



The RELAY)))

NOVEMBER
2022

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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The Relay Co-Editors:
Kim & Steve Waller

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AUTUMN 2022

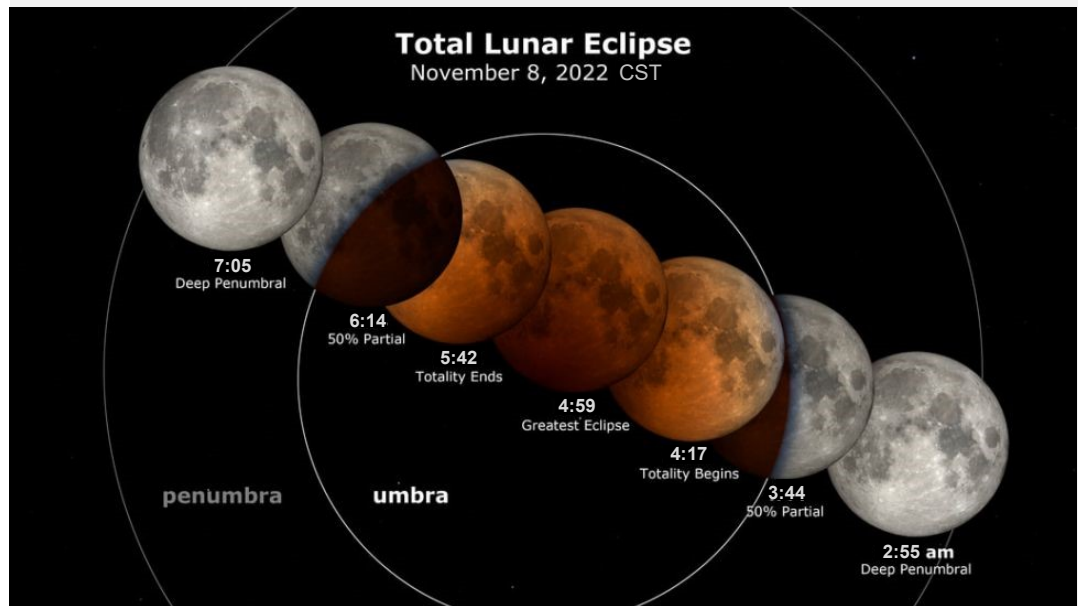


Join us on
Facebook!

Total Lunar Eclipse This Month

Scientists Say "Blood Moon" Eclipse is a Must-See

Lunar eclipses aren't rare. Our moon is eclipsed when, in Full Moon phase, it moves into the Earth's shadow when the Sun, Earth and Moon are aligned. On average, there are two eclipses each year, but there can be years when, three, four, or five of them occur. 2002 had three eclipses and there were four in 2020, for example. How are we doing in 2022?



In this NASA rendering, the Moon moves right to left, passing through the penumbra and umbra, leaving in its wake an eclipse diagram with the times at various stages of the eclipse. Times shown are Central Standard Time.

Image Credit: Ernie Wright, NASA's Scientific Visualization Studio

Two eclipses. One that occurred overnight on May 15-16 and an upcoming eclipse this month. Here's what NASA says:

"On November 8, 2022, the Moon enters the Earth's shadow, creating a total lunar eclipse, the first since May. The rendering (above) shows the changing appearance of the Moon as it travels into and out of the Earth's shadow, along with times at various stages. Celestial north is up in this imagery, corresponding to the view from mid-northern latitudes. Rotating the images by 180 degrees would create the south-up view for southern hemisphere observers. The penumbra is the part of the Earth's shadow where the Sun is only partially covered by the Earth.

Continued on Page 15

ARAC Board Meeting - October 4, 2022

PRESIDENT



NØVRM
Gene Ellefsen
3710 Chambersburg Ave
Duluth, MN 55811
218-390-3272
lspitech@mail.com

VICE PRESIDENT



KØDJP
David Pyrlík

david.pyrlík@gmail.com

SECRETARY



KFØGJW
Melinda Nelson

TREASURER



KNØNUL
Bruce Carlson
906 Anderson Rd
Duluth, MN 55811
763-315-2967
carlsbr@gmail.com

3RD YEAR BOARD



KD9ABS
Gary Minter
1621 N 26th St
Superior WI 54880

2ND YEAR BOARD



AAØAC
Dave Davis

218-348-6649
aaøac@outlook.com

1ST YEAR BOARD



AAØAW
Doug Nelson

aaøaw@arrl.net

Board Members

Gene Ellefsen – NØVRM, Bruce Carlson – KNØNUL, Gary Minter – KD9ABS, Melinda Nelson – KFØGJW, Dave Davis – AAØAC

Board Advisors (Non-Board Members)

Randy Wabik – KRØB

Guests: Elmer Berg – KCØNGY, Jon Nelson – NØUOZ, Wayne Rustvold – KFØJFS, Kurt Lund – KEØHHN, Rochelle Nelson

Meeting called to order by President Gene – NØVRM at 18:30 (6:30 pm)

Minutes:

Minutes were not available due to medical for the Secretary. No record of club meeting due to zoom not working.

Treasurer's Report:

Checking: \$892.19
Savings: \$2,374.93
Repeater: \$4,667.25
Subtotal Cash \$7,934.38

Winter CD: \$1,730.42
Summer CD: \$0.00
Subtotal CD: \$1,730.42

Assets Subtotal: \$9,665.80

Update – meet with Ed Murry – W1ELM he is putting together an audit meeting. They will be meeting after the meeting on Thursday and decide what it is that they are looking for. They will supply a list of what they are looking for and then will submit an audit report back to us. No questions on Treasurer's Report. Motion to approve by Doug Nelson – AAØAW, seconded by Melinda Nelson – KFØGJW, motion passed. Insurance – Going to wait till after the first of the year we will go with the risk assessment. All we need to do is fill out an application online and submit it. They need a list of all equipment that will be under the insurance.

Submitted by ARAC Treasurer Bruce Carlson – KNØNUL

Testing:

There is a closed session on Tuesday, other than that there has been no one interested. Will have a test for the Technician Class. As always if you are looking to test or upgrade, please contact Doug Nelson at

AAØAW@arrl.net

Continued on Page 3

ARAC Board Meeting continued

Education:

Class is on Tuesday's; they have 10 people national in the zoom class. There are 4 out-of-state students. Doug is looking at doing a General Class. He needs to look more into it but thinks that there is an interest in having a class.

Repeater:

Randy Wabik – KR0B, Nothing new on the repeater. Amplifier place is still not getting back to him. Will be getting down to Mahtowa to get things cleaned up and find out for sure what all they need. Going to order a new controller (RLC1 or RLC2) will be ordered this month.

Old Business:

ARRL Club Grant – we were not awarded the grant the first time around. Gene is applying for the second time. There was a webinar that showed how to apply for the grant.

501C3 – Still working on the application.

New Business:

Maple Tower – Doug Nelson acquired the 110-foot tower in Maple, WI. He just delivered three (3) new amateur frequency antennas. Working on getting the power turned on as well. (Something that the ARAC members can use)

D-Star repeaters are up and linked back to the 53A (Minnesota network)

Cloquet is no longer a UHF Repeater. It is now a VHF Repeater.

Wild Duluth is October 15th. Will be using the 94 repeater for the day.

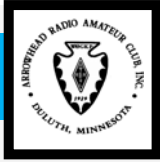
Taking nominations for Board of Officers, 1st year board member, and the Reibold Award.

Christmas Party will be held as normal this year.

Salvation Army Bell ringing at the Super One Food near the Burning Tree Plaza. (Look for the sign-up sheet at the club meeting)

Motion to adjourn by Melinda Nelson – KF0GJW, seconded by Bruce Carlson – KN0NUL, motion passed at 19:08 (7:08 pm)





ARAC Club Meeting Minutes

October 13, 2022

Present:

President: Gene Ellefsen – N0VRM
Vice President: Dave Pyrlik – K0DJP
Treasurer/Membership: Bruce Carlson – KN0NUL
Secretary: Melinda Nelson – KF0GJW
First Year Board: Doug Nelson – AA0AW
Second Year Board: Dave Davis – AA0AC
Third Year Board: Gary Minter – KD9ABS
Special Events: Open/Gene Ellefsen – N0VRM (acting)
Parliamentarian: Grant Forsyth – KC0WUP
Repeater: Dave Pyrlik – K0DJP
Testing: Doug Nelson – AA0AW

Absent:

Repeater: Randy Wabik – KR0B
HamFest/Education: Bob Schulz – KC0NFB
Property/Picnic: Scott Ahlgren – N0VYU
Chaplin:
Web Site: Thomas Dorr – KE0RHA
Newsletter/Historian: Kim Waller – KE0NQS
Newsletter/Historian: Scott Waller – KE0NQT

Meeting called to order at 19:02 (7:02 PM) by President Gene Ellefsen – N0VRM. Thirty-nine (39) members in attendance.

Minutes:

No Board minutes due to medical, and no club minutes due to zoom not working.

Treasurer's Report:

Checking: \$892.18
Savings: \$2,374.93
Repeater: \$4,667.23
Subtotal Cash \$7,934.38

Winter CD: \$1,730.42
Summer CD: \$0.00
Subtotal CD: \$1,730.42

Assets Subtotal: \$9,664.80

Grand Total \$9,630.02

Are there any questions? No questions. Motion to accept as presented by Doug Nelson – AA0AW, seconded by Grant Forsyth – KC0WUP, motion passed.

Continued on Page 5



ARAC Club Meeting Minutes, continued

Repeater:

Randy Wabik – KR0B, is not here, Gene – N0VRM gave an update. Still working on getting the equipment that he wants as he is designing a great working system for the club. Either he is not able to find the parts that he is looking for, or companies are not getting back to him.

Nominations for Board of Officers and Board Members:

President: Nomination of Gene Ellefsen – N0VRM
Vice President: Nomination of Dave Pyrlík – K0DJP
Treasurer/Membership: Nomination of
Secretary: Nomination of Melinda Nelson – KF0GJW
First Year Board Member: Nomination of Gary Minter – KD9ABS

Also looking for a nomination for the Thomas J Reibold Award W9IBM Memorial Award for someone who goes above and beyond to promote amateur radio here in the Twin Ports. If you know someone who deserves that please submit your nomination in writing to a board member.

Education:

Bob Schulz – KC0NFB – Nothing new to report. 9 people in our class, might have picked up 4 more from Green Bay, WI. Testing will be held January 10, 2023

Testing:

Doug Nelson – AA0AW 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.

New Business:

Dues are due – you can start paying now to Bruce Carlson – KN0NUL
Wild Duluth – Saturday October 15th.
Signed up to ring the bells for Salvation Army on December 15th. Sign-up sheet will be available next month. Super One at the Miller Hill Mall. (10:00 AM till 8:00 PM)
Christmas Party coming up in December. We will have food this year.
Looking for Net Control Operators.

New Members or returning members:

Justin Cheever – KD0VKI just achieved his General Class

Door Prize was won by Melinda Nelson – KF0GJW

Motion to adjourn by Jon Nelson – N0UOZ, seconded by Mike Lovold – N0PDG, motion passed at 19:28 (7:28 PM). Program was a YouTube presentation on wiring.





Pres Sez...

Greetings everyone!

It is that time of the year for nominations for Board Officers and the Reibold W9IBM Award. The nomination period closes at the end of the November 10th Club meeting, with elections taking place at the December Club meeting. Bruce Carlson is stepping down from the Treasurer position so we need someone to step up and fill that role. If you want to run for one of the positions or want to nominate someone contact one of the current Board members.

We are signed up for Salvation Army Bell Ringing on Thursday, December 15 from 10:00 AM to 8:00 PM at the Miller Hill Super One. I will have a sign up sheet at the November Club Meeting.

HO HO HO! We will have our Annual Christmas Party at the December Club Meeting on Thursday December 8. As in the past, it will be a pot luck, so bring your favorite dish to share. The Club will provide Meat and Cheese trays. Please note the meeting will start at 6:00 PM !!!

Have a Happy Thanksgiving,

Gene Ellefsen NØVRM

**CLUB REPEATER
WØGKP**

**146.94 (-)
CTCSS TONE
103.5**



Calling All Hams..

Dear Arrowhead Radio Amateurs Club,

The Salvation Army North Division is in the process of expanding The Salvation Army Team Emergency Radio Network (SATERN) membership in Minnesota & North Dakota.

SATERN volunteers are Emergency Disaster Services members that provide The Salvation Army with auxiliary & emergency radio communications, along with technical support, during disasters and special events. Members volunteer under the direction of a Salvation Army staff member or a staff appointed volunteer leader with experience. Members are required to be current on all of The Salvation Army training requirements.

Volunteers play a crucial role in disaster response efforts by offering basic needs to those who may have lost everything. To learn more about what The Salvation Army does during a disaster response, [click here - https://disaster.salvationarmyusa.org/aboutus/?ourservices](https://disaster.salvationarmyusa.org/aboutus/?ourservices)

The first step in becoming a disaster worker with The Salvation Army's Emergency Disaster Services program is to create an online profile and complete a simple application. Go to <https://disaster.salvationarmyusa.org/volunteer/new/> in order to begin that process. After you have completed the online application, your information will be shared with your local Salvation Army.

If you have any questions, please contact satern.north@gmail.com

We look forward to volunteering with you!

73,

Dean Blosberg, NØHOY
SATERN Coordinator
The Salvation Army
Central Territory
North Division

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	■■■■●●●●●
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US Amateur Radio Bands

US AMATEUR POWER LIMITS

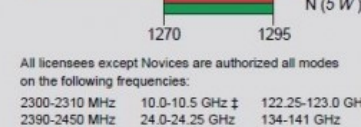
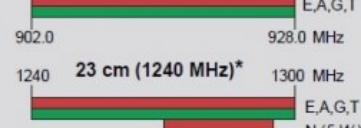
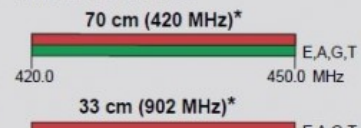
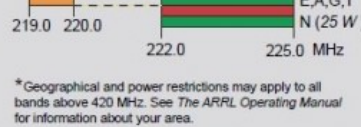
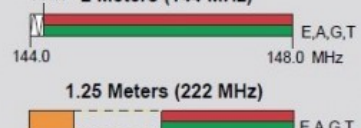
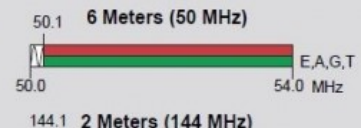
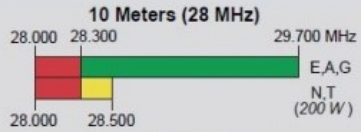
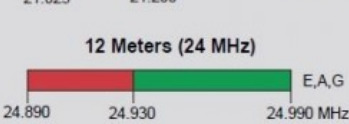
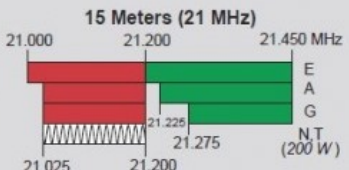
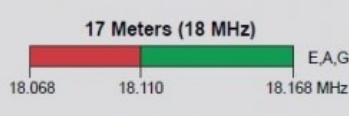
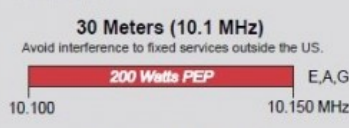
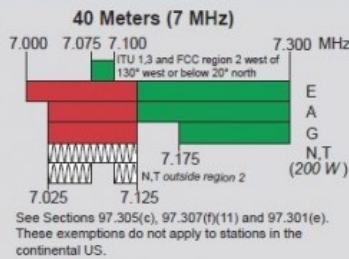
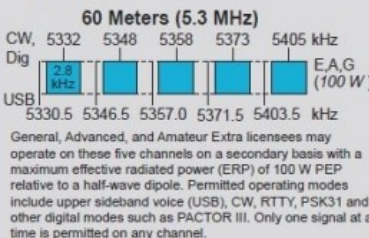
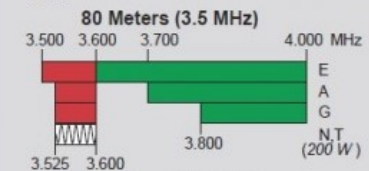
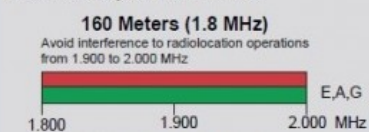
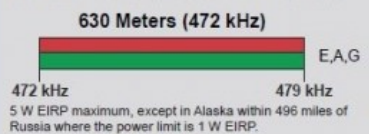
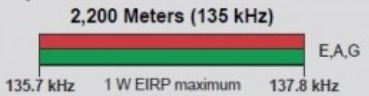
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

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



The national association for
ARRL 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 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 when the bands are fully available for use.



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: membership@arrl.org

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

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



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
- 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
- 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
- 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



UPCOMING EVENTS

Next ARAC Board Meeting

Tuesday, November 1st, 2022
@ 6:30 p.m.

Sammy's Pizza - Spirit Valley

Next ARAC Club Meeting

Thursday, November
10th

7 p.m.

Coppertop Church!



First United Methodist Church

230 E Skyline Pkwy,
Duluth, MN 55811

HAPPY THANKSGIVING!



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.



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)
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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

NARC System NAØRC

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

Stand Alone Repeaters

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

Fusion

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

147.15Ø	plus	151.4	NTØB Gilbert, MN Fusion Repeater
145.17Ø	minus	11Ø.9	WA9KLM Superior – Douglas County RACES/ARES Fusion Repeater (Digital only) Fusion Room 28373

443.1ØØ 5.ØØ1Ø3.5 KBØYHX Cloquet - Carlton County RACES/ARES Fusion Repeater

Fusion continued

444.3ØØ 5.ØØ 1Ø3.5 NØEO Spirit Valley Amateurs Fusion Repeater WIRES-X NØEO (Analog only) Fusion Room 40494

444.3ØØ 5.ØØ 1Ø3.5 NØEO 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

D Star

147.375	plus	NØEO D Star
442.200	plus	NØEO D Star

Revised by KCØWDQ on 4/29/2022 for The ARAC Relay

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-mør / [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...

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

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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
 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

NOVEMBER

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 ARAC BOARD MEETING Sammy's Pizza 6:30 pm DC Net 2000 CC Net 2030	2	3	4	5
6 CW 1930 AAØAW USB 2000 NØVRM ES 2100 AAØAW	7 WX 2000 KCØMKS	8 DC Net 2000 CC Net 2030	9 Lake County ARES/RACES Meeting 1800 Lake County Net 1900 2100 - BWAR	 10 ARAC Club Meeting Coppertop Church 7:00 PM	11	12
13 CW 1930 AAØAW USB 2000 AAØAW ES 2100 WØNWO	14 DC ARES/RACES Mtg 1900 DC EOC WX 2000 KCØMKS	15 DC Net 2000 CC Net 2030	16 St Louis County ARES/RACES Meeting 1800 2100 - BWAR	17	18	19
20 CW 1930 NØPDG USB 2000 WØLWU ES 2100 NØVRM	21 WX 2000 KCØMKS	22 DC Net 2000 CC Net 2030	23 Lake County Net 1900 2100 - BWAR	24 Happy Thanksgiving! Carlton County ARES/RACES Meeting ??? 1900 CC EOC	25  26 ARAC Club Breakfast The Chalet 4833 Miller Trunk Hwy Hermantown, MN 8 AM	
27 CW 1930 AAØAW USB 2000 K9KDK ES 2100 N9DMG	28 WX 2000 KCØMKS	29 DC Net 2000 CC Net 2030	30 2100 - BWAR			

Get this newsletter *faster*
via email!
Email Doug AAØAW at
aa0aw@arrl.net

Next Meeting: Thursday,
November 10th, 2022 - 7 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:

Bruce Carlson KEØNIT

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.

Lunar Eclipse, continued from page 1

The umbra is where the Sun is completely hidden. The Moon's appearance isn't affected much by the penumbra. The real action begins when the Moon starts to disappear as it enters the umbra at about 4:09 a.m. EST. An hour later, entirely within the umbra, the Moon is a ghostly copper color. Totality lasts for an hour and a half before the Moon begins to emerge from the central shadow. Throughout the eclipse, the Moon is moving through the constellation **Aries**. Also, the planet **Uranus** is about 3 degrees (six Moon widths) north of the



Moon during totality. It's normally a bit too dim to see with the naked eye, but binoculars and small telescopes reveal it as a small, mint-green dot."

So if you have a telescope or camera equipment suitable to identifying Aries and Uranus during November's "Beaver Moon", you may want to avail yourself of the opportunity during the eclipse. Hey—you're already getting up at 2:30 a.m., so why not?

Wait a minute. Why are we calling it "Beaver Moon"? Well according to **Farmer's Almanac**, for generations November's full moon is traditionally called a "Beaver Moon" because during

Aries is a midsize constellation in the Northern Hemisphere, with a few stars that are visible to the naked eye. Aries is located along the "zodiac" band of constellations. These are constellations through which the sun, moon and stars appear to travel from our perspective on Earth. At the Spring Vernal Equinox, when the sun crosses the celestial equator to the Northern Hemisphere, the sun's observed position was in the same spot as Aries in the past. However, Earth's rotational orientation gradually changes over time, so the vernal equinox has shifted, and now falls within **Pisces**. *Image Credit: ThePlanets.org*

Continued on Page 16

How a total lunar eclipse works

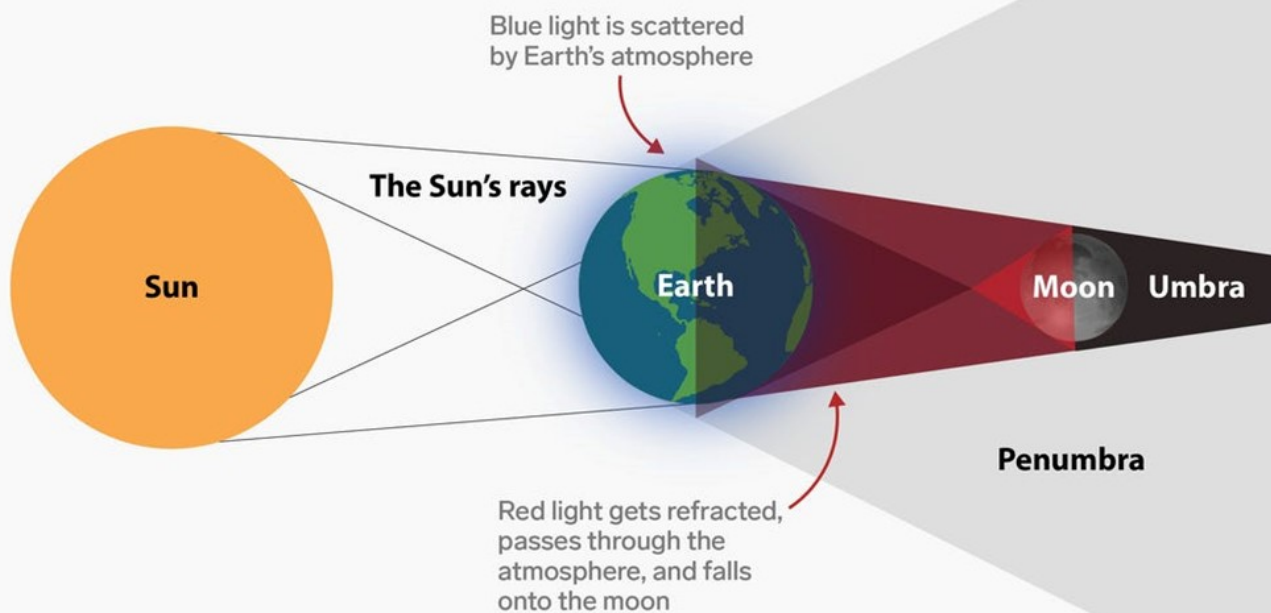


Image Credit: NASA/JPL-Caltech

Lunar Eclipse, continued from page 15

this month the already super-industrious beaver goes into overdrive by diligently reinforcing and enlarging their log and stick lodges to get ready for winter. They need thicker and larger lodges in winter to a) protect them from rain or snowfall, b) to house their much larger winter bodies, which they bulk up during the late summer and fall, and c) to store a large stash of “off season” food that they prefer—soft vegetation like apples, grass, and water plants. Beavers don’t hibernate and can easily eat trees & rough woody plants during the winter, but they like to stock up on their summer favorites to enjoy throughout the cold months as well.

All right. Why is the November 8th Full Moon, a Beaver Moon, also being called a “Blood Moon”? A “Blood Moon” is what all full moons are called when they are eclipsed, no matter what month of the year. The term “Blood Moon” simply refer to the unusual color that appears across the moon. Instead of seeing the normal yellow or white reflective color of our moon, during a total eclipse the moon appears to be distinctly red or reddish-brown.

All right. So far we’ve used the term “total lunar eclipse” a lot. What about other types of lunar eclipses? There are three types of lunar eclipses. [NASA](#) has a succinct image and description of each below:

Three Types of Lunar Eclipses



Total Eclipse

The Moon moves into the inner part of Earth’s shadow, or the umbra. Some of the sunlight passing through Earth’s atmosphere reaches the Moon’s surface, lighting it dimly. Colors with shorter wavelengths — the blues and violets — scatter more easily than colors with longer wavelengths, like red and orange. Because these longer wavelengths make it through Earth’s atmosphere, and the shorter wavelengths have scattered away, the Moon appears orangish or reddish during a lunar eclipse. The more dust or clouds in Earth’s atmosphere during the eclipse, the redder the Moon appears.



Partial Eclipse

An imperfect alignment of Sun, Earth and Moon results in the Moon passing through only part of Earth’s umbra. The shadow grows and then recedes without ever entirely covering the Moon.



Penumbral Eclipse

If you don’t know this one is happening, you might miss it. The Moon travels through Earth’s penumbra, or the faint outer part of its shadow. The Moon dims so slightly that it can be difficult to notice.

We’ll hope for clear skies in the wee hours of November 8th and that you get a chance to view all—or a portion—of the “Beaver Moon/Blood Moon” eclipse. Get on the radio and share your comments on what you see at any given point, and if you have the ability, take some photos of your experience. We’d love to have you share your photos and we’ll post them in the next [Relay](#). ★

FOR SALE

Entire Lot of Items - \$25



- **Two Drills**
One still holds a charge, with charger
- **Two vintage Crystal Regency scanners**
- **One analog Uniden scanner**

Contact:

Denny KBOSPA

If interested, please **TEXT ONLY** at **218-341-4033**

FOR SALE

I am selling equipment for another Ham. All items are as is. Please send me an email with your interest and/or Best offer.

For more information, please send all inquiries to kc0wdq@gmail.com

Kenwood TS-440S 10m-160m HF with Internal AT and CW and SSB Filters with Kenwood PS-50 \$ 450

Kenwood TS-430S 10m-160m HF with Kenwood PS-430 \$ 400

FT-60R 2/440 HT Needs new batteries has drop in charger \$ 75

Kantronics KPC-3 TNC \$ 60

Radio Shack SWR-Power Meter 21-534 \$ 20

J-com Magic Notch \$ 30

Midland CB Radio 77-882 \$ 20

Marine Radio – Presidents P580 \$ 30

Buxcomm Rascal for Packet \$ 30

Tiny Track with Garmin E Map GPS for APRS \$ 40

Pace 3 position Coax Switch Model 5621 \$ 40

White Fiberglass Masting with Pins approximately 30 feet – Interlocking \$ 100

Used Easy –up 3 foot Tripod \$50

Hitch mount for masting - 2” square tubing with a Swivel Trailer Jack for attaching masting off of vehicle – extends about 3 feet away from vehicle \$ 75

Radio Shack CB Antenna Mount 3/8” to SO-239 210-0961 Original Packaging \$ 10

Radio Shack Solder-type PL-259 for RG-8 279-0205 original packaging \$ 8

Radio Shack Solderless PL-259 for RG-58 278-196 original packaging \$ 5

Radio Shack 36” Mobile Scanner Antenna – 25-1300MHz 200-0032 in original packaging \$ 30

I am selling:

Kenwood TS-180S Receive only – No Transmit – Final Transistors no longer work or for parts \$ 165 with matching Kenwood PS-30 \$ 50

Please contact kc0wdq@gmail.com



Contest Calendar - November 2022

<u>+ Worldwide Sideband Activity Contest</u>	0100Z-0159Z, Nov 1
<u>+ ICWC Medium Speed Test</u>	0300Z-0400Z, Nov 1
<u>+ QCX Challenge</u>	0300Z-0400Z, Nov 1
<u>+ Silent Key Memorial Contest</u>	0600Z-0859Z, Nov 1
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 1
<u>+ QRP Fox Hunt</u>	0100Z-0230Z, Nov 2
<u>+ Phone Weekly Test</u>	0230Z-0300Z, Nov 2
<u>+ A1Club AWT</u>	1200Z-1300Z, Nov 2
<u>+ CWops Test</u>	1300Z-1400Z, Nov 2
<u>+ VHF-UHF FT8 Activity Contest</u>	1700Z-2100Z, Nov 2
<u>+ Mini-Test 40</u>	1700Z-1759Z, Nov 2
<u>+ Mini-Test 80</u>	1800Z-1859Z, Nov 2
<u>+ CWops Test</u>	1900Z-2000Z, Nov 2
<u>+ UKEICC 80m Contest</u>	2000Z-2100Z, Nov 2
<u>+ Walk for the Bacon QRP Contest</u>	0000Z-0100Z, Nov 3 and 0200Z-0300Z, Nov 4
<u>+ CWops Test</u>	0300Z-0400Z, Nov 3
<u>+ CWops Test</u>	0700Z-0800Z, Nov 3
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 3
	1800Z-1900Z, Nov 3 (CW) and 1900Z-2000Z, Nov 3 (SSB) and 2000Z-2100Z, Nov 3 (FM) and 2100Z-2200Z, Nov 3 (Dig)
<u>+ NRAU 10m Activity Contest</u>	2000Z-2200Z, Nov 3
<u>+ SKCC Sprint Europe</u>	0100Z-0230Z, Nov 4
<u>+ QRP Fox Hunt</u>	0145Z-0215Z, Nov 4
<u>+ NCCC RTTY Sprint</u>	0230Z-0300Z, Nov 4
<u>+ NCCC Sprint</u>	2000Z-2100Z, Nov 4
<u>+ K1USN Slow Speed Test</u>	0000Z, Nov 5 to 2359Z, Nov 6
<u>+ Gunung Jati DX Contest</u>	

Continued on Page 20



Contest Calendar - November 2022, Continued

<u>+ IPARC Contest, CW</u>	Cancelled for 2022
<u>+ Ukrainian DX Contest</u>	Cancelled for 2022
<u>+ ARRL Sweepstakes Contest, CW</u>	2100Z, Nov 5 to 0300Z, Nov 7
<u>+ IPARC Contest, SSB</u>	Cancelled for 2022
<u>+ EANET Sprint</u>	0800Z-1200Z, Nov 6
<u>+ High Speed Club CW Contest</u>	1400Z-1700Z, Nov 6
<u>+ ICWC Medium Speed Test</u>	1300Z-1400Z, Nov 7
<u>+ OK1WC Memorial</u>	1630Z-1729Z, Nov 7
<u>+ ICWC Medium Speed Test</u>	1900Z-2000Z, Nov 7
<u>+ RSGB 80m Autumn Series, Data</u>	2000Z-2130Z, Nov 7
<u>+ Worldwide Sideband Activity Contest</u>	0100Z-0159Z, Nov 8
<u>+ ARS Spartan Sprint</u>	0200Z-0400Z, Nov 8
<u>+ ICWC Medium Speed Test</u>	0300Z-0400Z, Nov 8
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 8
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 9
<u>+ Phone Weekly Test</u>	0230Z-0300Z, Nov 9
<u>+ A1Club AWT</u>	1200Z-1300Z, Nov 9
<u>+ CWops Test</u>	1300Z-1400Z, Nov 9
<u>+ Mini-Test 40</u>	1700Z-1759Z, Nov 9
<u>+ VHF-UHF FT8 Activity Contest</u>	1700Z-2100Z, Nov 9
<u>+ Mini-Test 80</u>	1800Z-1859Z, Nov 9
<u>+ CWops Test</u>	1900Z-2000Z, Nov 9
<u>+ CWops Test</u>	0300Z-0400Z, Nov 10
<u>+ CWops Test</u>	0700Z-0800Z, Nov 10
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 10
<u>+ EACW Meeting</u>	1900Z-2000Z, Nov 10
<u>+ NCCC RTTY Sprint</u>	0145Z-0215Z, Nov 11
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 11
<u>+ NCCC Sprint</u>	0230Z-0300Z, Nov 11

Continued on Page 21



Contest Calendar - November 2022, Continued

[+ K1USN Slow Speed Test](#)

[+ PODXS 070 Club Triple Play Low Band Sprint](#)

[+ WAE DX Contest, RTTY](#)

[+ ARRL EME Contest](#)

[+ 10-10 Int. Fall Contest, Digital](#)

[+ SARL VHF/UHF Analogue Contest](#)

[+ JIDX Phone Contest](#)

[+ SKCC Weekend Sprintathon](#)

[+ OK/OM DX Contest, CW](#)

[+ FISTS Saturday Sprint](#)

[+ CQ-WE Contest](#)

[+ AWA Bruce Kelley 1929 QSO Party](#)

[+ FIRAC HF Contest](#)

[+ Classic Exchange, Phone](#)

[+ K1USN Slow Speed Test](#)

[+ 4 States QRP Group Second Sunday Sprint](#)

[+ ICWC Medium Speed Test](#)

[+ OK1WC Memorial](#)

[+ ICWC Medium Speed Test](#)

2000Z-2100Z, Nov 11

0000Z, Nov 12 to 2359Z, Nov 14

0000Z, Nov 12 to 2359Z, Nov 13

0000Z, Nov 12 to 2359Z, Nov 13

0001Z, Nov 12 to 2359Z, Nov 13

0300Z-0500Z, Nov 12 (6m) and

0501Z-0700Z, Nov 12 (2m) and

0701Z-0900Z, Nov 12 (70cm) and

0300Z-0500Z, Nov 13 (6m) and

0501Z-0700Z, Nov 13 (2m) and

0701Z-0900Z, Nov 13 (70cm)

0700Z, Nov 12 to 1300Z, Nov 13

1200Z, Nov 12 to 2400Z, Nov 13

1200Z, Nov 12 to 1200Z, Nov 13

1600Z-1800Z, Nov 12

1900Z-2300Z, Nov 12 (CW/Digital) and

0100Z-0500Z, Nov 13 (Phone) and

1900Z-2300Z, Nov 13 (Phone) and

0100Z-0500Z, Nov 14 (CW/Digital)

2300Z, Nov 12 to 0300Z, Nov 14 and

2300Z, Nov 19 to 0300Z, Nov 21

0700Z to 1700Z, Nov 13

1400Z, Nov 13 to 0800Z, Nov 14 and

1400Z, Nov 15 to 0800Z, Nov 16

0000Z-0100Z, Nov 14

0100Z-0300Z, Nov 14

1300Z-1400Z, Nov 14

1630Z-1729Z, Nov 14

1900Z-2000Z, Nov 14

Continued on Page 22



Contest Calendar - November 2022, Continued

<u>+ Worldwide Sideband Activity Contest</u>	0100Z-0159Z, Nov 15
<u>+ ICWC Medium Speed Test</u>	0300Z-0400Z, Nov 15
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 15
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 16
<u>+ Phone Weekly Test</u>	0230Z-0300Z, Nov 16
<u>+ A1Club AWT</u>	1200Z-1300Z, Nov 16
<u>+ CWops Test</u>	1300Z-1400Z, Nov 16
<u>+ Mini-Test 40</u>	1700Z-1759Z, Nov 16
<u>+ VHF-UHF FT8 Activity Contest</u>	1700Z-2100Z, Nov 16
<u>+ Mini-Test 80</u>	1800Z-1859Z, Nov 16
<u>+ CWops Test</u>	1900Z-2000Z, Nov 16
<u>+ RSGB 80m Autumn Series, SSB</u>	2000Z-2130Z, Nov 16
<u>+ Walk for the Bacon QRP Contest</u>	0000Z-0100Z, Nov 17 and 0200Z-0300Z, Nov 18
<u>+ NAQCC CW Sprint</u>	0130Z-0330Z, Nov 17
<u>+ CWops Test</u>	0300Z-0400Z, Nov 17
<u>+ CWops Test</u>	0700Z-0800Z, Nov 17
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 17
<u>+ NTC QSO Party</u>	1900Z-2000Z, Nov 17
<u>+ NCCC RTTY Sprint</u>	0145Z-0215Z, Nov 18
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 18
<u>+ NCCC Sprint</u>	0230Z-0300Z, Nov 18
<u>+ YO International PSK31 Contest</u>	1600Z-2200Z, Nov 18
<u>+ K1USN Slow Speed Test</u>	2000Z-2100Z, Nov 18
<u>+ SARL Field Day Contest</u>	1000Z, Nov 19 to 1000Z, Nov 20
<u>+ LZ DX Contest</u>	1200Z, Nov 19 to 1200Z, Nov 20
<u>+ All Austrian 160-Meter Contest</u>	1600Z-2359Z, Nov 19
<u>+ REF 160-Meter Contest</u>	1700Z, Nov 19 to 0100Z, Nov 20
<u>+ South American Integration Contest CW</u>	1800Z, Nov 19 to 2100Z, Nov 20

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Contest Calendar - November 2022, Continued

<u>+ RSGB 1.8 MHz Contest</u>	1900Z-2300Z, Nov 19
<u>+ Feld Hell Sprint</u>	1900Z-2059Z, Nov 19
<u>+ ARRL Sweepstakes Contest, SSB</u>	2100Z, Nov 19 to 0300Z, Nov 21
<u>+ Homebrew and Oldtime Equipment Party</u>	1300-1500Z, Nov 20 (40m) and 1500-1700Z, Nov 20 (80m)
<u>+ FISTS Sunday Sprint</u>	2100Z-2300Z, Nov 20
<u>+ Run for the Bacon QRP Contest</u>	2300Z, Nov 20 to 0100Z, Nov 21
<u>+ K1USN Slow Speed Test</u>	0000Z-0100Z, Nov 21
<u>+ ICWC Medium Speed Test</u>	1300Z-1400Z, Nov 21
<u>+ OK1WC Memorial</u>	1630Z-1729Z, Nov 21
<u>+ ICWC Medium Speed Test</u>	1900Z-2000Z, Nov 21
<u>+ Worldwide Sideband Activity Contest</u>	0100Z-0159Z, Nov 22
<u>+ ICWC Medium Speed Test</u>	0300Z-0400Z, Nov 22
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 22
<u>+ SKCC Sprint</u>	0000Z-0200Z, Nov 23
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 23
<u>+ Phone Weekly Test</u>	0230Z-0300Z, Nov 23
<u>+ A1Club AWT</u>	1200Z-1300Z, Nov 23
<u>+ CWops Test</u>	1300Z-1400Z, Nov 23
<u>+ Mini-Test 40</u>	1700Z-1759Z, Nov 23
<u>+ Mini-Test 80</u>	1800Z-1859Z, Nov 23
<u>+ CWops Test</u>	1900Z-2000Z, Nov 23
<u>+ CWops Test</u>	0300Z-0400Z, Nov 24
<u>+ CWops Test</u>	0700Z-0800Z, Nov 24
<u>+ RTTYOPS Weeksprint</u>	1700Z-1900Z, Nov 24
<u>+ RSGB 80m Autumn Series, CW</u>	2000Z-2130Z, Nov 24
<u>+ NCCC RTTY Sprint</u>	0145Z-0215Z, Nov 25
<u>+ QRP Fox Hunt</u>	0200Z-0330Z, Nov 25
<u>+ NCCC Sprint</u>	0230Z-0300Z, Nov 25
<u>+ K1USN Slow Speed Test</u>	2000Z-2100Z, Nov 25

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Contest Calendar - October 2022, Continued

+ CQ Worldwide DX Contest, CW	0000Z, Nov 26 to 2400Z, Nov 27
+ Ham Spirit Contest, SSB	0600Z, Nov 26 to 0559Z, Nov 27
+ K1USN Slow Speed Test	0000Z-0100Z, Nov 28
+ QCX Challenge	1300Z-1400Z, Nov 28
+ ICWC Medium Speed Test	1300Z-1400Z, Nov 28
+ OK1WC Memorial	1630Z-1729Z, Nov 28
+ QCX Challenge	1900Z-2000Z, Nov 28
+ ICWC Medium Speed Test	1900Z-2000Z, Nov 28
+ RSGB FT4 Contest	2000Z-2130Z, Nov 28
+ Worldwide Sideband Activity Contest	0100Z-0159Z, Nov 29
+ QCX Challenge	0300Z-0400Z, Nov 29
+ ICWC Medium Speed Test	0300Z-0400Z, Nov 29
+ RTTYOPS Weeksprint	1700Z-1900Z, Nov 29
+ QRP Fox Hunt	0200Z-0330Z, Nov 30
+ Phone Weekly Test	0230Z-0300Z, Nov 30
+ A1Club AWT	1200Z-1300Z, Nov 30
+ CWops Test	1300Z-1400Z, Nov 30
+ Mini-Test 40	1700Z-1759Z, Nov 30
+ Mini-Test 80	1800Z-1859Z, Nov 30
+ CWops Test	1900Z-2000Z, Nov 30
+ UKEICC 80m Contest	2000Z-2100Z, Nov 30

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

The ARAC RELAY



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