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

The RELAY

FEBRUARY 2020

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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Winter 2020

Join us on

Co-Editors:

Kim & Steve Waller

Kim - KEØNQS • Steve - KEØNQT

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CW's Bright Future

Ever heard the expression, everything old is new again?

Well in the 176 years Morse Code has been around, there have been many vital uses for this important language of dits and dahs (what the public often calls dots and dashes) invented by Samuel FB Morse.

Anyone under the impression that "CW"—as hams call it—is in the rear view mirror and fading faster than the last guy you passed in your Bugatti Veyron 1 second ago? (*A girl can dream, can't she?*) Well actually, Morse code is making a "comeback" in more than one way.

"CW" is an abbreviation for Continuous Wave, describing the mode in which Morse code is most often transmitted. A transmitter is simply keyed on and off, and the presence or absence of carrier is decoded in the receiver as the presence or absence of a tone.

In amateur radio, CW clubs and forums are indicating an ***upswing*** in participation, especially among recently licensed hams. Why ***now,*** several years after the FCC dropped CW proficiency as part of amateur radio license requirements? There seem to be a few reasons for this and it will be interesting to observe as the trend continues.

Perhaps the largest factor is that ham radio clubs are "re-introducing" CW to their members through a variety of engaging activities. Amateur radio clubs are increasingly understanding that in this fast-paced world, it helps to view club activities as family-friendly so that even unlicensed family members can learn and participate in the hobby. Why is this?

Continued on page 19

Straight keys
Basic single-lever key going back to the days of Morse and Vail themselves. A simple SPST spring-loaded normally-open switch with a knob that moves up and down. Dits, dahs and spaces made manually

"Navy knob" or "Navy key"
This type of key denotes a straight key with a skirted knob. Most ops cannot send good code faster than 20-25 wpm with a straight key. Up and down motion can be a source of carpal-tunnel problems, called "glass arm" and "telegrapher's arm" back-when. No electronics, will key anything.

FEB
2020

Prez Sez ...

Hi everyone!

Well **Winter Field Day** was a success! **Joe Meese WØLWU** (WØ long winter underwear) again hosted this event. We made over **360 SSB contacts** and a number of **CW** and **RTTY** contacts. A lot of fellowship and good food was had. If you didn't make it this year plan to attend next year. We even had a young man come up and visit who then took his Tech Test and passed it on Tuesday Jan 28!!

Our next event is **Ice Station ZZL** which will be held on Sunday February 16th out on Caribou Lake, 11:00 AM to about 4:00PM.Take Hwy 53 north to the Munger Shaw Road, turn right off of Hwy 53 onto Munger Shaw Rd. Follow Munger Shaw past the stop sign at Industrial Rd to Birch Point Rd. Turn right in Birch point and follow it to the Public Boat landing. Get on the lake and follow the road left to where you see a lot of cars with antennas and a big blue tent. If you would like to bring something for the Pot Luck that would be great. Hope to see you out there!!

A reminder: Please get your dues in as we will be starting to prepare for the **Hamfest** coming up May 2nd in Superior!

73's Gene Ellefsen NØVRM

ARAC Board Meeting Minutes - January 7 2020

PRESIDENT

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

VICE PRESIDENT

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

SECRETARY

NØCALL
Robin Davis

218-391-3Ø77
davisfam2858@yahoo.com

TREASURER

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

3RD YEAR BOARD

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

2ND YEAR BOARD

AAØAC
Dave Davis

218-348-6649
aaØac@outlook.com

1ST YEAR BOARD

KDØYLN
Robert Boyd
5054 Boulder Dr
Hermantown, MN 55811

Present: Gene Ellefsen-N0VRM, Mike Lovold-N0PDG, Bruce Carlson-KE0NIT, Dave Davis-AA0AC, Gary Minter-KD9ABS, Bob Boyd-KD0YLN, Doug Nelson-AA0AW, Kim Waller-KE0NQS, Steve Waller-KE0NQT, Bob Schulz-KC0NBF, Randy Wabik-KR0B, Grant Forsyth-KC0WUP, Thomas Dorr-KE0RHA, Robin Davis

Guest: Emery Davis, Dennis Anderson-W0DIO, Jim Anderson-N0JWA

Meeting called to order at 6:30 pm by President Gene-N0VRM

Minutes:
Minutes published on the web and in the newsletter. Dave-AA0AC made a motion to accept, Bruce-KE0NIT seconded, motion passed.

Treasurer's Report:

Checking	1,515.00
Savings	1,373.06
Cash Subtotal	$2,888.06
Outstanding Check (Repeater # 1414)	-1,100.00
Winter CD	1,714.03
Summer CD	1,700.00
CD Subtotal	$3,414.03
Grand Total	$5,202.09

Income sheet 1/1/19 to 12/31/19 and the totals ended up the year a little on the plus side, a couple of hundred dollars. FYI from Treasurer - Check to First United Methodist for $150.00 for rent, plus check for Club's insurance. Move to approve by Gary-KD9ABS, seconded by Bob-KD0LYN, motion passed

Old Business:
Nothing

Committee Reports:

Ham Fest:
Nothing planned to make changes for this year's Ham Fest. We did apply for the ARRL sanctioning from Central and North Dakota. The Card Checker has already confirmed via email to Bob-KC0NFB that he will attend. Plan to get emails out to Venders this month. Try to get a contact out of the Board to sign the contract. This is our "money maker" for the year. We need volunteers to set up, take down, work at the Fest, etc. Have we applied for the Thrivent card again this year? Not yet but Gene-N0VRM will talk to Rollie (Rolland Bockbrader-KB0CK). The $250.00 provided by Thrivent paid for the food that we sell in the Ham Fest Café, including the beverages, which is fabulous

Education:
Next class, February 11, 2020, Technician Class offered through Duluth Community Education, and there will be a General & an Extra Study Group. Testing for the class will be at Ham Fest

Repeater:
Talked to Randy-N0BZZ. He really wants to get out there to get the Mahtowa Repeater done. He has four (4) projects he is working on and Randy Wabik-KR0B added another project to his pile. More to follow

Testing:
Good testing sessions in December – all smilers. UMD had sixteen (16) candidates –

Continued on Page 4

twelve (12) upgraded or received a new license. Tom Ferguson was the teacher and he is anticipating another teaching session. Dec 10, 2019, test session had ten (10) candidates, with ten (10) new licenses or upgrades. Next Test Session, January 28, 2020, 5:30 pm registration, 6:00 pm test session. Doug-AA0AW received three (3) emails from folks looking to test. Thank you to those who VEs at the test session. Which test is changing this year? Extra and then a year off with no changes to the Test Questions

Web Site:
Nothing that Tom-KE0RHA has seen. Newsletter is posted each month. 90th Anniversary Video was posted and taken down because the copy write has not been totally approved but is pending. We will post it again once everything is in place

Facebook:
People are asking and getting questions asked and answered so we are getting viewed by the general public, which was one (1) of the goals of having a Facebook page

New Business:
Donation Request:
Request for the group to donate money to the Choral Group at East High School as a thank you to them for coming to sing at our Christmas Program for the last few years. We have never donated before to them. Suggestion to donate $75.00 to the choir. It is a decent program and a professional presentation. Believe it is a good cause and the music is of high quality. Dennis Anderson-W0DIO believes that Kiwanis give them $75.00 or $100.00 each year, alternating between East and Denfeld choirs. Mike-N0PDG makes a motion to donate $50.00, friendly amendment to $75.00, agreed, seconded by Board, bring to General Membership. We are setting a precedent for future programs

Corporate Grant Request:
Idea that is a little bit out there - non-profit standard. Discussing the reciprocal credits back and forth from groups like Grandma's Marathon, Essentia, etc. Choose a race, offering to the runners an FR ID for a fee. Families could track the runners through the entire race. It could start with one race and move to other races. Doesn't Grandma's already do that for the Elite Runners? Yes. Thinking of smaller races like Wild Duluth. Problem with Wild Duluth, you would need freestanding RF ID stations in the woods because of the length of time-spent racing and the variety of check in locations

The part of this discussion is to look at Corporate Funding - first to ask should be Grandma's Marathon because we already have a strong relationship with them. They have different pockets to draw the funds from within their organization. Normally, it is an application along with some form of an essay, with a $5,000.00 to $10,000.00 threshold. Essentia's initial threshold is $10,000.00. Building community good will between the organizations. Good blend of us donating to a good organization like Grandma's. We have gotten kudos from the organizations that we provide communications (Health and Welfare) for at a variety of events and races. We are not a 501C3. Organizations do look for that and we are not. You do not always have to be a 501C3 to accept funds - there are ways around it. The Ely groups became a 501C3 and they have raised over $4,000.00 on a Go Fund Me Page. If we have a specific need, like the 94 Repeater fails and we can approach organizations for assistance. It would be nice to have a kitty, a reserve, for issues like bad weather. We have been lucky so far. Suggestion to get Mahtowa repeater done before we go much further asking for monies to maintain or upgrade the repeaters. It is a good reminder to look at these types of organizations that have money to give. It also puts our Club out there along with the hobby of Ham Radio. Grandma's is looking for places to put their community funding according to Kim-KE0NQS and Steve-KE0NQT. The most they can say is no. What you say in your essay, is who we are, what we do for the community, our value to the community, and upgrade and maintenance for our infrastructure as we provide our communication services. It is a tool for outside organizations to use - our communication services to the Community. We showed our wealth as volunteers, health, and welfare to the community, the government, that we had value, a value to be protected for us and by us. We should provide our volunteer services more to protect our value to the them, the community. FCC as an amateur radio operator, you cannot get a gain. We can't violate that that is for the attorneys, legalize. Kim-KE0NQS will get the latest information from Grandma's and report back to the Board

ARAC 90th Anniversary:
Doug-AA0AW made 187 contacts for the 90th Anniversary week

Upcoming Ham Fests:
There is a Ham Fest in Bertha, outside of Wadena, soon as well as the Brainerd and St Cloud Ham Fests

Motion to adjourn by Mike-N0PDG, seconded by Bruce-KE0NIT, motion passed at 7:19 pm

ARAC Club Meeting Minutes

January 9, 2020

Present:
President Gene Ellefsen-N0VRM
Treasurer / Membership Bruce Carlson-KE0NIT
Secretary Robin Davis
Third Year Board Dave Davis-AA0AC
Second Year Board Bob Boyd-KD0YLN
First Year Board Gary Minter-KD9ABS
Chaplain (Visiting) Rolland Bockbrader-KB0CK
Parliamentarian Grant Forsyth-KC0WUP
Special Events – Open / Gene Ellefsen-N0VRM acting
Ham Fest / Education Bob Schultz-KC0NFB
Property / Picnic Scott Ahlgren-N0VYU
Newsletter / Historian Kim Waller-KE0NQS
Newsletter Steve Waller-KE0NQT
Repeater Randy Wabik-KR0B
Testing Doug Nelson-AA0AW

Absent:
Vice President Mike Lovold-N0PDG
Repeater Derek McCorison-W0DNF
Repeater Randy Haglin-N0BZZ
Web Site Thomas Dorr-KE0RHA

Meeting called to order by President Gene-N0VRM at 7:00 pm

Rollie-KB0CX has a special announcement - one of our members, Lloyd Olson, Sr-KC0SJB, went into hospice and passed this last week. His memorial service is Friday, January 10, 2020, at Williams, Lobermeier & Boettcher Funeral Home (3208 W 3rd St), visitation at 10:00, service at 11:00 am, luncheon is potluck at the All American Club (1931 W Superior St), following the service. Military honors at the MN State Veterans Cemetery (4777 US Hwy 53). Moment of silence for Lloyd-KC0SJB. Please Rowena and his family in your thoughts and prayers

Minutes:
Minutes published in the newsletter and on the web page. Motion to approve by Bob-KC0NFB, seconded by Dave-AA0AC, motion passed

Treasurer's Report:

Checking	1,515.00
Savings	1,373.06
Cash Subtotal	$2,888.06
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Winter CD	1,714.03
Summer CD	1,700.00
CD Subtotal	$3,414.03
Grand Total	$5,202.09

Several members renewed their annual membership - thank you. Moved to approve as presented by Grant-KC0WUP, seconded by Cliff Tanner-AC0FO, motion passed

Committee Reports:
Education:
February 11, 2020, Tech level class, General & Extra study groups. Sign up through Duluth Public Schools Community Education

ARAC History:
Thank you to Kim-KE0NQS and Steve-KE0NQT for the history presentation of the Club. We have a couple of copyright formalities before it can post it on the web site

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ARAC Club Meeting Minutes, continued

Testing:
Tuesday, January 28, 2020, parameters are all the same. Registration 5:30 pm, Testing 6:00 pm, May 10, 2020, second Tuesday in May

Parliamentarian:
We have not been involved in any activities as a Club that have resulted in any FBI investigation so that it good

Ham Fest:
May 2, 2020, we have the approval of ARRL for sanctioning our Ham Fest. The Vendor notices will go out by the end of the month. Table reservations will be taken, starting tonight. We will promote our Ham Fest at the Brainerd and St Cloud Ham Fest as we normally do

There was an email scam going around using Gene-N0RVM's name on the email asking for gift cards. He will not send you an email asking for gift cards but he is a senior citizen on a fixed income. If you get this email, please delete it

New Business:
Jim Anderson-N0JWA suggested we donate $75.00 to the choir for them singing at our Christmas program. Grant-KC0WUP seconded the Board's motion and opened it up for discussion. Suggestion to say thank you as a one-time gift to the choir for the last three (3) years of music. Call for the vote, motion passed

Winter Field Day:
January, Winter Field Day, at Joe Meese-W0LWU's home, January 25 and 26, 2020, operating out of his garden shed. We placed 74th last year overall in the contest. Looking for people to come up and operate. More information will be shared on the nets

Minnesota QO Party:
MN QO party will be held on February 1, 2020. Ten (10) hours of pure joy. Beginning at 8:00 am in the morning until 6:00 pm. Doug-AA0AW will be with Dave-AA0AC, Gary Hansen-NU0W with Jeff Nast-KC0MKS, John Baumgartener-N0IJ with Randy Johnson-AA0ME, all three (3) teams covering the Northern MN counties. They would be happy to make contact with Hams all over Minnesota

$5.00 door prize drawing won by Ron Brochu-WJ0N

Motion to adjourn by Bob-KC0NFB, seconded by Bob-KD0LYN, motion passed at 7:21 pm

Program to follow by Doug-AA0AW and Jeff Nast-KC0MKS

Silent Key

Lloyd Olson Sr. KC0SJB

June 4 1939 - Jan 4 2020

Lloyd Roger Olson, Sr., 80, of Duluth, died January 4, 2020 at Viewcrest Health Center. He was born in Duluth June 4, 1939 to Erling Henry and Ursala (Nadesky) Olson. Lloyd was a 1957 graduate of Denfeld High School. Following high school he enlisted in the U.S. Army. He married Rowena Morgan on September 30, 1961 in Alexandria, VA. A truck driver for 35 years, Lloyd was employed by AEOA Transportation for 17 years, taking people to their doctor appointments. He was a member of Teamsters #346, the VFW, an active member of (ARAC) Arrowhead Radio Amateur Club, call letters KC0SJB, the Civil Defense Agency, and a volunteer for Grandma's Marathon for over 10 years. Lloyd was the first patrolman for Midwest Patrol, and had the first canine patrol. He was a former member of the Minnesota Army National Guard 109th Lt. Equip Maint. Co. He was preceded in death by his parents, brother Mike, and daughters-in-law Selma Sue Olson and Kelly Olson. He is survived by his wife of 58 years, Rowena; his sons Lloyd, Jr., of Williams, MN, Bruce of Superior, WI. and Kelly Goggleye of Rush City, MN; his granddaughters Katariann Hommel, Janell (Joel) Benson and SueAnn Olson; his great-grandchildren Jemica, Hazel, Abel and Kendra; his half brother Gregory (Peggy) Olson of Bozeman, MT; and many other relatives and friends. Lloyd's family would like to thank the St. Luke's doctors and staff, Viewcrest Health Center staff and the Fresenius Kidney Care staff for their care. The memorial service was held on January 10th at Williams Lobermeier Boettcher Funeral Home, followed by internment at the Minnesota State Veterans Cemetery-Duluth.

Arrowhead Radio Amateur Club

HAM FEST!

Saturday May 2nd, 2020 9:00 am – 1:00 pm

HEAD OF THE LAKES FAIRGROUNDS – MULTI PURPOSE BUILDING

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

Fairgrounds are located next to the Superior Airport.

Admission: $7.ØØ (12 & under FREE!)

Free parking for most vehicles.

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

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

Mike's email: mgcizek@gmail.com

ARRL The national association for AMATEUR RADIO

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

Talk-in on WØGKP Repeater:
146.94Ø(-) [1Ø3.5] Duluth
147.ØØØ(-) [1Ø3.5] Mahtowa
146.94Ø(-) [114.8] 2-Harbors

Dealer / Vendor Tables:
4 foot table: $5.ØØ
8 foot table: $1Ø.ØØ
Vendor setup starts at: 7:ØØam

www.thearac.org

Testing on site!

1Ø:ØØ AM 4-H Building
Contact: Doug
AAØAW / 218-391-5874
aa0aw@arrl.net

Table Reservations:

Robert Schulz, KC0NFB
115 Eden Lane
Duluth, MN 558Ø5-1533
218-481-7458
arac_hamfest@charter.net

Hourly Drawings!

Contest Calendar - February 2020

+ Vermont QSO Party	0000Z, Feb 1 to 2400Z, Feb 2
+ 10-10 Int. Winter Contest, SSB	0001Z, Feb 1 to 2359Z, Feb 2
+ F9AA Cup, CW	1200Z, Feb 1 to 1200Z, Feb 2
+ Mexico RTTY International Contest	1200Z, Feb 1 to 2359Z, Feb 2
+ FYBO Winter QRP Sprint	1400Z-2400Z, Feb 1
+ Minnesota QSO Party	1400Z-2400Z, Feb 1
+ British Columbia QSO Party	1600Z, Feb 1 to 0359Z, Feb 2 and 1600Z-2359Z, Feb 2
+ AGCW Straight Key Party	1600Z-1900Z, Feb 1
+ FISTS Winter Slow Speed Sprint	1700Z-2100Z, Feb 1
+ North American Sprint, CW	0000Z-0400Z, Feb 2
+ RSGB 80m Club Championship, SSB	2000Z-2130Z, Feb 3
+ ARS Spartan Sprint	0200Z-0400Z, Feb 4
+ QRP Fox Hunt	0200Z-0330Z, Feb 5
+ Phone Fray	0230Z-0300Z, Feb 5
+ CWops Mini-CWT Test	1300Z-1400Z, Feb 5 and 1900Z-2000Z, Feb 5 and 0300Z-0400Z, Feb 6
+ UKEICC 80m Contest	2000Z-2100Z, Feb 5
+ NRAU 10m Activity Contest	1800Z-1900Z, Feb 6 (CW) and 1900Z-2000Z, Feb 6 (SSB) and 2000Z-2100Z, Feb 6 (FM) and 2100Z-2200Z, Feb 6 (Dig)
+ SKCC Sprint Europe	2000Z-2200Z, Feb 6
+ NCCC RTTY Sprint	0145Z-0215Z, Feb 7
+ QRP Fox Hunt	0200Z-0330Z, Feb 7
+ NCCC Sprint	0230Z-0300Z, Feb 7
+ CQ WW RTTY WPX Contest	0000Z, Feb 8 to 2359Z, Feb 9
+ SARL Field Day Contest	1000Z, Feb 8 to 1000Z, Feb 9
+ Asia-Pacific Spring Sprint, CW	1100Z-1300Z, Feb 8
+ Dutch PACC Contest	1200Z, Feb 8 to 1200Z, Feb 9
+ KCJ Topband Contest	1200Z, Feb 8 to 1200Z, Feb 9
+ SKCC Weekend Sprintathon	1200Z, Feb 8 to 2400Z, Feb 9

Continued on Page 9

Contest Calendar - February 2020, Continued

± YLRL YL-OM Contest	1400Z, Feb 8 to 0200Z, Feb 10
± OMISS QSO Party	1500Z, Feb 8 to 1500Z, Feb 9
± FISTS Winter Unlimited Sprint	1700Z-2100Z, Feb 8
± RSGB 1.8 MHz Contest	1900Z-2300Z, Feb 8
± Balkan HF Contest	1300Z-1700Z, Feb 9
± Classic Exchange, Phone	1400Z, Feb 9 to 0800Z, Feb 10 and 1400Z, Feb 11 to 0800Z, Feb 12
± 4 States QRP Group Second Sunday Sprint	0100Z-0300Z, Feb 10
± CQC Winter QSO Party	0100Z-0259Z, Feb 10
± ARRL School Club Roundup	1300Z, Feb 10 to 2359Z, Feb 14
± NAQCC CW Sprint	0130Z-0330Z, Feb 12
± QRP Fox Hunt	0200Z-0330Z, Feb 12
± Phone Fray	0230Z-0300Z, Feb 12
± CWops Mini-CWT Test	1300Z-1400Z, Feb 12 and 1900Z-2000Z, Feb 12 and 0300Z-0400Z, Feb 13
± RSGB 80m Club Championship, Data	2000Z-2130Z, Feb 12
± PODXS 070 Club Valentine Sprint	0000Z-2359Z, Feb 14
± NCCC RTTY Sprint	0145Z-0215Z, Feb 14
± QRP Fox Hunt	0200Z-0330Z, Feb 14
± NCCC Sprint	0230Z-0300Z, Feb 14
± ARRL Inter. DX Contest, CW	0000Z, Feb 15 to 2400Z, Feb 16
± Russian PSK WW Contest	1200Z, Feb 15 to 1159Z, Feb 16
± Feld Hell Sprint	1900Z-2059Z, Feb 15
± AWA Amplitude Modulation QSO Party	2300Z, Feb 15 to 2300Z, Feb 16
± Run for the Bacon QRP Contest	0200Z-0400Z, Feb 17
± QRP Fox Hunt	0200Z-0330Z, Feb 19
± Phone Fray	0230Z-0300Z, Feb 19
± CWops Mini-CWT Test	1300Z-1400Z, Feb 19 and 1900Z-2000Z, Feb 19 and 0300Z-0400Z, Feb 20
± AGCW Semi-Automatic Key Evening	1900Z-2030Z, Feb 19
± NCCC RTTY Sprint	0145Z-0215Z, Feb 21
± QRP Fox Hunt	0200Z-0330Z, Feb 21
± NCCC Sprint	0230Z-0300Z, Feb 21

Continued on Page 10

Contest Calendar - February 2020, Continued

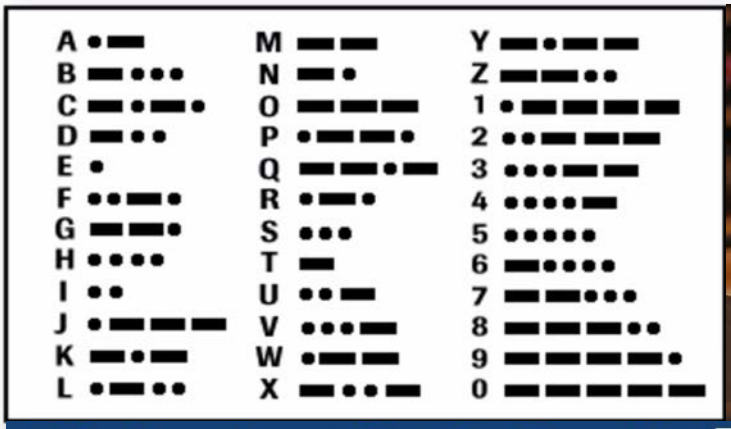
± CQ 160-Meter Contest, SSB	2200Z, Feb 21 to 2200Z, Feb 23
± REF Contest, SSB	0600Z, Feb 22 to 1800Z, Feb 23
± UK/EI DX Contest, CW	1200Z, Feb 22 to 1200Z, Feb 23
± SARL Digital Contest	1400Z-1700Z, Feb 23
± High Speed Club CW Contest	1500Z-1700Z, Feb 23
± QCX Challenge	1300Z-1400Z, Feb 24 and 1900Z-2000Z, Feb 24 and 0300Z-0400Z, Feb 25
± SKCC Sprint	0000Z-0200Z, Feb 26
± QRP Fox Hunt	0200Z-0330Z, Feb 26
± Phone Fray	0230Z-0300Z, Feb 26
± CWops Mini-CWT Test	1300Z-1400Z, Feb 26 and 1900Z-2000Z, Feb 26 and 0300Z-0400Z, Feb 27
± UKEICC 80m Contest	2000Z-2100Z, Feb 26
± RSGB 80m Club Championship, CW	2000Z-2130Z, Feb 27
± NCCC RTTY Sprint	0145Z-0215Z, Feb 28
± QRP Fox Hunt	0200Z-0330Z, Feb 28
± NCCC Sprint	0230Z-0300Z, Feb 28
± Feld Hell Sprint	0000Z-2359Z, Feb 29
± FTn DX Contest	1200Z, Feb 29 to 1200Z, Mar 1
± UBA DX Contest, CW	1300Z, Feb 29 to 1300Z, Mar 1
± South Carolina QSO Party	1500Z, Feb 29 to 0159Z, Mar 1
± NA Collegiate Championship, RTTY	1800Z, Feb 29 to 0559Z, Mar 1
± North American QSO Party, RTTY	1800Z, Feb 29 to 0559Z, Mar 1

Our thanks to Bruce Horn, WA7BNM for use of this calendar!

Please visit Bruce's site at
www.contestcalendar.com/contestcal.html
for many other helpful contest calendar formats.

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 Buzy?	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)
E,A,G
135.7 kHz 1 W EIRP maximum 137.8 kHz

630 Meters (472 kHz)
E,A,G
472 kHz 479 kHz
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
E,A,G
1.800 1.900 2.000 MHz

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 5332 5348 5358 5373 5405 kHz
USB 5330.5 5346.5 5357.0 5371.5 5403.5 kHz
2.8 kHz
E,A,G (100 W)
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 21.275 21.200

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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ARRL Headquarters:
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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

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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
- Upper Midwest Ten Meter Net: Every Thursday Evening @ 8 PM – 28.48Ø MHz USB
- 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

Next ARAC Board Meeting

Tuesday, Feb. 11, 2Ø2Ø
@ 6:30 p.m.
Sammy's West Duluth

Next ARAC Club Meeting

Thursday, February 13, 2020
7 p.m.
Copper Top Church

This month's presentation:

Winlink
with
Doug Nelson AAØAW &
Jeff Nast KCØMKS

Winlink is a worldwide radio messaging system that uses amateur-band radio frequencies and government frequencies to provide radio interconnection services that include email with attachments, position reporting, weather bulletins, emergency and relief communications, and message relay.

The system is built and administered by volunteers and is financially supported by the **Amateur Radio Safety Foundation**

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

CLUB REPEATER
WØGKP

146.94 (-)
CTCSS TONE
103.5

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**.

Amateur Radio License Class

Tuesdays, 7-9pm
Feb 11th - May 12th

House of Refuge
115 West Myrtle, Duluth, MN

Course fee $10
License Test on 5/12; $15 test fee

Instruction and testing for those who want to become Ham Radio operators. Invite friends & family to join the hobby!

Participants will learn communications for weather spotting, marathons, and disasters. Class will cover what you need to know to get your Technician license. We use the Gordon West manual that may be purchased the first night of class for $25.

Contact Bob KCØNFB at kcØnfb@charter.net for information on signing up.

General & Expert License Study Group
With Diane Saunders KØDSL

Tuesdays 7pm - 9 pm
House of Refuge
115 West Myrtle, Duluth, MN

Duluth Area Repeaters

ARAC System WØGKP

Freq.	*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	123.0	Solway (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)
147.330	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 / 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	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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Members, please check your name and email address for accuracy. If you are not on this list and want to be on the list, contact us with your info. If you need to make a change, please let us know at KEØNQS.mn@gmail.com Or KEØNQT@gmail.com

Co-Editors,
Kim & Steve Waller
KEØNQS & KEØNQT

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

FEBRUARY
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 21ØØ -**BWAR**	2	3	1
2 **CW 1930 NØPDG** **USB 2000 NØPDG** **ES 2100 N9DMG**	3 **WX 2000 KCØMKS**	4 **ARAC BOARD MEETING** **6pm Sammy's West Duluth** DC Net 2000 CC Net 2030	5 21ØØ -**BWAR**	6	7	8
9 **CW 1930 AAØAW** **USB 2000 AAØAW** **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** **7 pm**	14	15
16 **CW 1930 NØPDG** **USB 2000 WØLWU** **ES 2100 KCØWDQ**	17 **WX 2000 KCØMKS**	18 DC Net 2000 CC Net 2030	19 **St. Louis County ARES/ RACES Mtg 1630 Pike Lake EOC** 21ØØ -**BWAR**	20 **Carlton County ARES/RACES Meeting 1900 CC EOC**	21 **Birkebeiner**	22
23 **CW 1930 AAØAW** **USB 2000 K9KDK** **ES 2100 WØNWO**	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 **Club Breakfast @ The Chalet 0730-0800**

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

Next Meeting: Thursday,
January 9, 2020 - 7 pm
Coppertop Church

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

CONGRATULATIONS

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

We had a great turn-out at our December 10th testing session and look forward to having you all with us at the upcoming club meetings and events in 2020!

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

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

CW's Bright Future, Continued from Page 1

Well club members are more and more likely to choose family time over club participation when there's competition for valuable free time. But ham clubs that make a concerted effort to blend in family-friendly components have the opportunity to teach kids and spouses about amateur radio and invite them to join the hobby, too.

How are clubs doing this? One way is creating special "kids club" or family nights, with interactive presentations with titles such as "The Invisible Power of Radio", "The Secret Code of CW", "Treasure Hunt", and "Skywarn for Kids". Kids can make a brief video report (like "Show & Tell") on what they learned from the presentation and submit it to their science teacher for extra credit or for consideration as a class project or field trip.

Clubs are also making Field Day family-friendly to include scavenger hunts for kids using CW as "secret code" clues, fun demonstrations, food judging contests & camping. Sacrilege to the traditional Field Day? Not really. Contesting "in the field" was the original intent of Field Day, with just you and your radio equipment and some camping gear. No trailers with computers or generators or a massive antenna, like today. But shortly after its inception, Field Day began to grow and change as an event to include new developments in the hobby and become what it is today. While Field Day continues the importance of contesting at its core, ham clubs are also coming up with new ways for families to participate. New interest in CW is one of the results.

Another reason there is an upturn in Morse code interest is that, surprisingly, some young people are beginning to be exposed to it from STEM education. One such electrical engineering student from the University of South Carolina, Eddie King, wrote an article last year in the online publication *The Conversation,* enthusiastically informing his peers about Morse code, its history and his fascination with it. King's attraction to CW also led to his becoming a ham radio operator and pilot. Here's an excerpt from his fairly lengthy article ***Simply Elegant Morse Code Marks 175 Years and Counting:***

The first message sent by Morse code's dots and dashes across a long distance traveled from Washington, D.C., to Baltimore on Friday, May 24, 1844 – 175 years ago. It signaled the first time in human history that complex thoughts could be communicated at long distances almost instantaneously.

Thanks to Samuel F.B. Morse, communication changed rapidly, and has been changing ever faster since. He invented the electric telegraph in 1832. It took six more years for him to standardize a code for communicating over telegraph wires. The wires, magnets and keys used in the initial demonstration have given way to smartphones' on-screen keyboards, but Morse code has remained fundamentally the same, and is still – perhaps surprisingly – relevant in the 21st century. Although I have learned, and relearned, it many times as a Boy Scout, an amateur radio operator and a pilot, I continue to admire it and strive to master it.

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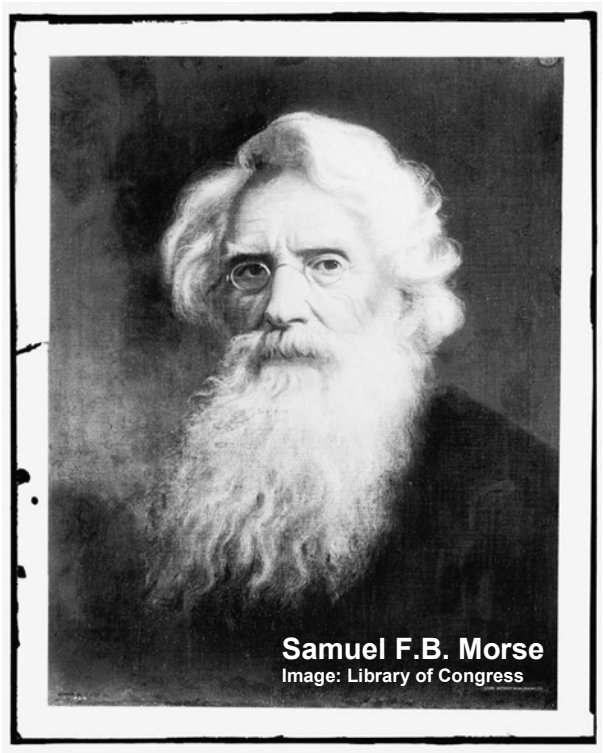
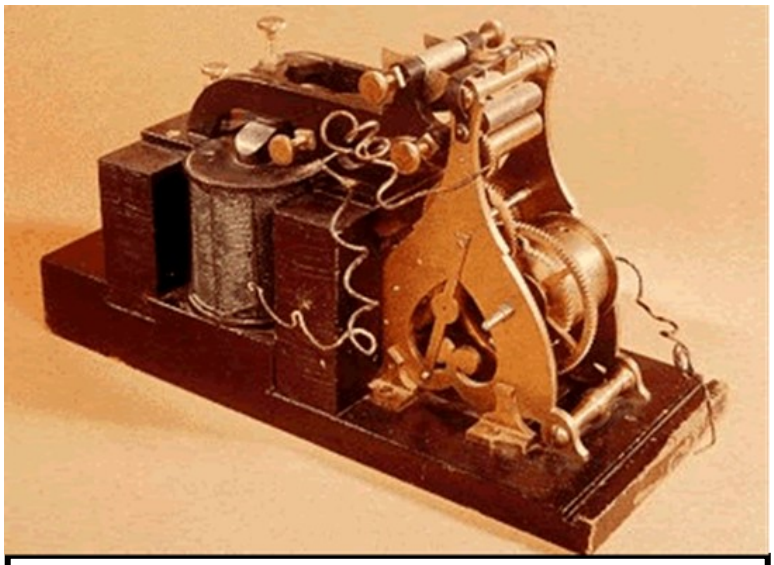


Samuel F.B. Morse
Image: Library of Congress



Samuel Morse Telegraph Receiver

Image: Smithsonian National Museum of American History

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Easy sending

Morse's key insight in constructing the code was considering how frequently each letter is used in English. The most commonly used letters have shorter symbols: "E," which appears most often, is signified by a single "dit." By contrast, "Z," the least used letter in English, was signified by the much longer and more complex "dit-dit-dit (pause) dah." The reference to letter frequency makes for extremely efficient communications: Simple words with common letters can be transmitted very quickly. Longer words can still be sent, but they take more time.

Going wireless

In the late 19th century, Guglielmo Marconi invented radio-telegraph equipment, which could send Morse code over radio waves, rather than wires. The shipping industry loved this new way to communicate with ships at sea, either from ship to ship or to shore-based stations. By 1910, U.S. law required many passenger ships in U.S waters to carry wireless sets for sending and receiving messages.

After the Titanic sank in 1912, an international agreement required some ships to assign a person to listen for radio distress signals at all times. That same agreement designated "SOS" – "dit-dit-dit dah-dah-dah dit-dit-dit"– as the international distress signal, not as an abbreviation for anything but because it was a simple pattern that was easy to remember and transmit. The Coast Guard discontinued monitoring in 1995. The requirement that ships monitor for distress signals was removed in 1999, though the U.S. Navy still teaches some sailors to read, send and receive Morse code.

Aviators also use Morse code to identify automated navigational aids. These are radio beacons that help pilots follow routes, traveling from one transmitter to the next on aeronautical charts. They transmit their identifiers – such as "BAL" for Baltimore – in Morse code. Pilots often learn to recognize familiar-sounding patterns of beacons in areas they fly frequently.

There is a thriving community of amateur radio operators who treasure Morse code, too. Among amateur radio operators, Morse code is a cherished tradition tracing back to the earliest days of radio. The Federal Communications Commission used to require all licensed amateur radio operators to demonstrate proficiency in Morse code, but that ended in 2007. The FCC does still issue commercial licenses that require Morse proficiency, but no jobs require it anymore.

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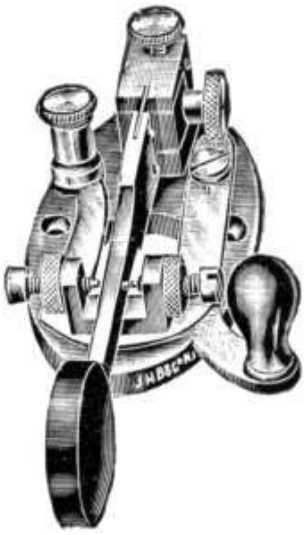

Sideswiper, "cootie key"
Simplest form of speed key. Key lever moves horizontally right and left, spring-loaded to return to center (open) position. Dits, dahs and spaces made manually. Side to side motion avoids carpal-tunnel problems and can permit higher speeds. No electronics, will key anything

Vibroflex "Bug"
Bug, semiautomatic key, "Vibroplex" (actually a brand name) - Most common form of speed key before electronic keyers. Key lever moves horizontally right and left, spring-loaded to return to center (open) position. Dits made automatically by mechanical means, dahs and spaces made manually. Side to side motion avoids carpal-tunnel problems and, with automatic dits, permits higher speeds. For a right-handed op, thumb makes dits, first finger makes dahs. Left-hand op needs left-handed key. No electronics, will key anything. Speed adjustment is mechanical.

Begali HST Single Lever Key
Single-lever paddles: Single key lever moves horizontally right and left, spring-loaded to return to center (open) position. Both sides cannot be closed at the same time. Dits, dahs and intra-letter spaces made automatically by electronic keyer. Electronics may be stand-alone or built into rig. Side to side motion avoids carpal-tunnel problems and, with automatic dits and dahs, permits higher speeds. For a right-handed op, contacts are usually wired so that thumb makes dits, first finger makes dahs, but some ops prefer reverse. Left-hand op can use same key. Interface relay or other system may be needed when external electronic keyer is used to key certain rigs. Speed adjustment is electronic. "Paddles" name comes from shape of key knobs.

▶ **A "Key" or "Paddles" is the thing you actually touch to send with mechanically.**

▶ **A "Keyer" is a device used to generate dits and dahs electronically.**

*Thanks to **Jim Miccolis N2EY** for sharing all the Keys & Keyers photos and descriptions with the public at **www.hamuniverse.com***

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Blinking Morse

Because its signals are so simple – on or off, long or short – Morse code can also be used by flashing lights. Many navies around the world use blinker lights to communicate from ship to ship when they don't want to use radios or when radio equipment breaks down. The U.S. Navy is actually testing a system that would let a user type words and convert it to blinker light. A receiver would read the flashes and convert it back to text.

Other Morse messages

Perhaps the most notable modern [military wartime] use of Morse code was by Navy pilot Jeremiah Denton, while he was a prisoner of war in Vietnam. In 1966, about one year into a nearly eight-year imprisonment, Denton was forced by his North Vietnamese captors to participate in a video interview about his treatment. While the camera focused on his face, he blinked the Morse code symbols for "torture," confirming for the first time U.S. fears about the treatment of service members held captive in North Vietnam.

There are still many ways people can learn Morse code, and practice using it, even online. In emergency situations, it can be the only mode of communications that will get through. Beyond that, there is an art to Morse code, a rhythmic, musical fluidity to the sound. Sending and receiving it can have a soothing or meditative feeling, too, as the person focuses on the flow of individual characters, words and sentences. Overall, sometimes the simplest tool is all that's needed to accomplish the task.

Double-lever paddles, "iambic" paddles
Two key levers move horizontally right and left, spring-loaded to return to (open) position. Both sides can be closed at the same time for "iambic" or "squeeze key" operation. Dits, dahs and intra-letter spaces made automatically by electronic keyer. Electronics may be stand-alone or built into rig. Side to side motion avoids carpal-tunnel problems and, with automatic dits and dahs, permits higher speeds. For a right-handed op, thumb usually makes dits, first finger makes dahs, but some ops prefer reverse. Left-hand op can use same key. Interface relay or other system may be needed when external electronic keyer is used to key certain rigs. Speed adjustment is electronic. "Paddles" name comes from shape of key knobs.

"Iambic" or "squeeze" operation is a feature of the keyer, not the key. With double-lever paddles, both sides can be closed simultaneously by squeezing, hence the name. An electronic keyer set up for iambic or squeeze operation will generate an alternating series of dits and dahs when both paddles are closed at the same time; the series starts with whichever side is closed first. This permits many letters with both dits and dahs to be sent with a single squeeze of the paddles.

There are two common iambic modes: Mode A and Mode B. They differ only in what happens when the key levers both are released after both being closed. In Mode A, the keyer finishes the dit or dah being sent and stops. In Mode B, the keyer finishes the dit or dah being sent and then sends the opposite (dah or dit) once. Mode A is far more popular.

There's another area where CW is being re-discovered by young people. College students learning to be educators are finding that children with learning disabilities, from mild dyslexia to autism can benefit enormously from learning the "language" of Morse code. When taught as a language which uses auditory rhythms to denote letters and words, Morse code becomes a sub-cognitive process in which the user does not consciously think of how to tap out each character and becomes an simple extension of a person's thoughts. This is true of anyone who learns CW and sticks with it long enough.

Also, students of the medical sciences are learning that Morse code is an effective tool for those with physical or emotional conditions that make it difficult or impossible for individuals to speak.

Jim Lubin is a resource consultant advocating for the disabled, and an alternative information technology expert. As a quadriplegic for nearly 30 years, he's been described as building virtual communities "one breath at a time with Morse code. Fleshing out those dots and dashes to create a full life for himself and a smorgasbord of resources for others." Lubin devised a method of transmitting Morse code to a computer via an air tube attached to his ventilator using "sips and puffs" almost 3 decades ago. A sip is a dit (dot) and a puff is a dah (dash). On one of his web sites, Lubin explains: "Morse code is a perfect method for a quadriplegic, someone with little or no ability to move. A person just needs to be able to activate a switch by some method.

"Many people with physical disabilities are not able to use a computer keyboard or mouse. This severely limits their access to the educational, recreational and career opportunities provided by computer technology. Morse code has long been recognized as an effective computer access method for people who are not able to use a keyboard or mouse. Morse code has a number of advantages over other alternate computer access strategies. It is usually faster, requires less fine motor control and is less likely to produce fatigue than other methods. Perhaps its most important advantage is its ability to become a sub-cognitive process. After using the code for a period of time, the Morse code user no longer thinks about the code they're entering. This is the same process as is used by touch typists and it has a significant impact on speed, accuracy and the quality of the work being produced. Morse code is the only alternate access method that can become a sub-cognitive process."

Google agrees with Lubin's assessment. 18 months ago, it launched new Morse code functionalities for iOS & Android. Google collaborated with developer **Tania Finlayson**, who was born with cerebral palsy and is an expert in Morse code assistive technology.

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They created a game to help people learn Morse code fast, via desktop, Android or iOS. In fact Google claims users can learn Morse code in "less than an hour." *Wow. That I have to see.*

Finlayson says, "Most technology today is designed for the mass market. Unfortunately, this can mean that people with disabilities can be left behind. Developing communication tools like this is important, because for many people, it simply makes life livable."

Finlayson helped Google design their "Gboard" keyboard layout. The keyboard is not a standard "QWERTY" one, but rather one designed for Morse code dits (dots) and dahs (dashes). To the auto-suggestions, she added Morse code sequences and settings that allow users to customize the keyboard for their specific needs. Gboard also allows users to link external switches to it so that users with limited mobility can operate it with their preferred equipment.

All of these developments paint a promising picture for the future of CW as students are increasingly aware the value of Morse code around us in everyday life, including as an enjoyable hobby. What's more, a resurgence of young people's interest in "all things analog" has been a trend for 5 years or so. Vinyl records are back with stellar sales in the 18-35 age group with no end sight. And as a matter of fact, Morse code has been featured in several recorded songs over the years, including the band Rush's hit "YYZ". YYZ, which is Toronto's airport code, inspired the song's rhythms and title.

Sound strange? College classes in 35 mm photography and dark room development are offered again. Film classes are offered in video tape formats as an option rather than digital. Morse code & CW T-shirts can be spotted on college campuses and beyond. This generation sees these technologies as **art** that adds richness to the mundane digital landscape of their lives. To be sure, these trends "snuck up" on most of us who remember the original age of vinyl and tape recordings. Who'd have thought they'd ***ever*** be popular again? It seems that Morse code is here to stay, including its future in amateur radio. ★

These CW T-shirts and more available at https://www.cafepress.com/+morse-code+t-shirts
Images courtesy cafepress.com

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