

Northern Colorado Amateur Radio Club

P.O. Box 272956

Fort Collins, CO 80527-2956

The Tribander

The monthly Newsletter of the Northern Colorado Amateur Radio Club

**Club Meetings are held on the 3rd Saturday of each month
At the Golden Corral, 901 E. Harmony Rd, Fort Collins, CO.**

All are welcome and encouraged to attend.

**Bring yourself and your appetite at 8:00 am.
The Meeting begins at 9:00 am.**

NCARC Club Information

Club Officers

President	Steve Henry	N7GN	(970)226-2817	n7gn@arrl.net
Vice President	Bill Beach	K0UT	(970)224-1958	k0ut@earthlink.net
Secretary	Dave Langenberg	KC9FOO	(773)612-8435	dave@thelangenbergs.com
Treasurer Membership Chair	Willis Whatley	WA5VRL	(970)407-6599	whatley@frii.com
Interference Coordinator	Mike Bates	N7DQ	(970)219-3225	n7dq@comcast.net
Newsletter	Willis Whatley	WA5VRL	(970)407-6599	whatley@frii.com
Technical Chair	Eric Slutz	N0EAS	(970)282-3752	eric@redginger.com
Hamfest Chair	Matt Kassawara	KG0W	(970)232-5215	battery@writeme.com

NCARC Repeaters

W0UPS: 145.115 MHz – (144.515 MHz Input) 100 Hz CTCSS Subtone (1* on, 0* off) Autopatch (40-32.926N, 105-11.898W, 7229 ft) Horsetooth Mountain, west of Fort Collins, CO
W0UPS: 447.275 MHz – (442.275 MHz input) 100 Hz CTCSS Subtone Autopatch (40-32.926N, 105-11.898W, 7229 ft) Horsetooth Mountain, west of Fort Collins, CO
W0UPS: 146.625 MHz – (146.025 MHz Input) 100 Hz CTCSS Subtone (40-50.266N, 105-3.017W, 5600 ft) SW of the Rawhide Power Plant, 17.5 miles north of Fort Collins, CO
W0UPS: 146.850 MHz – (146.250 MHz Input) 100 Hz CTCSS Subtone (1* on, 0* off) (40-25.341N, 104-44.182 W) Greeley, CO
W0UPS-5: 144.390 MHz – APRS Digital Repeater (40-32.926N, 105-11.898W, about 7229 ft) Horsetooth Mountain, west of Fort Collins, CO

Nets

ARES District 10 Information Net	Wednesday	9:00 pm	145.115 MHz
ARES Statewide Net	Sunday	8:30 pm	145.310 MHz
Central Colorado Traffic Net	Daily	7:30 pm	145.310 MHz
Tech Net	Monday	7:00 pm	145.115 MHz

Web Page

<http://www.ncarc.net>

Note: TECH NET Changed!

This is a reminder that the 145.115 TECH NET has been **changed to Monday evening at 07:00 PM.**
It is hosted by N0WIQ, Kerry. All amateur radio operators (with 2M privileges) are welcome to check in.
It is an open forum net with Questions, Answers and Topics of interest.

If the 145.115 repeater is not available, the net will be held on the 447.275 repeater

Local Area Swaplists:

For those who can not wait or can not attend the area swapmeets, below are the websites for some of the regional swaplists found on the internet. These are updated weekly.

Aurora Repeater Assn. Swaplist: <http://www.qsl.net/n0ara/swaplist.html>

Colorado Repeater Assn. Swaplist: <http://www.w0cra.org/swap/craswaplist.htm>

Wyoming Swap Shop: <http://www.qsl.net/n0ara/wss.htm>

New Mexico Swaplist: <http://bc-ares.org/swapnet/listings.html>

New and renewing members for the current month:

N0NXC – Arthur N0FRT – Joe K0DLH – David KI0BJ – Rex KC0DHU - Julie **The NCARC thanks you for your support.**

New 220 MHz Net

There is a new informal net that is being held every Thursday evening at 7:00 pm on the 224.520 Repeater.
This is the **AB0SF** machine located at the Horsetooth Mountain site along with the 145.115 and 447.275 NCARC Repeaters.

This repeater uses the standard offset for the 220 MHz band (input on 222.920) and a 100 Hz CTCSS.
Hosted by KG6TDB, the topics will change each week and all licensed operators are invited to check in.

For those who are interested, it also features IRLP capability (it is node 3902).

Wyoming State Hamfest

May 25 – 27, 2007

At the Best Western

800 N. Poplar

Casper, WY 82601

(307) 266-6000

\$62/per night w. registration before May 11th

**Swapmeet, Grand Prize plus door prizes, WX Spotter Class, VEC Testing,
ARRL Section Meeting, Forums, Banquet and more.**

Further info and Flyer under “events” at: <http://www.wy7fd.com>

**Spring is in the Air**

It's prime time for Amateur Radio operators to work on antennas and the structures that support them. Don't forget basic safety – If you fail to plan, then you plan to fail.

1. Check the current WX as well as the forecast.
2. Never work alone and always have one person on the ground.
3. Always use appropriate personal protective and safety equipment.
4. Have and follow a safety plan (pre-climbing equipment inspection, etc).
5. Have a work plan and discuss it before beginning.
6. Verify that all power sources to the system are disabled.
7. Limit work time as needed to avoid fatigue.
8. Never work past daylight hours.
9. Never get in a hurry and take a break if things are not going as planned.
10. Verify that all tools, equipment and persons are accounted for when done.

WOITD, Cliff Baker - SK

May 28, 1920 - April 16, 2007

Cliff was a member of NCARC since 1980. The following info is taken with permission from the Greeley Tribune. Cliff became a Silent Key on Monday at the North Colorado Medical Center in Greeley.

Tribute: Lt. Colonel Clifford Arnold Baker was born in Wakefield, Neb., to William Ickabod and Iva Myrtle (Keyser) Baker.

On Oct. 1, 1944, he married Alice Virginia Hughes and remained married for 62 years.

He was reared in Nebraska, South Dakota and Denver. He graduated from Englewood High School in Colorado in 1939 and from the University of Denver with a Bachelor of Science degree in 1957. He also volunteered in 1942 with the Army Air Corps. He completed Glider Pilot training, and radio and radar schools.

He was inducted in 1942 to the U.S. Army, then into the Air Force. He served as a glider pilot in World War II. At the end of World War II, he joined the Air National Guard 138th AC&W Squadron with other University of Denver students and faculty. He served in the Korean War with the recall of the Air National Guard with the same unit.

In 1966, he became the detachment commander, and in 1971, he became the commander of the squadron. Mr. Baker will be remembered for his sense of civic duty, a volunteer to the core.

The "Colonel," as his many friends would call him, was a member of the board of directors for the Boys Scouts of America and was appointed on a regional committee for organization. He spent five years as chairman for the Muscular Dystrophy (Jerry Lewis Telethon). He was also Mended Hearts visitor for 10 years; two of which he was president. He also served as president of the Air Force Association of Greeley and president of the Colorado State Wildlife Association for two years.

He received many accolades and awards for his work in the military, volunteer work and charitable contributions. Most notable are a commendation medal from the Civil Air Patrol, the service to mankind award from Sertoma Club and the Meritorious Service Award from the Colorado Air National Guard. People who knew him will recollect a non-stoppable humorous personality and a humanitarian with a great heart for his fellow man.

NOIAK, Ted Cross - SK

Ted passed away April 16 at the age of 46 years old. In his early childhood, Ted was known by his family as Edward. He loved the great outdoors and liked nothing better than messing about with boats and fishing with his father, Eddie. He learned camping and many outdoor skills as a member of the British Scout Association. His father encouraged him in all practical matters and taught him how to strip down a car engine and showed him how to carry out all forms of electrical work. At 13, he built his first basic computer.

From his mother, Irene, who was a trained nurse, Ted learned about cooking, music, faith in God and caring for other people. As Ted grew up, the Church of England became more important in his life and he seriously considered becoming an Anglican priest.

He chose instead to train in electronics and computing at Loughborough University, successfully completing a degree program. After university, he returned to his hometown of Barrow-in-Furness where he worked for VSEL, shipbuilding and engineering company. In the late 1980s, while working on a joint U.S./UK project, Ted met a girl named Bonnie. He decided to move to the United States where he and Bonnie were married. After moving to the United States, Ted took a position with a Coors subsidiary that eventually became Coors Microolithics, where he worked through the 1990s. In 2000 Ted found his way to his final employer, Hewlett-Packard.

During his time in the States, Ted became a first responder and a member of Douglas County Search and Rescue. He was a ham radio operator, an audiophile, a duffer and an avid fisherman. He rode motorcycles, was building an airplane and had just purchased a sport car. Ted was, and is, multidimensional ... as comfortable talking about spirituality as about physics or motorcycles ... never hesitant to let out a belly laugh at the silliest comedy sketch, yet so brilliant as to gain the admiration and respect of eminent scholars and professionals.

Ted was a scholar, a teacher, and a mentor. Ted contributed a high level of energy to any endeavor be it work or play and expected no less of others. Forever endeared to old friends and quick to make new ones. Musician, scientist, engineer, adventurer, historian, warrior and, most of all - friend ... sorely missed and beloved by the spectrum of those whose lives he touched over the years.

Memorial contributions may be made to The Douglas County Search and Rescue in c/o Resthaven Funeral Home 8426 South Highway 287, Fort Collins, CO 80525

NCARC Meeting - April 21, 2007
Location: Golden Corral

Called to order by Steve Henry N7GN at 9:00 - There were 27 members and 8 guests present.

REPORTS

Secretary: Minutes approved as read

Treasurer: Checking Balance \$11329.61. Savings as of March 23 is \$2153.02

Tech Committee:

3 folks met with Virgil discussing the 145.115 machine sensitivity.

Going to collect more data

Requested that folks who experience problems with the 115 note the time that they have the problem.

Then report it in. The committee recommended that the club purchase a signal generator

Membership: No report.

Control Op: Nothing new. One experience of an open mic.

Interference: April 12 at around 10 am, we had open mic on the 440 machine. Please check your stations to ensure this doesn't happen. The signal seemed to originate from North Greeley.

Ham Fest: Nothing happening yet. Getting started in June.

Field Day: LRA/NCARC Field day at WOFT's place. Backup location is the Loveland Fire Training Center. Still planning antennas. Going to operate 2A with heavy emphasis on GOTA.

MOTION: Dave: NCARC and LRA join forces for Field day. Seconded and approved.
The NCARC will assist the LRA with field day this year.

Unfinished Business:

Events Center Repeater: An equipment check was performed at events center. We are awaiting installation of power and wiring.

Colorado Marathon: May 6th. Contact Jeff K0JEF. 970-214-4135 (cell)

Annual Officers Meeting: Still awaiting details

QSO Party: July 15 - July 16 1200 UTC - 0400 UTC.

New Business:

Cliff, W0ITD, who passed away this week, had a generator that belongs to NCARC. K00J will try to get our generator back.

CCARC Meeting: April 28th 1-4 PM. This is the group that coordinates repeater frequencies

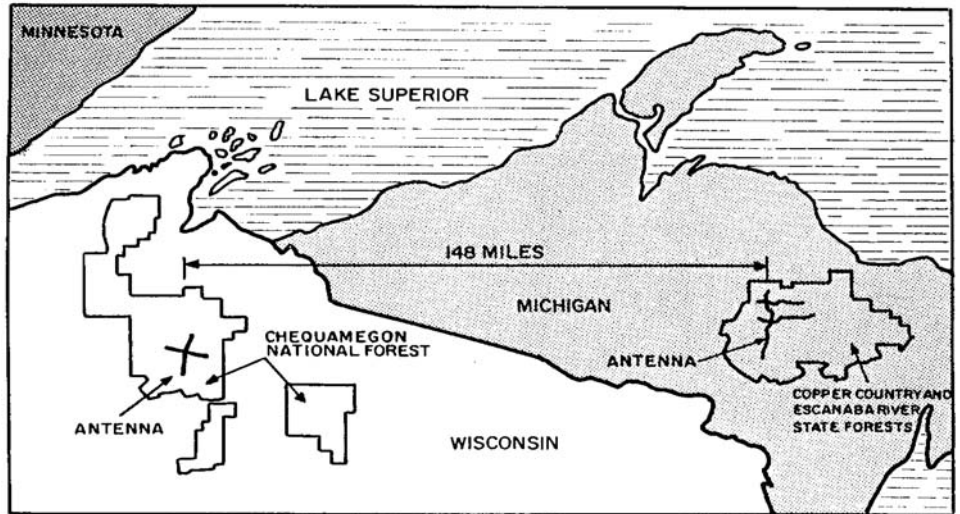
BARC Juniors will be giving a practice talk at the May LRA (2nd Saturday of May) for Dayton.

W0KGY SK -- still has an antenna at his house. We're looking for an antenna party to go remove the antenna.

ARES: October 6th there will be an exercise at the Ft Collins airport.

And you think you need more room for your antennas?

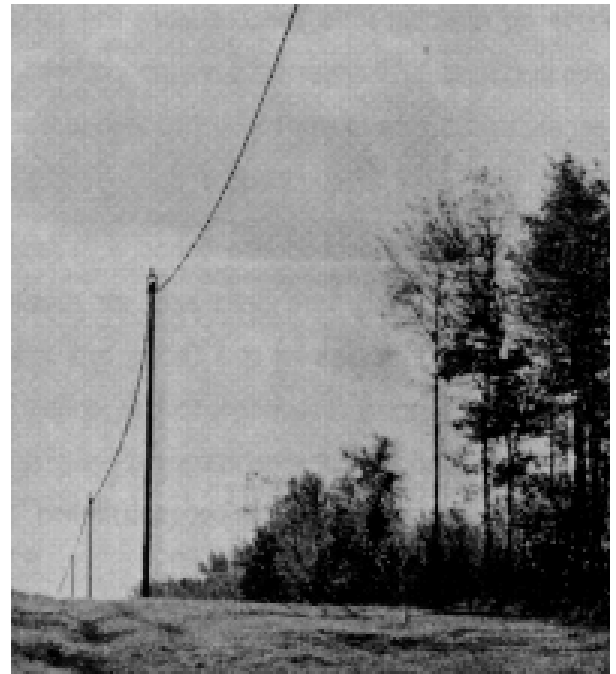
First made public by the US Navy in 1968, this Extremely Low Frequency communications system is designed to communicate with deeply submerged submarines. "Project ELF" uses low-frequency waves to signal one-way coded messages to US and British Trident submarines (as well as other Fast Attack subs). The system is used to alert them to surface for more detailed communications. Project ELF became fully operational in 1989 and broadcasts at frequencies between 30 Hz to 300 Hz. It consists of two transmitters, one near Clam Lake in Northern Wisconsin, and the other at Republic, in Michigan's Upper Peninsula. The Michigan and Wisconsin sites, separated by 148 miles as the crow flies, must operate simultaneously to meet worldwide coverage requirements.



One of the great difficulties associated with the use of ELF for communication purposes, is the problem of generating a useful signal. Due to its extremely low frequency, the antenna system is huge. An electromagnetic wave at 76 Hz has a full wavelength of just over 2,452 miles. A "scientific breakthrough" that occurred in 1969 allowed the use of antennas that were significantly shorter than expected for the ELF frequencies at which the system operates. The exact nature of that breakthrough remains "classified" information but the findings are related to the ground conductivity at the sites as well as improved antenna and receiver techniques. Due to the limited lengths of the system's antennas, they are placed near nonconductive rocks from the Precambrian era. To be useful, the rock formation must be fairly close to the surface and be large enough to support the ELF antenna grid. The rocks must be as nonconductive as possible so as not to "shorten" the electromagnetic wave. Very few places in the United States meet those conditions, Wisconsin and Michigan being the best two. (Think about how this differs from Amateur HF operation where we normally want high ground conductivity...).

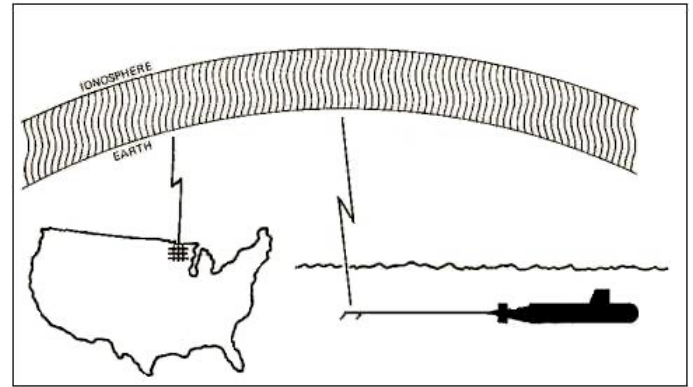
The Wisconsin antenna consists of two lines, each one about 14 miles long. The Michigan antenna uses three lines, two about 14 miles long and one roughly 28 miles long. Originally, the antennas were to be buried 6 feet underground, but reasons of economy dictated otherwise. The antennas that were actually built look like power lines, mounted on 40-foot wooden poles with a transmitter building near each antenna system. The transmitter facility in Michigan uses about six acres of land and the one in Wisconsin, deep in the Chequamegon National Forest, about two acres. A 165-mile underground cable connects the two sites, which have a typical operating frequency of 76 Hz. The very first ELF test transmission from Clam Lake took place in May 1982, when a message was successfully received by a submarine submerged at a depth of 400 feet in the Atlantic Ocean off the Florida coast.

The ELF antennas, resembling ordinary power distribution lines, are located above ground in cleared right-of-ways that are 70 to 100 feet wide. The antennas consist of two conductors in Wisconsin and a single conductor in Michigan. The transmitter sends an electrical current through the antenna cables into the earth at the "ground terminals". The end of each antenna element is terminated with one to three miles of buried horizontal ground wire and typically one or more arrays of well-type electrodes extending to depths of 100 to 300 feet. The current then flows back to the transmitter through the earth, completing the circuit. Most of the earth current flows deeply, and disperses through the non-conductive bedrock underlying the ELF system around and between the two sites.



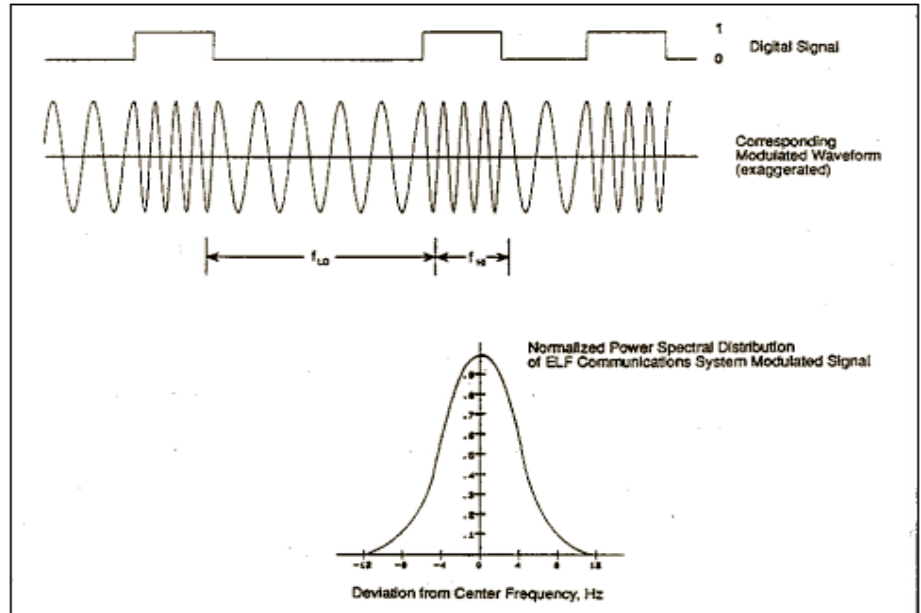
As a result of the high electrical conductivity of seawater, signals are attenuated rapidly as they propagate downward through it. In effect, seawater "hides" the submarine from detection while simultaneously preventing it from communicating with the outside world through conventional high-frequency radio transmissions. In order to receive HF communications, a submarine must travel at slow speed and be near the surface. Unfortunately, both of these situations make a submarine more susceptible to enemy detection. Lower frequencies, such as those in the ELF range, however, can be received considerably deeper in the ocean. Project ELF's signal at 76 Hz is capable of forming strong wavefronts that penetrate well below the ocean's surface. With the ELF system, millions of watts are transformed into a 2,500-mile long wave that turns the Laurentian granite bedrock of Lake Superior into a massive antenna for deep-sea contact with the submarine fleet.

The ELF antenna system produces a radiated signal between the ground and the ionosphere where it travels around the world filtering down through the ocean depths to reach the fleet of submarines. The subs that are running deep pick up the ELF signal using a long trailing antenna that stretches for several hundred yards behind the vessel.



The ELF message provides only basic information. It's not meant to be a substitute for the higher-frequency communication systems. The ELF signals do not provide the rate of information and speed of transmission of other systems but it "gets through" where the others cannot. It is a one-way, non-voice system, but it can provide sufficient information to the submarine's commander and signal him to surface for reception of more information via other means.

The ELF System uses a frequency modulation principle known as "minimum key-shifting" centered around 76 Hz. In this type of modulation, the signal consists of smoothly connected segments of sinusoids of two distinct frequencies. The figure shows a signal shifting between 72 Hz and 80 Hz depending on whether an analogous code of "one" or "zero" is being transmitted. Transitions from one frequency to the other occur at the peak of zero crossings of a wave in order to minimize the bandwidth of the frequency spectra. Both transmitters at Clam Lake and Republic can operate at other center and shift frequencies but have not done so operationally. These 76 HZ FM signals have field intensities much larger (and mask) ambient 60 Hz unmodulated field intensities generated by power utility transmission and distribution lines.



The power required for the Michigan and Wisconsin sites is about 5 megawatts each and each site requires some special measures to be taken both on the site as well as in the surrounding area. A unique lightning neutralization system is in use due to the size and configuration of the antenna system. Grounding of all metal structures such as fences in the surrounding area is required to avoid severe shock cause by the inductive coupling to the intense magnetic field generated by the operation. On a more positive note, faculty and researchers at the Michigan Technological University (MTU) School of Forestry and Wood Products have found that the Project ELF's antenna grid makes the trees grow faster. MTU foresters have been studying the effects ever since the system became operational over ten years ago. (Can you already visualize some of our fellow Amateur operators driving ground rods and connecting their 60 Hz AC Mains to them as backyard experiments?)

Those Amateur Radio operators who served in the Submarine Service of the U.S. Navy within the last few decades may be familiar with the ELF system and some may have even had the opportunity to use it. Many of those operators also maintain contact with each other using Amateur Radio and information found on the following websites:

Submarine Veterans Amateur Radio Association (SVARA)
<http://w0oog.50megs.com/>

SVARA Yahoo Group
<http://groups.yahoo.com/group/SVARA/>

