
+ K1USN Slow Speed Test	0000Z-0100Z, Apr 3
+ ICWC Medium Speed Test	1300Z-1400Z, Apr 3
+ OK1WC Memorial	1630Z-1729Z, Apr 3
+ ICWC Medium Speed Test	1900Z-2000Z, Apr 3
+ RSGB 80m Club Championship, CW	1900Z-2030Z, Apr 3
+ ARS Spartan Sprint	0100Z-0300Z, Apr 4
+ Worldwide Sideband Activity Contest	0100Z-0159Z, Apr 4
+ ICWC Medium Speed Test	0300Z-0400Z, Apr 4
+ ZL Sprint	0800Z-0829Z (CW), Apr 4 and 0830Z-0859Z (SSB), Apr 4
+ Phone Weekly Test	0230Z-0300Z, Apr 5
+ A1Club AWT	1200Z-1300Z, Apr 5
+ CWops Test	1300Z-1400Z, Apr 5
+ Mini-Test 40	1700Z-1759Z, Apr 5
+ VHF-UHF FT8 Activity Contest	1700Z-2100Z, Apr 5
+ Mini-Test 80	1800Z-1859Z, Apr 5
+ CWops Test	1900Z-2000Z, Apr 5

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Contest Calendar - April 2023

+ UKEICC 80m Contest	2000Z-2100Z, Apr 5
+ Walk for the Bacon QRP Contest	0000Z-0100Z, Apr 6 and 0200Z-0300Z, Apr 7
+ CWops Test	0300Z-0400Z, Apr 6
+ CWops Test	0700Z-0800Z, Apr 6
+ Maundy Thursday Contest	1200Z-1500Z, Apr 6 and 2000Z-2300Z, Apr 6
+ SARL 80m QSO Party	1700Z-1900Z, Apr 6
+ NRAU 10m Activity Contest	1800Z-1900Z, Apr 6 (CW) and 1900Z-2000Z, Apr 6 (SSB) and 2000Z-2100Z, Apr 6 (FM) and 2100Z-2200Z, Apr 6 (Dig)
+ SKCC Sprint Europe	2000Z-2200Z, Apr 6
+ NCCC RTTY Sprint	0145Z-0215Z, Apr 7
+ NCCC Sprint	0230Z-0300Z, Apr 7
+ K1USN Slow Speed Test	2000Z-2100Z, Apr 7
+ QRP ARCI Spring QSO Party	0000Z-0600Z, Apr 8
+ JIDX CW Contest	0700Z, Apr 8 to 1300Z, Apr 9
+ DIG QSO Party, CW	1200Z-1700Z, Apr 8 (20m-10m) and 0700Z-0900Z, Apr 9 (80m) and 0900Z-1100Z, Apr 9 (40m)
+ IG-RY World Wide RTTY Contest	1200Z, Apr 8 to 1800Z, Apr 9
+ SKCC Weekend Sprintathon	1200Z, Apr 8 to 2400Z, Apr 9
+ OK/OM DX Contest, SSB	1200Z, Apr 8 to 1200Z, Apr 9
+ New Mexico QSO Party	1400Z, Apr 8 to 0200Z, Apr 9
+ Georgia QSO Party	1800Z, Apr 8 to 0359Z, Apr 9 and 1400Z-2359Z, Apr 9
+ Yuri Gagarin International DX Contest	2100Z, Apr 8 to 2059Z, Apr 9
+ WAB 3.5/7/14 MHz Data Modes	1000Z-1400Z, Apr 9 and 1700Z-2100Z, Apr 9

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Contest Calendar - April 2023

+ Hungarian Straight Key Contest	1500Z-1600Z, Apr 9
+ K1USN Slow Speed Test	0000Z-0100Z, Apr 10
+ 4 States QRP Group Second Sunday Sprint	0000Z-0200Z, Apr 10
+ ICWC Medium Speed Test	1300Z-1400Z, Apr 10
+ DARC Easter Contest	1500Z-1730Z, Apr 10
+ OK1WC Memorial	1630Z-1729Z, Apr 10
+ ICWC Medium Speed Test	1900Z-2000Z, Apr 10
+ 144 MHz Spring Sprint	1900 local - 2300 local, Apr 10
+ Worldwide Sideband Activity Contest	0100Z-0159Z, Apr 11
+ ICWC Medium Speed Test	0300Z-0400Z, Apr 11
+ ZL Sprint	0800Z-0829Z (CW), Apr 11 and 0830Z-0859Z (SSB), Apr 11
+ NAQCC CW Sprint	0030Z-0230Z, Apr 12
+ Phone Weekly Test	0230Z-0300Z, Apr 12
+ A1Club AWT	1200Z-1300Z, Apr 12
+ CWops Test	1300Z-1400Z, Apr 12
+ Mini-Test 40	1700Z-1759Z, Apr 12
+ VHF-UHF FT8 Activity Contest	1700Z-2100Z, Apr 12
+ Mini-Test 80	1800Z-1859Z, Apr 12
+ CWops Test	1900Z-2000Z, Apr 12
+ CWops Test	0300Z-0400Z, Apr 13
+ CWops Test	0700Z-0800Z, Apr 13
+ EACW Meeting	1900Z-2000Z, Apr 13
+ NCCC RTTY Sprint	0145Z-0215Z, Apr 14
+ NCCC Sprint	0230Z-0300Z, Apr 14
+ K1USN Slow Speed Test	2000Z-2100Z, Apr 14
+ Holyland DX Contest	2100Z, Apr 14 to 2059Z, Apr 15
+ ES Open HF Championship	Cancelled for 2023
+ Worked All Provinces of China DX Contest	0600Z, Apr 15 to 0559Z, Apr 16
+ YU DX Contest	0700Z, Apr 15 to 0659Z, Apr 16

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Contest Calendar - April 2023

+ Dutch PACCdigi Contest	0700Z to 1900Z, Apr 15
+ CQMM DX Contest	0900Z, Apr 15 to 2359Z, Apr 16
+ Nebraska QSO Party	1300Z, Apr 15 to 0100Z, Apr 16 and 1300Z-2200Z, Apr 16
+ Texas State Parks on the Air	1400Z, Apr 15 to 0200Z, Apr 16 and 1400Z-2000Z, Apr 16
+ Michigan QSO Party	1600Z, Apr 15 to 0400Z, Apr 16
+ EA-QRP CW Contest	1700Z-1800Z, Apr 15 (10m) and 1800Z-1900Z, Apr 15 (15m) and 1900Z-2000Z, Apr 15 (20m) and 2000Z-2100Z, Apr 15 (40m) and 2100Z-2300Z, Apr 15 (80m) and 0700Z-0900Z, Apr 16 (40m) and 0900Z-1000Z, Apr 16 (20m) and 1000Z-1100Z, Apr 16 (15m) and 1100Z-1200Z, Apr 16 (10m)
+ North Dakota QSO Party	1800Z, Apr 15 to 1800Z, Apr 16
+ Ontario QSO Party	1800Z, Apr 15 to 0500Z, Apr 16 and 1200Z-1800Z, Apr 16
+ Feld Hell Sprint	1800Z-2159Z, Apr 15
+ Quebec QSO Party	1200Z-2000Z, Apr 16
+ ARRL Rookie Roundup, SSB	1800Z-2359Z, Apr 16
+ Run for the Bacon QRP Contest	2300Z, Apr 16 to 0100Z, Apr 17
+ K1USN Slow Speed Test	0000Z-0100Z, Apr 17
+ ICWC Medium Speed Test	1300Z-1400Z, Apr 17
+ OK1WC Memorial	1630Z-1729Z, Apr 17
+ ICWC Medium Speed Test	1900Z-2000Z, Apr 17
+ Worldwide Sideband Activity Contest	0100Z-0159Z, Apr 18
+ ICWC Medium Speed Test	0300Z-0400Z, Apr 18

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Contest Calendar - April 2023

+ ZL Sprint	0800Z-0829Z (CW), Apr 18 and 0830Z-0859Z (SSB), Apr 18
+ 222 MHz Spring Sprint	1900 local - 2300 local, Apr 18
+ Phone Weekly Test	0230Z-0300Z, Apr 19
+ A1Club AWT	1200Z-1300Z, Apr 19
+ CWops Test	1300Z-1400Z, Apr 19
+ VHF-UHF FT8 Activity Contest	1700Z-2100Z, Apr 19
+ Mini-Test 40	1700Z-1759Z, Apr 19
+ Mini-Test 80	1800Z-1859Z, Apr 19
+ CWops Test	1900Z-2000Z, Apr 19
+ RSGB 80m Club Championship, SSB	1900Z-2030Z, Apr 19
+ Walk for the Bacon QRP Contest	0000Z-0100Z, Apr 20 and 0200Z-0300Z, Apr 21
+ CWops Test	0300Z-0400Z, Apr 20
+ CWops Test	0700Z-0800Z, Apr 20
+ NTC QSO Party	1900Z-2000Z, Apr 20
+ NCCC RTTY Sprint	0145Z-0215Z, Apr 21
+ NCCC Sprint	0230Z-0300Z, Apr 21
+ K1USN Slow Speed Test	2000Z-2100Z, Apr 21
+ YOTA Contest	0800Z-1959Z, Apr 22
+ QRP to the Field	0800-1800 local, Apr 22
+ SP DX RTTY Contest	1200Z, Apr 22 to 1200Z, Apr 23
+ North American SSB Sprint Contest	0000Z-0400Z, Apr 23
+ International Vintage Contest HF	0700Z-1100Z, Apr 23 and 1500Z-1900Z, Apr 23
+ UA1DZ Memorial Cup	1300Z-1859Z, Apr 23
+ BARTG Sprint 75	1700Z-2059Z, Apr 23
+ K1USN Slow Speed Test	0000Z-0100Z, Apr 24
+ ANZAC Day Contest	1200Z, Apr 24 to 1159Z, Apr 25
+ ICWC Medium Speed Test	1300Z-1400Z, Apr 24

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Contest Calendar - April 2023

+ QCX Challenge	1300Z-1400Z, Apr 24
+ OK1WC Memorial	1630Z-1729Z, Apr 24
+ RSGB FT4 Contest	1900Z-2030Z, Apr 24
+ ICWC Medium Speed Test	1900Z-2000Z, Apr 24
+ QCX Challenge	1900Z-2000Z, Apr 24
+ Worldwide Sideband Activity Contest	0100Z-0159Z, Apr 25
+ ICWC Medium Speed Test	0300Z-0400Z, Apr 25
+ QCX Challenge	0300Z-0400Z, Apr 25
+ ZL Sprint	0800Z-0829Z (CW), Apr 25 and 0830Z-0859Z (SSB), Apr 25
+ SKCC Sprint	0000Z-0200Z, Apr 26
+ Phone Weekly Test	0230Z-0300Z, Apr 26
+ A1Club AWT	1200Z-1300Z, Apr 26
+ CWops Test	1300Z-1400Z, Apr 26
+ Mini-Test 40	1700Z-1759Z, Apr 26
+ Mini-Test 80	1800Z-1859Z, Apr 26
+ CWops Test	1900Z-2000Z, Apr 26
+ 432 MHz Spring Sprint	1900 local - 2300 local, Apr 26
+ UKEICC 80m Contest	2000Z-2100Z, Apr 26
+ CWops Test	0300Z-0400Z, Apr 27
+ CWops Test	0700Z-0800Z, Apr 27
+ RSGB 80m Club Championship, Data	1900Z-2030Z, Apr 27
+ NCCC RTTY Sprint	0145Z-0215Z, Apr 28
+ NCCC Sprint	0230Z-0300Z, Apr 28
+ K1USN Slow Speed Test	2000Z-2100Z, Apr 28
+ 10-10 Int. Spring Contest, Digital	0001Z, Apr 29 to 2359Z, Apr 30
+ UK/EI DX Contest, CW	1200Z, Apr 29 to 1200Z, Apr 30
+ Helvetia Contest	1300Z, Apr 29 to 1259Z, Apr 30
+ Florida QSO Party	1600Z, Apr 29 to 0159Z, Apr 30 and 1200Z-2159Z, Apr 30

Our thanks to Bruce Horn, WA7BNM for use of this calendar!
Visit Bruce at www.contestcalendar.com/contestcal.html