



The RELAY

AUGUST 2019

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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Reflections on Aerial Lift Bridge History as 90th Anniversary Celebration Nears

By Steve Waller KEØNQT & Kim Waller KEØNQS

October 29, 1929 was a pivotal day in American history. After a decade of optimism and opulence of the post-war boom, the Wall Street stock market crashed on what would be called thereafter “Black Tuesday.” The same day, in Duluth, Minnesota, around 5,000 undeterred residents came out to see the first-ever lift of the Aerial Lift Bridge. More than ever, it stood as a symbol of achievement in American engineering and the hope of great things to come for this bustling port city.

90 years later, we celebrate that iconic achievement that still stirs the hearts of young and old alike as we watch the lift bridge rise for the passage of a 1000-foot lake freighter or a small sailboat out for the day.

“Anyone who knows Duluth, the first thing they think of is this bridge,” said Dave Campbell, Aerial Lift Bridge Supervisor, in an interview with WCCO TV for their feature called *Finding Minnesota*. “When a ship is coming in, they’ll call us when they’re an hour out on the radio. You work by yourself and you can’t leave. You are married to the bridge while you’re here,” Campbell said.

Campbell supervises a team of five bridge operators that take turns covering lift bridge operation ‘round the clock in 8-hour shifts, keeping constant contact on the radio.

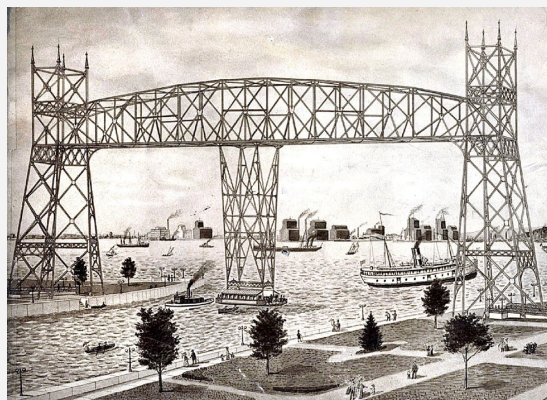


Illustration of the proposed Aerial Ferry Bridge published in the Duluth Evening Herald in Oct. 5, 1901. Image courtesy of Kathryn A. Martin Library Archives and Special Collections at UMD

In *Finding Minnesota*, Campbell speaks with admiration about the history of the bridge’s design.

“They came up with this design without computers, and CAD programs, and everything they use now,” he says. “It was just some guys in an office with a slide rule and a calculator.”

Campbell’s right, of course. The

Continued on Page 16



Join us on facebook!

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PRESIDENT



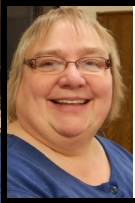
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ARAC Board Meeting Minutes for July 2, 2019

Present: Gene Ellefsen-NØVRM, Mike Lovold-NØPDG, Bruce Carlson-KEØNIT, Gary Minter-KD9ABS, Dave Davis-AAØAC, Bob Boyd-KDØYLN, Randy Wabik-KRØB, Doug Nelson-AAØAW, Grant Forsyth-KCØWUP, Bob Schultz-KCØNFB, Robin Davis

Guest: Diane Saunders-KØDSL, Del Minter-KEØCLI, Emery Davis

Meeting called to order by President Gene-NØVRM at 6:30 pm

Minutes:
Minutes posted in newsletter and on the web page. Motion to accept by Bruce-KEØNIT, seconded by Mike-NØPDG, motion passed

Treasurer's Report:

Checking	1,498.54
Savings	4,871.01
Cash Subtotal.....	\$6,369.55
Outstanding Check (Repeater # 1414)	-1,100.00
Subtotal	-\$1,100.00
Winter CD	1,707.19
CD Subtotal.....	\$1,707.19
Grand Total	\$6,976.74

Motion to approve by Dave-AAØAC, seconded by Bob-KDØLYN, motion passed

Theresa Dall-KAØCDO's mother passed about two (2) weeks ago. Our condolences to her and her family

Testing:
Good session. Two (2) candidates, two (2) promoted from Tech to General, 100% passing. Nothing planned for now but could test whenever

Education:
Next class in September through Community Education

Ham Fest:
Cashed the check for the building rental and it's on the calendar for next year

Repeater:
Tower inspection done today at the Mahtowa Repeater site. Climbed up, checked every joint, and took pictures. Went all the way to the top and checked everything on the ground. Everything looked good. They will review the pictures. Nothing glaringly wrong. They will send us a report and bill for the work done. There are trees that need to be removed - mostly poplar, some birch. There are tall trees that will need to be carefully removed as they pose a hazard to the building, the tower and the guy wires should they fall.

Gary Minter in at 6:42 pm

Continued on Page 3

ARAC BOARD Meeting Minutes, Continued from Page 2

Picnic:

Every year we (ARAC) have bought handhelds for the Picnic Club Raffle. Suggestion to buy a little more expensive handheld radio. May have to adjust the number given away, to three (3) instead of five (5) Baofang handhelds. Looking at 2 meter and UHF, maybe three (3) radios. The raffle is supposed to help defer the cost of the picnic. If we lose money on the raffle, it defeats the purpose. Maybe more folks would buy more tickets if we gave away a little better radio. One year we did give away a bigger radio that was won by Rex. A lot of people have the FT 60's, which run \$160-70.00. FT65 VHF/UHF is \$79.00. Suggestion to put a cap on what we spend to buy the radios. Suggestion to get three (3) of the dual band, which should be under \$300.00. You might spend more money on raffle tickets if there was a better radio. Motion to buy three (3) at \$79.00 FT4XR by Mike-N0PDG, seconded by Bruce-KE0NIT, bring it to the Membership. We will need tickets to sell at the Club meeting in July

10:00 am set up, Chambers Grove; August 4, 2019, permit was obtained in January. Motion for food at picnic, motion up to \$300.00 by Mike-N0PDG, Bob-KD0LYN seconded, motion passed. Ask Elmer Berg-KC0NGY if he will do corn again this year. Doug-AA0AW has offered to assist him. Jeff Peterson-KD0DHF has also offered to assist with the corn and/or cooking on the grill

Aerial Lift Bridge:

Diane-K0DSL received an e-mail from Mark Bauers, Parking Manager for the City of Duluth, \$90.00 fee for parking spots, and a rider for the two (2) day event, \$2 million in coverage per incident, listing the City of Duluth

Motion to adjourn by Robin, seconded by Mike-N0PDG, motion passed at 7:03 pm

ARAC Club Meeting Minutes

July 11, 2019

Present:

President Gene Ellefsen-N0VRM
Vice President Mike Lovold-N0PDG
Treasurer / Membership Bruce Carlson-KE0NIT
Secretary Robin Davis
Third Year Board Gary Minter-KD9ABS
Second Year Board Dave Davis-AA0AC
First Year Board Bob Boyd-KD0YLN
Chaplain (Visiting) Rolland Bockbrader-KB0CK
Special Events – Open / Gene Ellefsen-N0VRM acting
Ham Fest / Education Bob Schultz-KC0NFB
Property / Picnic Scott Ahlgren-N0VYU
Repeater Randy Wabik-KR0B
Testing Doug Nelson-AA0AW

Absent:

Parliamentarian Grant Forsyth-KC0WUP
Newsletter / Historian Kim Waller-KE0NQS
Newsletter Steve Waller-KE0NQT
Web Site Thomas Dorr-KE0RHA
Repeater Derek McCorison-W0DNF
Repeater Randy Haglin-N0BZZ

Meeting called to order at 7:02 pm by President Gene-N0VRM

Continued on Page 4

ARAC Club Meeting Minutes, Continued from Page 3

Minutes:

Published in the newsletter and on the web site. Motion to approve by Bob-KD0LYN, seconded by Gerry Hawkinson-W0ELH, motion passed

Treasurer's Report:

Checking	1,498.54
Savings	4,871.01
Cash Subtotal.....	\$6,369.55
Outstanding Check (Repeater # 1414)	-1,100.00
Subtotal.....	-\$1,100.00
Winter CD	1,707.19
CD Subtotal.....	\$1,707.19
Grand Total	\$6,976.74

Motion to accept as presented by several, seconded by Bob-KD0LYN, motion passed

Board Meeting has two (2) motions to be brought forward to Club for approval:

Spending up to \$300.00 for the picnic (food)

Authorization to purchase three (3) Yaesu Handheld radios for the Picnic Raffle

Motion to accept by Diane-K0DSL, seconded by Bob-KC0NFB, motion passed

Theresa Dall-KA0CDO's mother passed about two (2) weeks ago. Our condolences to her and her family

Committee Reports:

Picnic:

Flyer put together and on the tables. Bring a side dish or a dessert to share. Bob-KC0NFB will be bringing calico beans, and Denny Anderson-W0DIO will bring Judy's Famous Meatballs. Set up time is 10:00 am. Food will be ready after setup. Gene-N0VRM is asking for help with the setup, if you come early. We need time for the corn to be cooking and to get the grills going. Jeff-KB0DHF is not available to grill this year. Mike-N0PDG will be the grill master this year. We are not buying pop again this year because of having to store it but we will provide bottled water. Please no alcohol on the picnic grounds because our permit will not allow it

Education:

Nothing until Fall

Testing:

Testing was held with two (2) candidates looking to upgrade from Tech to General. Congratulations to Rob Opjen-KD0HZO and John Minor-KD9NFJ for passing. We no longer have to advertise testing sessions. We have a lot of VEs available to work the test session. Get a hold of Doug-AA0AW if you want to test

Repeater:

Talked with Randy Haglin-N0BZZ. We had the tower inspected at Mahtowa. We came out pretty lucky with nothing major wrong. Some of the connections had the tape deteriorate - a little TLC is needed on the tower itself. We do need to do some tree cutting and some lawn mowing. If you have a chain saw or weed whacker, please let Gene-N0VRM know. He will be coordinating a work session at the Mahtowa site. We have a lot of trees that need to be cleared. It is Carlton County land that we lease. Do we have permission to cut down the trees? Yes, it is in our lease, to maintain the tower site. What is the diameter of the trees? They are poplars and vary from 4" to 6" and a few are 8" to 10". We dodged a bullet but we have to do some maintenance. Next week the new repeater

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ARAC Club Meeting Minutes, Continued from Page 4

will be installed. We will get the written report end of this week or next week from the inspection of the tower and the guy wires. When that report arrives, Bruce-KE0NIT will pay the bill

Bob-APRS with some concerns on 94 Repeater and on other frequencies. If you hear a data burst on the 94 and you can hear it directly on the radio, notify Bob-KC0NFB to track it. He will contact the offending party to get it shut off. Make sure your time out timers are set for three (3) minutes in and out. The repeater will time out if you stay on it too long. You aren't doing it on purpose we know but your equipment needs to be set up properly. If you don't know how to set your time out timers, see one of the "guys" for assistance

Grandma's Marathon Wrap-Up:

Thank you to everybody who gave their time to the Marathon this year. They (Grandma's officials and board members) are immensely impressed with the communications we provide. 149 treated last year at the medical tent with three (3) transports to local hospitals. This year 202 treated at the finish line medical with three (3) transports. Approximately, 18,000 runners on the courses. Once again, a huge thank you to all who participated with a carrot for next year. Thank you, Doug-AA0AW, from the Club for all your help. Passing the torch to Scott-N0VYU. Shane Bauer, Executive Director and Greg Haapala, Race Director, talked about going to conferences for the marathons. They get a lot of kudos for the communication we provide for the Marathon. It is outstanding!

New Business:

Conference:

Under One Roof, a Red Cross Sheltering Annual Conference, for Public Safety Communications, has an annual conference. Marcus Bruning, former St Louis County Sheriff, is now the director for ARMOR. If you think ARMOR is fail safe, you are wrong and it will fail according to Marcus. He said get to know your Ham Radio operators, because they can save your life. There are many situations where a Ham Radio would be a vital part of emergency communications. We will be using the 94 Repeater again this year Swap Fest: August 10, 2019, is the Tailgate Swap Fest in Brainerd

Remind in five (5) weeks, on August 17th, there will be a Special Event celebrating the 90th Anniversary of the Aerial Lift Bridge, at the Mariner Time Museum. People from ARAC have signed up to be operators during this event. This will be a very important event for Ham Radio with N0B as the special call sign. We will have a portable tower trailer for the antenna. This is getting National attention and it is in the August QST magazine. We hope this will be a really big event. We will be handing out information on Amateur Radio. If you are available, come down to operate and participate. New Hams? It's a good time to get over your mike fright and operate over the air

Eugene Curnow Trail Marathon has 342 runners registered. It is scheduled for Saturday, July 13, 2019. If you want to help during the Marathon, see Randy Scott-KC0RTX

Minnesota Voyageur 50 Mile Trail Ultramarathon is scheduled for July 27, 2019

Door prize won by Bob-KD0YLN. He put the money in the coffee fund

Motion to adjourn by Scott-N0VYU, seconded by Dave-AA0AC, motion passed at 7:30 pm

Prez Sez...

Hi Everyone!

Summer is here at last and that brings out Races that we provide, Health and Welfare communications. This is a good opportunity to improve your radio skills and to help out our Community. Also this month, KØDSL is putting on a Special Event Station celebrating the 90th birthday of the Duluth Aerial Lift Bridge. This will be down in Canal Park and she is looking for operators. Should be a great time and a good opportunity to get out some PR for the Club.

Have great and safe summer!!!!

Gene NØVRM

Date: August 17, 2019 Time: 9:00 a.m. to 6:00 p.m.

Duluth Aerial Lift Bridge 90th Anniversary Special Event



Sponsors



N0EO
Spirit Valley
Amateurs



This special event commemorates the 90th Anniversary of the bridge (1929-2019). The original bridge built in 1905 was a transporter bridge, with a gondola to carry people and goods from Canal Park to Minnesota Point.

The bridge we see now is 501.4' long and 23' 11" wide. The bridge can be raised to its full height of 135 feet in about a minute, and is raised about 5,000 times per year. The span is about 390 feet (120 meters).

An amateur radio Special Event Station will be on site to operate and contact other amateur radio stations around the country to commemorate the anniversary of the bridge. Educational materials on the bridge will be available for the public, as well as materials on amateur radio. We invite all interested persons to attend.

There are many restaurants in the area for those who are interested. Amateur radio operators will be there as well to answer questions.

Directions: From the south: Drive North on I-35 to the Lake Avenue Exit in Duluth. Turn right onto Lake Avenue to Canal Park. There is street and parking lot parking available.

From the North: Drive south on Hwy 61 and continue to London Rd. At London Rd and Superior Street, you can either turn left on Superior St. or go up to 1st St to get away from traffic in Downtown Duluth. Continue to Lake Avenue, and turn left on Lake Avenue to Canal Park.

From Wisconsin, drive North on Hwy 53 to Superior or west on Hwy 2 to Superior. Continue on and drive over the Blatnick Bridge (Hwy I-535) to Duluth and proceed north to Canal Park as above.

Location:

U.S. Army Corps of Engineers Maritime Museum and Visitors Center, Canal Park, Duluth Minnesota. See Map for directions.

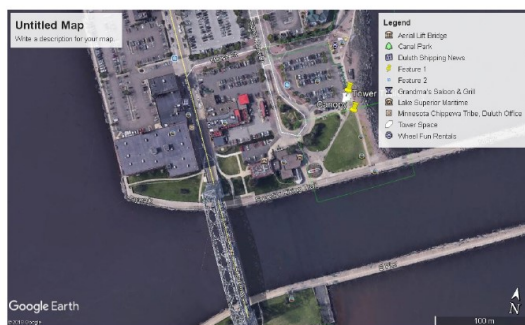
Contact person:

Diane Saunders

Phone: (763) 807-8772

Email:

ke0aqu@charter.net



Sponsors

American Radio Relay League (ARRL)

Minnesota Wireless Association (MWA)

Spirit Valley Amateurs Club

Arrowhead Radio Amateurs Club (ARAC)

City of Duluth MN

U.S. Army Corps of Engineers, Maritime Museum & Visitors Center

Lake County MN ARES/RACES

Acknowledgements

The organizer wishes to thank the U.S. Army Corps of Engineers, Maritime Museum and Visitors Center, The City of Duluth, Interstate Parking, Lake County ARES/RACES, all the amateur radio operators and others who are participating in the event for their generous time and help.

Callsigns: AA0AW, KC0NFB, KC0WDQ, W0NWO, KD0HHW, KC0MKS, NOVRM, AC0W

U.S. AIR FORCE MILITARY AUXILIARY RADIO SYSTEM

Minnesota State MARS Director
Reginald B. Cass / AFS5MN



Gene Ellefsen
NØVRM

Thank you for your time and interest.

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

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

Personally, Identifiable Information (PII) <https://iatraining.disa.mil/eta/piiv2/launchPage.htm>

Cyber Awareness https://iatraining.disa.mil/eta/disa_cac2018/launchPage.htm

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

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

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

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

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

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

For even more information please open and read the attachment.

Our recruitment team is as follows:

AFA5XK Dave, WB7DRU wb7dru@gmail.com

AFA5ZV Randy, KRØB afa5zv@gmail.com

AFA5JY Reg, KAØRJY reg_cass@msn.com

Contest Calendar 2019

AUGUST

ARRL 222 MHz and Up Distance Contest	1800 UTC Aug 3 to 1800 UTC Aug 4
North American QSO Party, CW	1800 UTC Aug 3 to 0600 UTC Aug 4
Maryland-DC QSO Party	1600 UTC Aug 10 to 2400 UTC Aug 11
Rookie Roundup RTTY	1800 UTC to 2359 UTC Aug 18
Hawaii QSO Party	0400 UTC Aug 24 to 0400 UTC Aug 26
Ohio QSO Party	1600 UTC Aug 24 to 0400 UTC Aug 25

SEPTEMBER

Tennessee QSO Party	1800 UTC Sept 1 to 0300 UTC Sept 2
New Hampshire QSO Party	1600 UTC Sept 21 to 2200 UTC Sept 22
Maine QSO Party	1200 UTC Sept 28 to 1200 UTC Sept 29
Texas QSO Party	1400 UTC Sept 28 to 2000 UTC Sept 29

OCTOBER, NOVEMBER & DECEMBER

COMING NEXT MONTH

CW Abbreviations

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

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



US Amateur Radio Bands

US AMATEUR POWER LIMITS

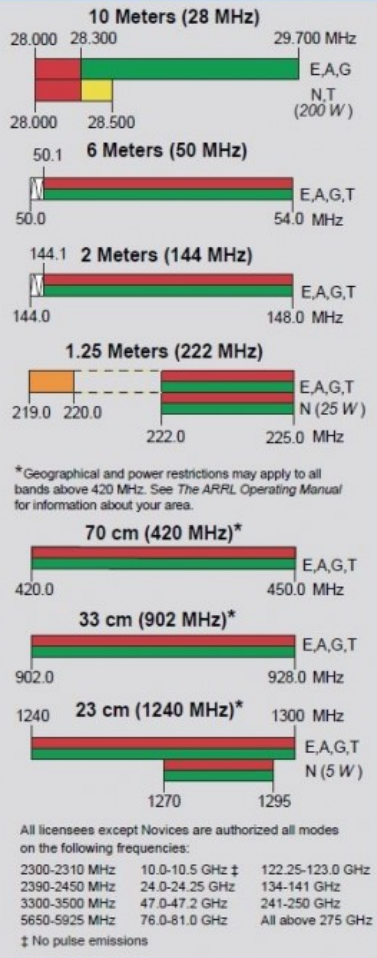
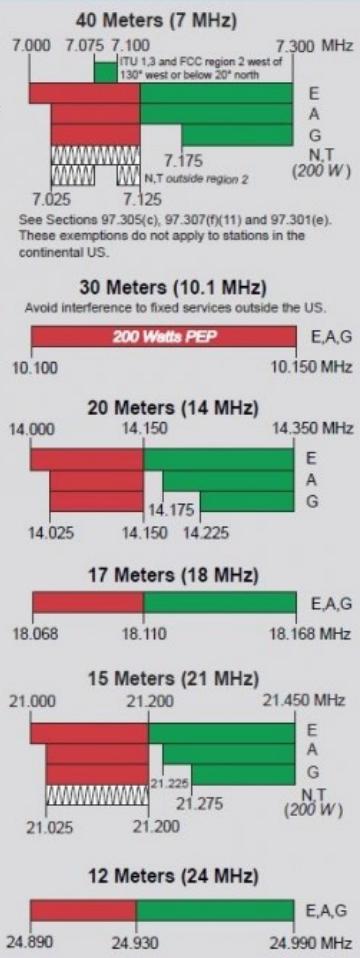
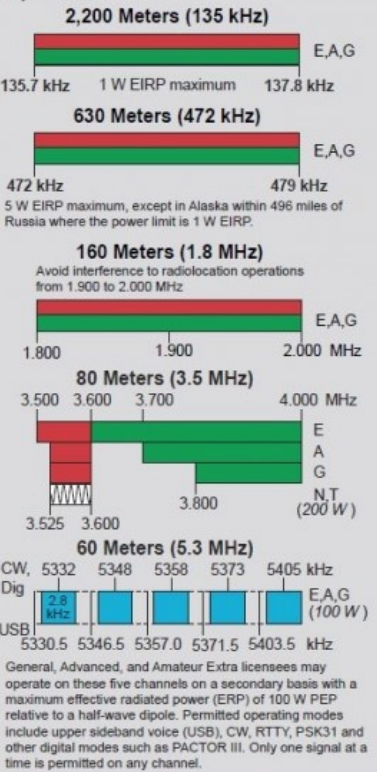
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

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.



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.

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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

Nets... Nets... Nets... Nets... Nets... Nets... Nets... Nets...

Have a favorite HF/6m/2m/1.25m/70cm net that you check into or listen in on? Also, please send corrections and we will add it to the list below - Kim KEØNQS at my email KEØNQSmn@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/glmmnet/>
- MIDCARS: 07:30-13:00 - 7.258 MHz. See: <http://www.midcars.net>
- Iowa snowbird net on 14.257MHz, M-W-F at 10:00 am Local Time. This is an open net.
- Spider Web Net (Marco Island FL) on 14.347 every morning at 0730 CST/CDT: <http://www.spiderwebnet.net>
- Maritime Mobile Service Network: Daily at 1100—2100 Central on 14.300. <http://mmsn.org> and <http://www.14300.net>
- RV Radio Network: Every day at 1900 Central on 7.265 MHz. Web site: <http://www.rvradionetwork.com>
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Wisconsin Sideband Net: Daily @ 5:15 PM – 3985 [or 3982.5] KHz LSB
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.480 MHz USB
- Hobby Helpers Net - Tuesday @ 8 PM – 28.330 MHz USB (Isanti MN) LSB [Net Manager: WOØA].
- Northstar Trader Net: 3.908 +/- at 0830 CST Sundays
- WARFA: 3.908 +/- Sun/Tue/Thu nights at 2200 CST, <http://warfa.org/>
- Youth Net: 14.320-14330 Sundays 1800-1900 UTC, Net Control: AC8PI
- YACHT: Saturdays 1900 CST on EchoLink #481872, <http://yachthams.webstarts.com>
- Northwestern Ontario ARES Net: Evenings at 20:15 (Central) on +/- 3.750Mhz
- The Iron Range Net: Saturdays at 0800 Central time on or near 3.919 Mhz. Look them up on Facebook!
- FORX Net: Mondays at 1900 Central at 3.941 Mhz +/- QRM. WAØJXT — Grand Forks, North Dakota
- HF CW: Fridays 08:00 CST, 7.112 MHz. Informal slow speed CW Net. W8IRT NCS. Email: w8irt@aol.com
- 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

Wanted!

Looking to buy a non-working Icom 706 for parts. Email me: anordin@aol.com

Please email your for sales or wanted items to Kim, KEØNQS, at KEØNQS.mn@gmail.com.

KCØNFB, Bob, would like to remind all hams to **make sure your license is current** and up-to-date on your address. You can visit the FCC ULS to check it and make changes at www.fcc.gov/uls.

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.

Club Repeater
WØGKP
146.94 (-)
CTCSS Tone
103.5

Next ARAC Board Meeting
Tuesday, August 6, 2019
@ 1830
Sammy's West Duluth

Next ARAC Club Meeting
7 p.m. Thursday
August 8, 2019
Copper Top Church

2019 HOLIDAYS

July 4	Independence Day
September 2	Labor Day
November 11	Veteran's Day
November 28	Thanksgiving
December 25	Christmas Day

Upcoming 2019 Local Events

Confirmed Dates for 2019 (Correct as of publication)

- **August 17- Duluth Lift Bridge 90th Anniversary Special Event**
1400 UTC to 2300 UTC

Upcoming 2019 Meeting Programs

TBD

Interested in providing a program, or have an idea for one? Contact Mike NØPDGP at lovoldm@gmail.com

Duluth Area Repeaters



ARAC System WØGKP

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

N9MMU/N9QWH System (WI)

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

WECOMM – WI Statewide Linked System WE9COM

147.075 plus 110.9 Meteor Hill (closest repeater to Duluth)

LSAC System #1

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

NARC System NAØRC

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

Stand Alone Repeaters

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

Fusion and D Star

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

147.15Ø	plus	151.4	NTØB Gilbert Fusion Rptr
145.17Ø	minus	11Ø.9	WA9KLM Superior – Douglas County RACES/ARES Fusion Repeater

443.1ØØ +5.ØØ 1Ø3.5 KBØYHX Cloquet – Carlton County RACES/ARES Fusion Repeater

444.3ØØ +5.ØØ 1Ø3.5 NØEO Spirit Valley Amateurs Fusion Repeater WIRES-X NØEO

147.375 plus NØEO D Star
442.2ØØ plus NØEO D Star

[Repeater list compiled by Dr. Frequency—KCØWDQ]

ST. Louis County Department of Emergency Services Net Control Roster

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

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

Ten Meter SSB Net Control Roster

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

Sunday Nights at 2ØØØ on 28.45Ø MHz USB

Ten Meter CW Net Control Roster

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

Sunday Nights at 193Ø on 28.125 MHz

Northland Weather Group Net Control Roster

KCØMKS Jeff Nast

Monday Nights at 2ØØØ on the ARAC System

Douglas County Net

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

Central Carlton County Net

Tuesday Nights at 2Ø3Ø on the ARAC System

Lake County RACES/ARES Net

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



Elmers



El-mer / el-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.

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

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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 me with your info. If you need to make a change, please let us know at KEØNQSmn@gmail.com Or KEØNQT@gmail.com

Co-Editors,
Kim & Steve Waller
KEØNQS & KEØNQT



AUGUST

CLUB EVENTS

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 LSAC & ARAC

TUESDAY NIGHT NETS

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

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4 CW 1930 NØPDG USB 2000 WØDIO ES 2100 KCØWDQ	5 WX 2000 KCØMKS	6 ARAC BOARD MEETING 1900 Sammy's West Duluth DC Net 2000 CC Net 2030	7	8 ARAC Club Meeting @ 1900 Coppertop	9	10
11 CW 1930 AAØAW USB 2000 NØVRM ES 2100 WØNWO	12 DC ARES/RACES Mtg 1900 DC EOC WX 2000 KCØMKS	13 DC Net 2000 CC Net 2030	14 Lake County ARES/RACES Meeting 1800 Lake County Net 1900	15	16	17 Aerial Lift Bridge Event 1400 UTC to 2300 UTC
18 CW 1930 NØPDG USB 2000 NØPDG ES 2100 NØVRM	19 WX 2000 KCØMKS	20 DC Net 2000 CC Net 2030	21 St. Louis County ARES/RACES Mtg 1630 Pike Lake EOC	22 Carlton County ARES/RACES Meeting 1900 CC EOC	23	24 Club Breakfast @ The Chalet 0730-0800
25 CW 1930 AAØAW USB 2000 AAØAW ES 2100 KØDSL	26 WX 2000 KCØMKS	27 DC Net 2000 CC Net 2030	28 Lake County ARES/RACES Meeting 1800 Lake County Net 1900	29	30	31

Get this newsletter *faster*
via email!

Email Doug AAØAW at
aa0aw@chartermi.net

Next Meeting: Thursday,
August 8, 2019 - 7 pm

CONGRATULATIONS

To new hams who have joined our community in the last few weeks, as well as those who have newly upgraded — to General or Extra:

Terrance Thompson KAØTST, upgraded from General to Extra Class

New Ham: Sue Schotz - Call Sign TBD

ARAC Committee Chairs

Club License Trustee:

Ray Barnes KEØZN

Control Operators:

AAØAW - NØKXT - KCØNFB

Newsletter:

Kim KEØNQS & Steve KEØNQT Waller

Education Chair:

Bob Schulz KCØNFB

Hamfest Chair:

Bob Schulz KCØNFB

Chaplains:

Visiting Chaplains:

Denny Anderson WØDIO

Parliamentarian:

Grant Forsyth KCØWUP

Website:

Thomas Dorr KEØRHA

Membership:

Bruce Carlson KEØNIT

Property Chair:

Wulf Gar WU1FGR

Testing:

Doug Nelson AAØAW

Field Day:

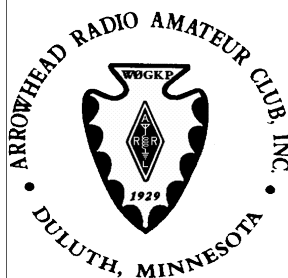
Dennis Anderson WØDIO

Picnic Chair:

Scott Ahlgren, NØVYU

Repeater Chairs:

Randy Haglin NØBZZ
Randy Wabik KAØJZV



The ARAC RELAY

Published monthly and distributed free to members, "The RELAY" is the official publication of the Arrowhead Radio Amateur Club, Inc. Members are encouraged to submit articles, opinions, and classifieds. Your submission will be placed as soon as possible providing it does not conflict with the bylaws of the Arrowhead Radio Amateur Club, Inc. The editors reserve the right to omit any submission that is not a required item. If a submission is questionable, it will be presented to the Board of Directors at the next scheduled board meeting for authorization.

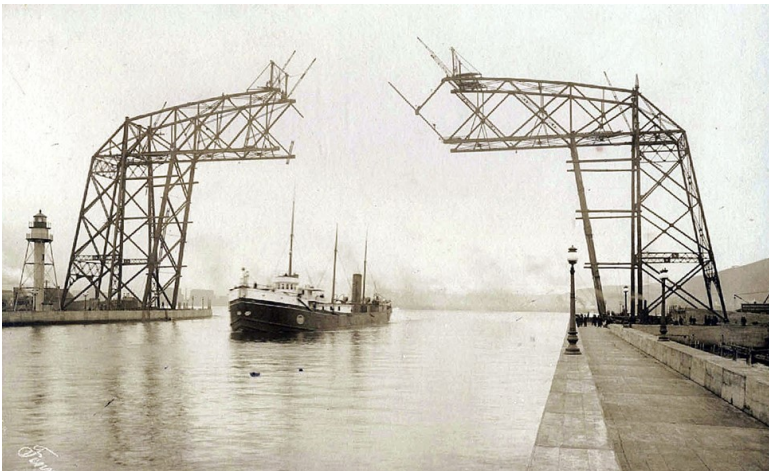


Aerial Lift Bridge, Continued from Page 1

first version of the bridge was actually completed back in 1905 as the Aerial Ferry Bridge. In 1900, the City of Duluth was considering the idea of a steel suspension bridge to link the Minnesota Point neighborhood that had formerly been part of a long natural isthmus between Lake Superior and the St. Louis River Harbor Basin that extended out from mainland Duluth. When the shipping canal was constructed in 1871, the isthmus became an island, cut off from access by land, making it necessary for people traveling back and forth to use ferries. This worked for awhile, but the volume became far too extensive to rely on relatively small boats and barges crossing at random intervals.

The newspaper at the time was called the Duluth Herald and it described the City plans as follows: "a steel pier on each side of the canal, 192 feet in height. Between these piers and about 175 feet above the water is a suspension bridge, on the under side of which is a horizontal tramway high enough above the water to allow the highest-rigged vessels on the lakes to pass under. From the tramway is suspended on steel cables a car that reaches within about eight feet of the water. The car is to be large enough to carry vehicles and passengers. It rolls along the under side of the tramway, the motive power coming from an electric motor on the bank."

Thomas F. McGilvray was the City Architect at the time and is credited with the initial, basic design of the Duluth Aerial Ferry Bridge. An engineer from Minneapolis named C.A.P. Turner received a patent for the final design. Interestingly, Turner was formerly a Duluthian before moving to Minneapolis for his career.

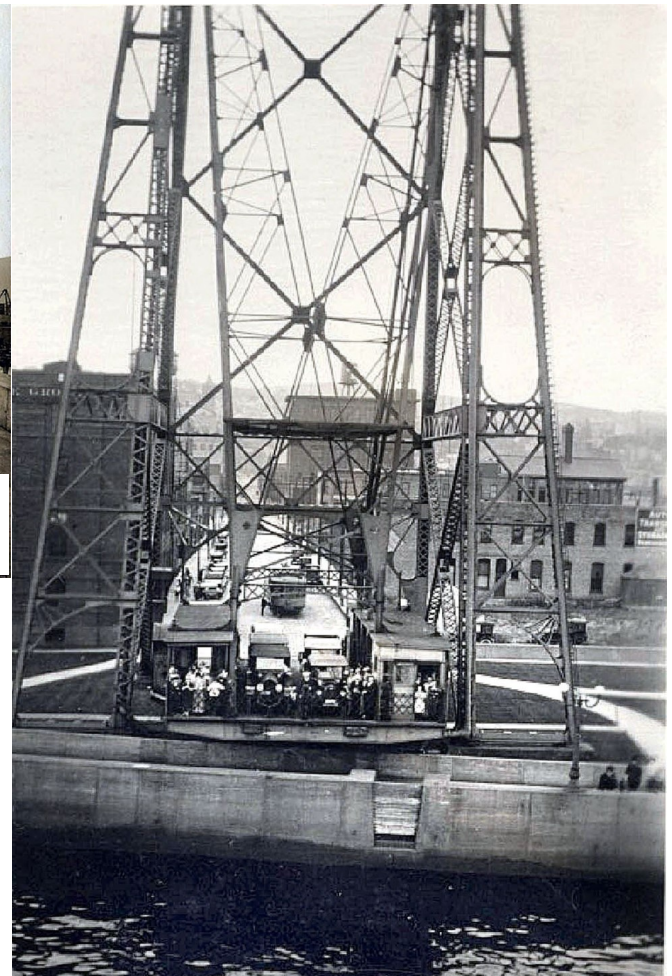


The Aerial Ferry Bridge under construction in 1904. The bridge would be completed in February of 1905 at the cost of \$111,699.70, which would be about \$3,000,000 today.

Image courtesy of Kathryn A. Martin Library Archives and Special Collections at UMD

The Aerial Ferry Bridge opened to the public on March 27th, 1905 in the midst of a spring storm. 40 people attended the official first crossing scheduled for 6:00 p.m. As strong winds whipped around the daring passengers, the aerial ferry gondola glided across the canal flawlessly and into history.

Over the following two decades, there were track malfunctions and repairs as the volume of passengers steadily increased. One harrowing incident occurred in November of 1921 when the gondola stalled in its tracks halfway across the canal with 50 passengers. The Great Lakes steam ship *Joshua W. Rhodes* was entering the canal and could not



The Aerial Ferry Bridge gondola, sometime from 1927-1929, its vehicle bay packed to capacity with a Ford Model A (center, left) and a Model T (center, right), along with 4 other vehicles. The passenger bay (left) and the operator's house (right) can also be seen.

Image courtesy of Kathryn A. Martin Library Archives and Special Collections at UMD

Continued on Page 17

Aerial Lift Bridge, Continued from Page 16

change course. The ship passed under the terrified passengers and cleared the gondola above by an estimated 50 feet.

Passenger demand for the Aerial Ferry Bridge increased to 30,000 people a day at times, with long waiting lines because of the relatively small occupancy limits of the gondola. City officials realized it was time to redesign the bridge to accommodate this volume. They reached the conclusion that a lift span would be necessary to replace the ferry gondola, while retaining the bridge's main structure.

On July 1st, 1929 the Aerial Ferry Bridge carried its last gondola of passengers across the canal. Tugboat Ellen D. was tasked to transport passengers across the canal while the lift span was built and installed. A little less than four months later, the Aerial Lift Bridge was commissioned on October, 29th, with its 386-foot road span that lifted to the height of 42 feet. This 900-ton span was lifted by means of two 450-ton counterweights and drive sheaves, which are deeply grooved pulleys, and deflector sheaves that reduced the vibration of the steel cables in travel. This was powered by four 95-HP electric motors.



Construction to convert the Aerial Ferry Bridge to the Aerial Lift Bridge in 1929.
Image courtesy of Kathryn A. Martin Library Archives and Special Collections at UMD



The oceangoing vessel Millenium Osprey passes under the Aerial Lift Bridge in September 2001. Photo by Justin Hayworth, courtesy Duluth NewsTribune

Over the years the Lift Bridge has had routine maintenance and repairs, but its historic design has endured.

Originally green-colored until 1970, the City of Duluth decided to "modernize" the Lift Bridge color by painting it silver. Three years later it was placed on the National Register of Historic Places and its iconic image has continued to grace postcards, tourist guidebooks, Duluth business ads and the City of Duluth logo, to name a few.

In 1985 a major overhaul of the bridge was done, replacing the lift cables and motors, as well as installing a new control house still in use today. The bridge normally lifts every half hour from Memorial Day to the end of the shipping season sometime in January.

To celebrate the 90th anniversary of the commission of the Aerial Lift Bridge, Diane Saunders K0DSL heads up a planned August 17th event with a Special Event Station located in Canal Park at the U.S. Army Corps of Engineers Lake Superior Museum near the bridge. Pending final approval, members of the Arrowhead Radio Amateur Club will be on the air from 1400 UTC to 2300 UTC on 20 Meters and 40 Meters using SSB, CW, and Digital (FT8). Contacts may request a QSL card and Certificate upon verification of the contact. We will be uploading our log to LoTW. For more information contact K0DSL at ke0aqu@charter.net ★