

The Link

July 2008



The Official Journal of the Buffalo Amateur Radio Repeater Association, Inc.

It's Time for the Annual Mobile Clinic and Picnic!

Summer is fully upon us and that means that it is time for the annual BARRA Mobile Clinic and Picnic at our Cole Road repeater site. The date is Monday, July 21, starting around 5:30 PM, with a rain date of the following Monday, July 28th. Directions to the site are at the right. For those wanting to do GPS routing, the site's address is 8741A Cole Road, Boston. There will be folks on 146.91/444.00 for talk-in should you wander in the wrong direction.

While the focus of this event has turned more to being a picnic than a work session on our rigs, there will be professional test equipment available to evaluate your radio's performance. If you plan on having to make adjustments to your radio, please bring your own manuals and other related tools. Our technical guys are good, but they don't know every rig out there.

For a little history lesson, the Mobile Clinic was born in a time when VHF and UHF rigs were either homemade or converted commercial equipment, almost always rock-bound (crystal controlled) and by today's standards, horribly drifty. All that rattling around in the car threw things out of adjustment over time. A once-a-year work session helped to true things up again for a while. Today's modern "wonder rigs" don't necessarily have the drift problems as of old, but it is surprising how many come out of the box with badly set audio levels and/or deviation. Many of today's rigs can be adjusted through front panel service menus without having to open the box... but you'll need the service information for your rig, they're all different!

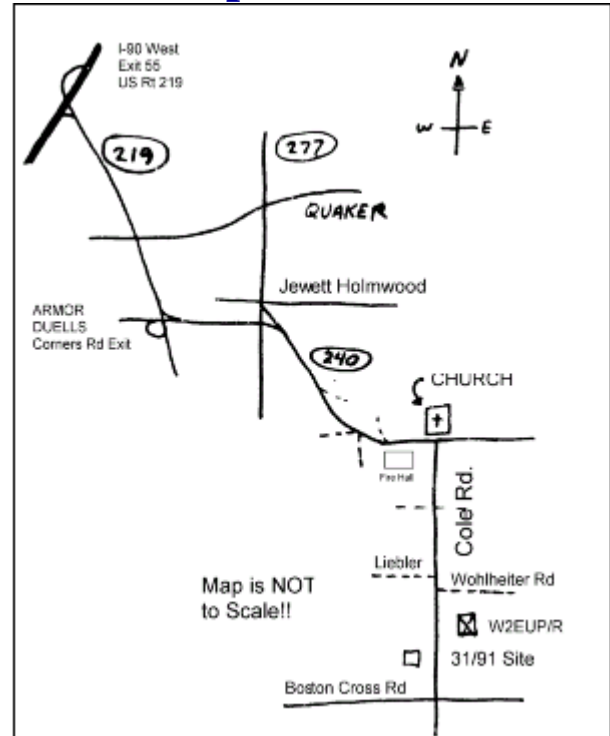
The picnic portion of the event is bring-your-own. The club will provide grills for cooking, and some locally famous hot dog condiments courtesy of K2RSK. You are welcome to bring a dish to share, and maybe even throw in a little extra for those who have to come directly from work. Gathering will start around 5:30 PM, and will continue to dusk... or beyond!

The Mobile Clinic is also an opportunity to see BARRA's flagship repeater site, home to the 146.91 and 224.82 repeaters and various linking equipment, remote receivers and transmitters. Also the work on "Chet's Shack" has been continuing and the progress on that can be inspected.

In all, it's a don't miss evening. We hope to see you all at the 2008 edition of the Mobile Clinic and Picnic.

Remember Transmitter Hunts?
There's a new one scheduled!
See Page 3!

Map to Cole Road Repeater Site



TOW2EUP/R FROM BUFFALO:

Take the Thruway, I-90, westbound, to Exit 55, US Rt 219. Continue down US 219 to the Armor Duells Corners exit (after Mile Strip Rd).

At the top of the exit, turn right.

Proceed to intersection with Rt 277, and continue straight through.

Proceed along Rt. 240 about 2.1 mi. as it bends and twists its way along. You will come to a stop light, bear to the left at the light. Watch for a fire hall on your right not far past the stop light – Cole Rd is soon after!

After the fire hall, very shortly on your left is a white church. Almost immediately is a right turn, watch for yellow "T" sign – this is Cole Rd! Turn rt. onto Cole Rd.

Proceed along Cole Rd approx. 6.1 miles. The site is less than 1/2 mile from the intersection of Liebler and Wohlheiter Roads. Look for two 100 ft. towers on your left.

Turn left onto driveway just past a pond and small house. Go up small hill and watch for directions for where to park. Please DO NOT park on the paved driveway – it is the driveway of our neighbors in the back.

The Mobile Clinic will begin around 5:30 pm and continue until dark, or thereabouts. In case of "iffy" weather, listen to 146.91/444.00 for updates about local conditions in Boston.

Buffalo Amateur Radio Repeater Association, Inc.

Club Officers & Directors

President	Nelson Oldfield WA2ZSJ '09	634-6394
Vice President	Doug Alderdice KA2WFT '09	834-2664
Secretary	Greg Miller K2GTM '08	289-0853
Treasurer	Ed Swan W2EAS '10	836-0417
Director	Dave Halik W2ZZA '08	824-3432

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Technical	Ted Ertl WA2HKS
Link Editor	Doug Alderdice KA2WFT
Associate Link Editor	Dave Sewhuk N2GH
WNYSORC Representative Chair	Ben Bass N2YDM
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Roster & Passwords	KA2WFT, W2EAS
Activities List	Ed Swan W2EAS
ID Badges	W2EAS
Erie County Emer. Coord.	Vince Harzewski N2JRS
Erie County RACES Officer	Gene Kremzier N2OBW

Voice Repeaters

K2GTM	PL 107.2	29.68-	Boston
K2ISO		145.17-	Wethersfield
K2ILH	PL 107.2	146.73-	Niagara Falls
W2EUP		146.91-	Boston
N2YDM	PL 107.2	147.00+	Kenmore
W2EUP		224.82-	Boston
WR2AHL	PL 110.9	442.00+	Wethersfield
WA2HKS		444.00+	Buffalo
WB2DSS	PL 151.4	444.75+	Kenmore

APRS Digi-peater

K2ILH-2	144.39	Amherst
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BARRA Tech Net

Join the BARRA Technical crew on the 146.91/444.00 system Wednesdays at 8 PM for answers to your technical questions.

RAWNY Net

Stop by Monday evenings at 7:00 pm and join the RAWNY club's net which meets on our 146.91 and 444.00 repeaters.

BARRA on the Internet

<http://barra.hamgate.net>

Club Calls

BARRA holds club calls W2EUP and K2ISO in honor and memory of two of its founders, Gil Boelke, W2EUP, and Hugh Wilson, K2ISO.

CBS-Scanners-Ham-Marine-Business Radios-Radar Detectors

HIRSCH'S

WNY's Largest Communication Store Since 1961
219 California Drive - Williamsville, NY 14221

Hours-M,T,Th,F 10-5:30; Sat. 10-5:00; Closed Wed.

(716) 632-1189

Sales - Service - Installation

WA2OLW (Leprechaun Graphics, 675-3764) still has BARRA jackets and T-shirts available.

Don't Forget to Get Your BARRA Mug!



These great looking, sturdy, quality ceramic mugs sport the BARRA buffalo logo, are dishwasher safe, and let you show your club colors in style!

Only \$5.00 Each!

Available at all club meetings

The BARRA E-Mail List Serve

To join, send an e-mail message to:

majordomo@hamgate.net

with the message subscribe barra in the main body of the note.

To send a message to the list subscribers, address your e-mail to:

barra@hamgate.net

The Link is published eight times a year by BARRA, the Buffalo Amateur Radio Repeater Association, Inc. The opinions expressed herein, however, are not necessarily those of the Board of Directors or membership of BARRA. Letters to the editor are solicited and must be signed. Names and addresses will be withheld if requested. Material for *The Link* should be sent to the Editor:

Buffalo Amateur Radio Repeater Ass'n
P.O. Box 507
N. Tonawanda, NY 14120-0507

or may be submitted electronically to the editor's e-mail address: ka2wft@arrl.net. The editor may be reached by telephone in the evenings at (716) 834-2664.

DISTRIBUTION

The Link is available in both print and electronic formats. If you wish to receive *The Link* in the Adobe cross-platform PDF format by e-mail instead of regular mail, please notify the editor at ka2wft@arrl.net. Regular mail recipients are charged \$4 beyond their dues.

ARTICLES

Articles for the *Link* on any subject, technical or general interest, are always welcome and encouraged. When submitting material to the *Link*, please type it or submit it electronically, if possible. Remember that the editor reserves the right to make necessary changes including reformatting and condensing for space and that Full Membership may be obtained by writing articles.

LINK DEADLINES

All material must be submitted to the Editor by the end of the month previous to the issue (e.g. December 31st for the January issue). Of course, if the material is received earlier than that date, you will have a better chance of getting your article in the next issue. All advertising is subject to the same deadline.

ADVERTISING

Want-Ads are free to BARRA members and are published in the next available issue. Ads from other hams are accepted free on a space-available basis. Ads appearing in other club newsletters with which BARRA has an exchange agreement are reprinted on a space-available basis.

Display advertising is available at the prevailing rates. Business card size is currently \$2.50/mo; full page is \$20.00/mo. Contact the editor for rates for other sizes.

DUES

Basic membership rate: \$25.00

Family member in the same household as first member: \$3.00

Discounts from basic rate

Senior Citizen (65+): -5.00

Disabled: -5.00

Voting member: -5.00

Full-time student with ID: -5.00

Each new member recommended: -1.00

US Mail newsletter delivery: add \$4.00

Note: A voting member is a member who has performed a service for BARRA (e.g. helped out at an activity, written a *Link* article, etc.).



Transmitter Hunts

Tom Foley, WA2EYF

Well guys, it has been years since we had transmitter hunts, but let us give it a shot on Thursday, August 12th at 7:00 PM. We will meet in the BJ's parking lot, away from the store, on Youngs Road in Tonawanda. Get off the Colvin exit on the I-290 and head north to the second signal just north of the highway. Turn left at the light and go around the bend and turn left on the other side of McDonald's. BJ's is on the right on the far end of the lot.

Back in the 70s Gil, W2EUP, and Fran, K2GUG, got it going. We would have one every month and it lasted several years. The winner would be the next to hide. Fran and Gil were great hunters, they even found my occasional beeping "Bunny" (the hidden tx) buried in a Grand Island swamp, with a reed over the antenna.

On another one, we started at the Thruway Mall and found Fran on his back in two feet of snow, in a field, way off Center Road, between East Aruora and Ch. 4's tower. He came in the back way, it was snowing and night, there were no foot prints and no light of any kind. All we had were flashlights. You could not see Fran until you were right on him. He was comfortable with a big smile on his face.

I won one by default once. All of us arrived together at a field in Pendelton at dusk, in the summer. As soon as they stepped into the field, everyone was covered with mosquitoes and yelling. They all went to the house of a guy who lived close by, to put salve on their bites. Oh, me? I walked right through the field and mosquitoes and found a guy in a tree with a HT. It's really a fun night out and you learn about VHF propagation. After we are finished, we all went to a restaurant.

So, how about it?? We will start at 7:00 PM and you can get there as early as you need to prepare.

January Meeting Eliminated

Members at the June general membership meeting voted to approve the proposal made in February concerning the elimination of the January general meeting. The proposal was made due to the poor attendance most years at the January meeting because of the weather conditions. The January meeting has been the annual report of the Technical Committee and is a don't miss event, yet sadly, many did miss it each year.

The Technical Committee report has been moved to September and per the results of the vote, the January meeting has been removed from our calendar so the members can stay safely at home in January!

Don't forget to check in with the BARRA
Tech Net

Wednesdays, 8 PM

146.91/224.82/444.00

Repeaters in the sky

Building a Satellite Earth Station

A Technical Perspective

Dave Halik, W2ZZA

About four years ago satellite UO-14 failed in orbit. Ted, WA2HKS had been providing a downlink for the ill-fated "bird" and was retransmitting it on the WA2HKS and W2EUP repeaters. This was a great service and it introduced a large number of hams to satellite communications. When UO-14 failed the system went dark.

After UO-14 failed, Sandy, KC2LGK, (my XYL) asked me to put together a satellite earth station so that she could continue her endeavors into satellite communications on other satellites.

The goal was to put together a tracking earth station that was so automatic that all the details would take care of themselves and make the operation hands free.

The target satellites were AO-51 and SO-50, both FM EZ satellites, so named because they have FM input on 2 meters (145 MHz) and FM output on 70 cm (435 MHz) and are relatively easy to use -- relatively being the key word. A good way to think of an EZ sat is like a cross-band repeater in the sky.

The difference between a terrestrial repeater and a FM EZ sat is that the satellite is about 600 or so miles overhead (at its closest point) and moving at 17,000 miles per hour. And, unlike a terrestrial repeater, the FM EZ satellites have an output power of ½ watt or less. These satellites are small and run off solar charged batteries. The entire satellite is about the size of a milk crate (18 inch cube). They orbit the earth about every 90 minutes and half the time they're running on the dark side of earth, powered by small batteries, that's about 18 charge/discharge cycles a day.

THE TECHNICAL CHALLENGES.

Since the satellites are moving so fast as they orbit there is a Doppler shift in the carrier frequency when received from a fixed location. The shift can be as much as +/- 15 kHz. It's clear the receiver and transmitters used for the earth station will need to shift frequency as the satellite passes over head. First tuning high as the satellite approaches and then low as it passes by. The selected transceiver should be remotely controllable to adjust for Doppler shift as satellite flies by. A transceiver that has the ability to receive on one band and simultaneously transmit on the other band is advisable. Although you can use a transceiver that does not do duplex operation it's much easier to run full duplex and be able to hear yourself on the downlink. For our earth station we selected the Icom 821H transceiver because it meets all these requirements and was priced within our budget. Other good choices might be the Icom 820, Icom 910, Icom 970, Kenwood TS 790, or the Yaesu FT-736.

WEAK SIGNAL FROM THE SATELLITES.

Remember the satellite can be ½ watt or less 600 miles or more away. With these weak signals a high gain antenna is needed and as the satellite goes down range as much as 2500 miles before it drops below the horizon the signals are even weaker. To receive the satellites require high gain antennas, low loss transmission line (½ hard-line or larger) and a mast mounted low noise preamp. Of course the best high gain antennas are directional and need to be pointed at the signal source. For best performance the downlink

antenna should be circular polarized having both vertical and horizontal elements.

For a pre-amp the Icom AG1 430 MHz mast mount GASFET unit is a good choice. The nice thing about this type of preamp is that it is powered and switched by the Icom 821H (and other models) right on the coax so no power supply or separate cable is needed. Icom also makes newer models, the AG35 for UHF and the AG25 for VHF

A tracking antenna system is needed to point the antennas at the satellites as they form an arc in the sky. This requires a set of rotors. One to rotate the antenna's azimuth (N,E,S,W) and the second to moves the antenna's elevation (up,down). This way the antennas can be steered to any point in the sky. The tracking antenna system also needs to have external control inputs so it can be controlled by a computer interface. By far the most popular rotors used for azimuth-elevation control are the Yaesu G5500 pair also sold under the KenPro name. We found a good set on eBay for a fraction of the new price.

OK, so we have a radio, antennas, low loss transmission line, pre-amps and rotors. We need a way to tie it all together: unified control and tracking software. Computer software is required to locate the chosen satellite in the sky and send commands to the radio and rotors thru some kind of interface. We chose Orbitron Software <http://www.stoff.pl/> because it was free to use and had features like rotor/radio control (built-in or user's driver support) and automatic Kep file download and update. By the way a "Kep" file is short for Keplerian elements that contains orbital information for a satellite or object in space. It is used by the Orbitron software to calculate the location of the satellites in the sky based on the earth station's ground location (latitude and longitude). The software also sets the radio downlink and uplink frequencies from data in the satellite database.

Of course we needed a control interface for the radio and the rotors. The interface must allow the computer to send and receive commands from and to the radio as well as the rotor controllers. We chose to use a homebrew interface for both.

The radio required a CI-V arrangement. This is a simple RS-232 level converter (+/-12V to TTL 5V) and a multiplexer that merges the TX and RX data on one cable. There are many circuits online; here is a link to one. <http://www.seedsolutions.com/gregordy/Amateur%20Radio/Experimentation/CIVInterface.htm>

For the rotor control interface I did a board layout and built up a FOD track interface. This is a printer port adapter that with the right driver nicely controls the KenPro rotors. Here is a link to the Fodtrack site. <http://ludens.cl/Electron/fodtrack/fodtrack.html>

So we don't have to tune the radio to track the Doppler shift or mess with the rotors to aim the antenna the computer software and interface does all that, but there is one thing left to make the setup truly hands free: the addition of a push to talk foot switch and a Sennheiser HMD25-1 headset-mic finish the package.

At this time Sandy, KC2LGK, has made satellite contacts in all but a few of the lower 48 states, most of Canada, Central America and the Islands of the Caribbean, but her best Satellite contact is the Queen Mary Maritime Mobile. [see her article in last October's Link]

So that all there is to it. From Grid Square FN02 this is W2ZZA. I'll talk to you on the next Pass.

Field Day!

A few random views of BARRA's 2008 Field Day station, caught by KA2WFT.



"Oh, for crying out loud, Bill, I said a 'Sheep Shank,' not a 'Sheep Snarl'!"



Carl, WA2OLW's sons Tim, KC2SZW, and Jim, KC2SZV, try their hand at operating... and gave us some ops-under-18 points!



W2ZZA, KC2PIT and KB2TOY valiantly trying for a satellite QSO.



How many licensed hams (and gallons of water sealer) does it take to light a camp fire?



K2GTM and KB2TOY puzzle out the usual logging network issues.

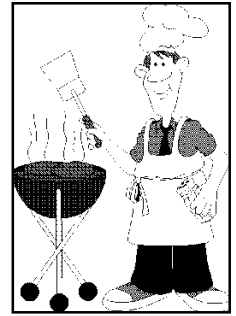


The 2008 Field Day Site.

Buffalo Amateur Radio Repeater Ass'n

Post Office Box 507

N. Tonawanda, NY 14120-0507



FIRST CLASS MAIL

Calendar of Events

GENERAL MEETINGS

General meetings are held at St. Bartholomews Episcopal Church, Brighton and Fries Roads, Tonawanda, across from Kenmore East HS. Doors open at 7:00 pm for rag chew, business meeting at 7:30, with program following.

Monday, July 21, 2008 -- Annual BARRA Mobile Clinic and Picnic at the Cole Road repeater site. A map and directions are on Page 1.

Monday, September 15, 2008 -- Report of the Technical Committee to the membership... our new September program with the elimination of the January meeting, see Page 3.

Monday, October 20, 2008 -- Annual meeting of BARRA, Inc. Election of board members and hearing of reports.



**NO GENERAL MEETINGS IN MARCH,
MAY, AUGUST OR NOVEMBER**
The *Link* is not published in those months.

BOARD MEETINGS

Board Meetings are held the second Monday of every month at the **Athens Family Restaurant**, 2801 Harlem Rd, Cheektowaga, between Genesee Street and George Urban Blvd. The meetings begin at 7:30 PM and **members are always welcome** to sit in on a meeting or bring concerns to the board.

TECHNICAL COMMITTEE

The Technical Committee has formal meetings the first Friday of every month at 7:00 PM in Room 117 of the BOCES Potter Road Career and Technical Center, 705 Potter Road, West Seneca (Corner of Slade, Potter and Orchard Park Rds). Come on out to BARRA's own CCITT (Coffee & Crumpets Interrupted by Technical Talk), where progress of current projects is evaluated and new projects are planned. The meetings usually conclude with munchies at a nearby restaurant.

See you at the
BARRA Mobile Clinic & Picnic
Monday, July 21st!

Rain Date: Monday, July 28th.