OUR 27TH YEAR!

EPARA BEACON

VOL. 7, NUMBER 1 THE OFFICIAL NEWSLETTER OF THE EASTERN PENNSYLVANIA AMATEUR RADIO ASSOCIATION JANUARY 2023

NEXT CLUB MEETING: JANUARY 12TH

Monroe County Public Safety Center, 100 Gypsum Rd Stroudsburg, PA 18360

Welcome to the EPARA Beacon! This newsletter is published monthly and is the official newsletter of the Eastern Pennsylvania Amateur Radio Association. EPARA has served the amateur radio community in the Pocono Mountains for over 25 years. We have been an ARRL affiliated club since 1995. We offer opportunities for learning and the advancement of skills in the radio art for hams and non-hams alike. EPARA supports Monroe County ARES/RACES in their mission of providing emergency communications for served agencies in Monroe County. Feel free to join us at one of our meetings or operating events during the year. The club meets on the second Thursday of every month, at the Monroe County 911 Emergency Control Center. The business meeting starts at 7:30 P.M. Anyone interested is invited to participate in our meetings and activities.

ZOOM Meeting Info: Meetings begin at 7:30PM!

https://us02web.zoom.us/j/85463346031?pwd=bU1KcVZoaVZiVEUvdjRsUXlNNHZkZz09

Meeting ID: 854 6334 6031 Password: 244632

From The President

2022 is now behind us and we look forward to 2023. We will begin VE sessions as well as ARES meetings on January 27th. The Holiday season was quite busy for me but I did manage to confirm the use of Big Pocono State Park for Field Day as well as Antenna/Elmer weekend. I also have reserved the meeting room at the 911 center for our meetings and testing sessions for the year 2023.

It was great to see so many of you show up at the Christmas Dinner, we took over the place! I had a great time and I hope you all did as well. We did have to cancel the Santa net as the 045 was off air on Christmas Eve, we considered moving the net to the 865 repeater but our net control and some of the regular check-ins with children could not reach the 865 from their QTH. I personally think many of us should get 160-meter capability and hold weekly nets on 1.8 Mhz, hey its only around 260 feet of wire.....

Well that's it for now. Our next meeting will be on January 12. I hope you all had a Merry Christmas, A Happy Hanukkah, and a wonderful New Year
73 Chris AJ3C

CONTACT INFORMATION

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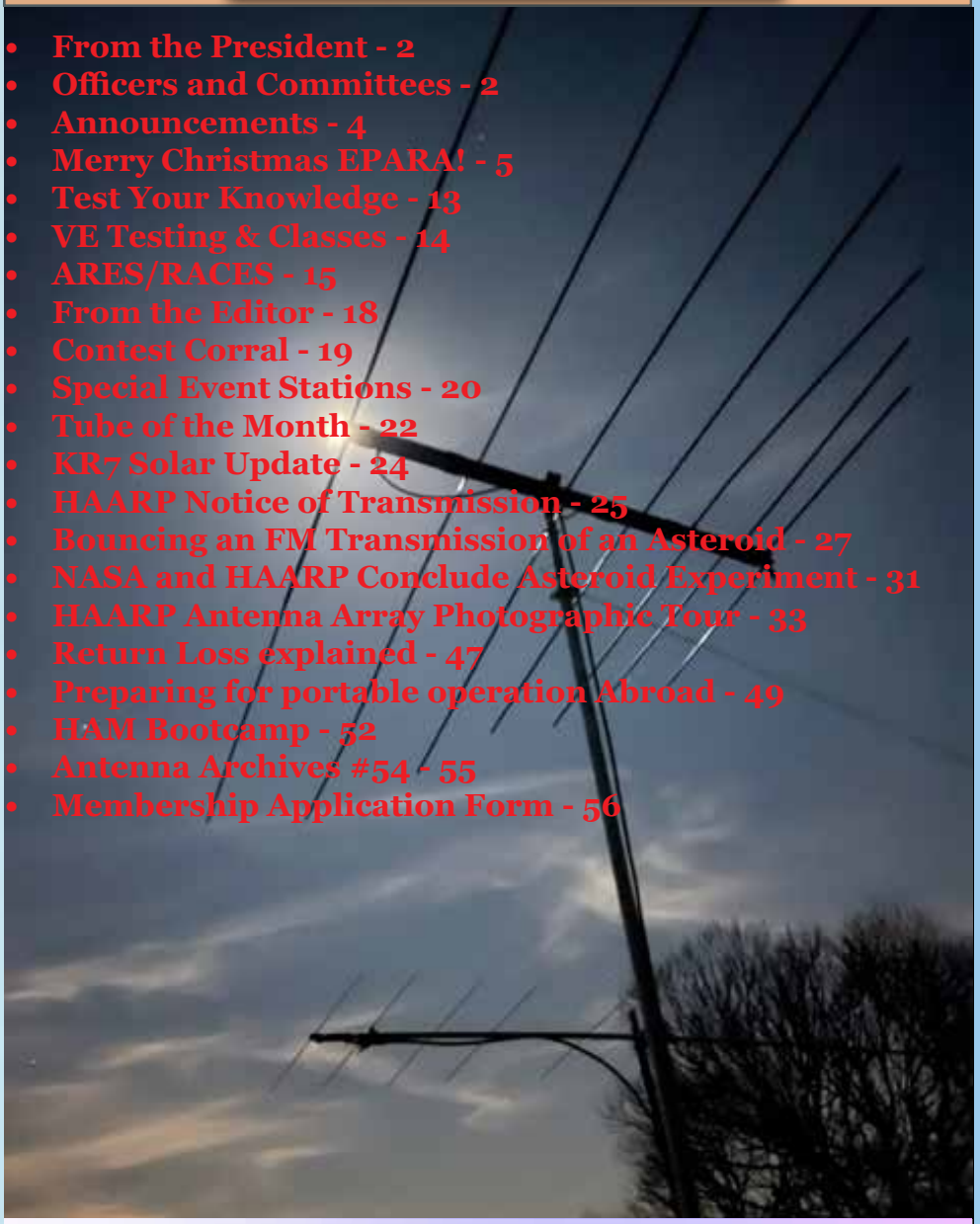
What's INSIDE this ISSUE



EPARA Net list

Monroe county ARES-RACES – Sunday's 8:30 PM, 146.865 MHz, PL -100 Hz

The Monday Night Pimple Hill repeater 8:30 PM (Repeater freq = 447.275 with a - 5MHz offset) DMR TECH Net on TG314273* Time Slot 2

SPARK Information/Swap Net – Tuesday's 8:30 PM, 147.045 MHz, PL 131.8 Hz

The Wednesday Night EPARA Hot Spot DMR Rag Chew net at 8:30 PM, TG 3149822* Time Slot 2 (N3IS Talk Group)

EPARA Tech Net – Friday's 8:30 PM, 147.045 MHz, PL +131.8 Hz

*TG = Talk Group

Announcements
AND UPCOMING EVENTS

EPARA Club Dues!
Club dues are coming due next month. Contact Scott KC3IAO via his email: KC3IAO@hobbyguild.com and you can send him a check or pay via PayPal.

Ham TV to Return to the ISS
During the AMSAT-UK Space Colloquium on October 8th, AMSAT announced the Ham TV unit for the ISS is repaired and on the way to Houston for testing. The flight date dependent on testing.

Ham TV has been inoperative since April 2018. It had been active since April 2014, having been launched to the ISS in 2013. It was returned to earth for diagnosis and repair in late 2018.

The ARISS Ham TV transmitter is capable of downlinking DVB-S digital video of ARISS contacts and other activities on board the ISS to amateur ground stations in the 2.3 GHz amateur band. More information can be found at https://www.ariss.org/hamtv-on-the-iss.html

4H Ham Radio Club
EPARA is looking forward to getting involved with the startup of a local 4H club dedicated to the fundamentals of ham radio for our younger generation. Announcements will follow as we make plans in the near future.

Rep. Bill Johnson Introduces Bill to Eliminate Private Land Use Restrictions on Amateur Radio
Congressman Bill Johnson (OH-6) introduced a bill in the U.S. House of Representatives (H.R.9670) on Thursday, December 22, 2022, to eliminate private land use restrictions that prohibit, restrict, or impair the ability of an Amateur Radio Operator from operating and installing amateur station antennas on property subject to the control of the Amateur Radio Operator.

Amateur Radio Operators Invited to participate in Asteroid Bounce Experiment
The High-frequency Active Auroral Research Program (HAARP) will be conducting a research campaign/experiment on December 27, 2022, with transmissions between 1100 - 2300 UTC (0200 - 1400 AKST).

This experiment will reflect HAARP transmissions off of Near-Earth Asteroid (NEA) 2010 XC15, and the echo will be received by the Owens Valley Radio Observatory Long Wavelength Array (OVRO-LWA) at the California Institute of Technology (Caltech) and by the University of New Mexico's Long Wavelength Array (UNM-LWA). The target asteroid will be roughly two lunar distances away from Earth at the time of transmission. Characterizing the interior structure and composition of NEAs is critical for advancing the understanding of solar system evolution and aiding in planetary defense.

Rule #1 of Amateur Radio, it is a hobby, unless you figured out a way to fashion a living out of it.
Rule #2 of Amateur Radio, life is not a hobby and typically carries heavy responsibilities of everything that is not a hobby.
Rule #3 of Amateur Radio, never give up a LIFE event for a Ham event. You may make some great memories at the Ham event, but the guilt you may carry missing a LIFE event can be a terribly heavy millstone.
Rule #4 of Amateur Radio, as technology moves forward, so does Ham Radio - do what makes you happiest, experiment with other elements of Ham Radio as LIFE allows.
Rule #5 of Amateur Radio, it is only Ham Radio, when confused always refer to Rule #1 through #4.

Merry Christmas EPARA!

Merry Christmas EPARA!

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Merry Christmas EPARA!

TEST YOUR KNOWLEDGE!

Which of the following improves the efficiency of a ground-mounted quarter-wave vertical antenna?

A. Installing a radial system
B. Isolating the coax shield from ground
C. Shortening the radiating element
D. All these choices are correct

Last month's answer was, A. Proper phasing of the antennas is necessary to produce the proper match and radiation pattern desired. Manipulating the phase of the driven elements in this way influences the direction in which the array achieves maximum gain. Maximum gain is realized where the wavefronts from each driven element in the array arrive in such a way that they add constructively. That phase is influenced by the distance the wave had to travel and the phase of the wave at the radiating elements.

DMR
DIGITAL MOBILE RADIO

The EPARA HOT SPOT Wednesday night DMR rag chew is here!

Wednesday evenings at 8:30 PM local, 0:30 UTC!

Tune your DMR radios to Talk Group 3149822 TS2 to join the

N3IS EPARA Hot Spot rag chew DMR net.

Listen to the Tech Net Friday nights on the 147.045 repeater to learn more about joining this net and for upcoming ZOOM meetings announcements to learn more about programing your radios and hot spots!

VE Testing & Classes

Anyone looking to take an exam is encouraged to contact Chris AJ3C to preregister at least one (1) week in advance of the test date. If you have any questions or to register, Chris can be reached via email AJ3C@GMX.COM. VE sessions are being held the 4th Friday of each month at 6pm at the Monroe County 911 training center. Seating is limited for the time being so we can follow the health guidelines set forth by the county and state.

VE sessions are back - contact Chris AJ3C for further information!

AMATEUR RADIO CLASSES

ARES/RACES meetings are now being held on the fourth Friday of each month at 7PM. The meetings are once again being held at the 911 call center. These meetings will serve as training sessions covering several aspects of amateur radio emergency communications. We will start with traffic handling and the use of Radiograms and the ICS 213 general message form. Future sessions will cover the use of several ICS forms and the setup and use of digital communication modes including Winlink, Packet Radio, APRS, and the FLDIGI software program. Meeting are open to all, you do not need to be an ARES/RACES team member to attend.

Want to Put Your Ham Radio Skills to Good Use? Get Involved in

EmComm!

One of the missions of the Amateur Radio Service is for amateur radio operators to provide public service and emergency communications (EmComm) when needed. We act as a voluntary noncommercial communication service and pitch in to help our communities and first responders.

So, what organizations are out there for community-minded amateur radio operators and what can we do to help?

Join In

One good entry point into public service and emergency communications is to join SkyWarn, a volunteer program run by the National Weather Service (NWS) with more than 290,000 trained severe weather spotters. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to the NWS.

Not all of these weather spotters are amateur radio operators, but many are. Amateur radio communications can report severe weather in real time. When severe weather is imminent, SkyWarn spotters are deployed to the areas where severe weather is expected. A net is activated on a local repeater and SkyWarn spotters who are Hams check into that net. The net control advises the spotters when they might expect to see severe weather, and the spotters report conditions such as horizontal winds, large hail, rotating clouds, and even tornadoes.

To become a SkyWarn spotter, you must attend a class that teaches you the basics of severe weather, how to identify potentially severe weather features, and how to report them. The classes are free and typically last about two hours. Check your local NWS website for class schedules.

ARES/RACES/CERT

Another way Hams can become involved in public service and emergency communication is to join an ARES or RACES group. Technically, these are two separate services—the Amateur Radio Emergency Service (ARES) is run by the ARRL, while the Radio Amateur Civil Emergency Service (RACES) is a function of the Federal Emergency Management Agency (FEMA). Amateur radio operators who typically take part in one also take part in the other.

To participate in RACES, you'll need to take some self-study FEMA courses in emergency preparedness and emergency-response protocols. Classes may or may not be required to participate in ARES. These requirements are set by each individual ARES group. To get involved with either ARES or RACES, ask your local club members when they meet. You can also contact the Section Manager or Emergency Coordinator for your ARRL section. To contact them, click here and find the section that you live in.

Amateur radio operators belonging to ARES (and its predecessor, the Amateur Radio Emergency Corps) have responded to local and regional disasters since the 1930s, including the 9/11 attacks, and Hurricane Katrina and Hurricane Michael, among others.

The Community Emergency Response Team (CERT) program trains volunteers—both Hams and non-hams—how to be prepared for disasters that may impact their area. They provide basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a nationwide approach to volunteer training and organization that first responders can rely on during disaster situations, allowing them to focus on more complex tasks.

What Gear Do You Need?

For most local needs, a 5-watt VHF/UHF handheld transceiver is sufficient for utilizing local repeaters to relay messages and report on conditions as they exist. Replacing the radio's stock antenna with a higher gain antenna or connecting it to a magnetic mount on a vehicle will increase range significantly.

Even better is a VHF/UHF mobile radio installed in your vehicle with 25 or more watts output and a good mobile antenna. In the event the repeater loses power, you can talk over a considerably larger area in simplex mode with the extra power and a good mobile antenna.

If you work with an ARES or RACES group, you may be asked to act as a county control station. In this capacity, you'd need both HF and VHF transceivers in a fixed location, such as your house, with a good antenna system and emergency power capabilities like a generator or batteries. This allows you to make contacts within your state and throughout the U.S.

Helping Hams

Ham radio can play a key role in emergency situations. Here are a few examples:

- Ham radio connected firefighters and police departments, Red Cross workers, and other emergency personnel during the 2003 blackout that affected the northeast United States.
- In 2017, fifty amateur radio operators were dispatched to Puerto Rico to provide communications services in the wake of Hurricane Maria.
- Amateur radio operators provided communications in the aftermath of the Boston Marathon bombing when cellphone systems became overloaded.

- During Hurricane Katrina, more than one thousand ARES volunteers assisted in the aftermath and provided communications for the American Red Cross.
- During the devastating Oklahoma tornado outbreak that began in May 1999, amateur radio operators—giving timely ground-truth reports of severe weather—played a critical role in the warning and decision-making processes at the NWS Weather Forecast Office in Norman, Oklahoma.

Credit: https://www.onallbands.com/want-to-put-your-ham-radio-skills-to-good-use-get-involved-in-emcomm/

From the Editor

Eric, N3SWR

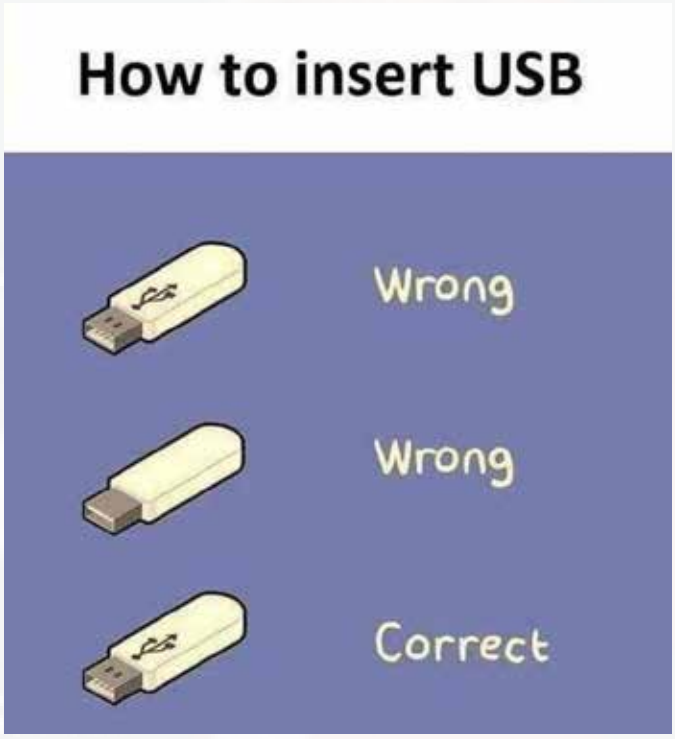
This has been one wild Christmas to remember from the crazy temperature swings to the EPARA Christmas party that put all the past years to shame. I has a great time meeting many of you and taking pictures that will be remembered for years to come.

I've been busy finding new sources for articles to stuff this newsletter with - so enjoy!

And last but not least - did any of you happen to catch the HAARP transmission on the 27th?
It was a constant 2 hertz chirp on 9.6MHz that you could hear using almost any mode. If you missed it, you can listen to a clip from that is embedded on page 30. It's in mp3 format so any computer can handle that easily.

I want to wish every one of you a safe and Happy New Year! I think this year is going to be a good one terms of HAM radio. See you on the air :)

Cheers for now!
Eric
N3SWR



"I love being married. It's so great to find that one special person you want to annoy for the rest of your life."
—Rita Rudner

Topics of Interest

Have an idea you would like to share with your fellow hams? Interested in one of the new exotic digital modes and would like to get others interested in it too? Found a blog somewhere that you think others would find interesting? Members are encouraged to submit items of interest for publication. Submitted articles (are suggested) to be no more than a page or two in length and may be edited for content and grammar. The EPARA officers and newsletter editor reserve the right to determine which items will be included in The Beacon. The deadline for publication is the 15th of the month. The publication date will be at the end of each month. Copyrights are the property of their respective owners and their use is strictly non-profit/educational and intended to foster the spirit of amateur radio.

If you've taken pictures at an event and would like to submit them for possible inclusion in the newsletter, forward them to the newsletter editor. Please send action shots, if possible. Faces are often preferable over the backs of heads. Many hams may be way too overweight, so please consider using a wide-angled lens.

Disclaimer

The Beacon is not representative of the views or opinions of the whole organization, and such views and opinions expressed herein are of the individual author(s).

Contests!

Contest Corral

January 2023

Check for updates and a downloadable PDF version online at **www.arrl.org/contest-calendar**.
Refer to the contest websites for full rules, scoring information, operating periods or time limits, and log submission information.

Start - Finish				Bands	Contest Name	Mode	Exchange	Sponsor's Website
Date	Time	Date	Time					
1	0000	1	0100	3.5	AGB New Year Snowball Contest	CW Ph Dig	RST, serial, mbr (if any)	www.qsl.net/eu1eu/agb_nysb.htm
1	0800	1	1100	3.5, 7	SARTG New Year RTTY Contest	Dig	RST, serial, name, "HNY" greeting	www.sartg.com/contest/nyrules.htm
1	0900	1	1200	3.5-14	AGCW Happy New Year Contest	CW	RST, serial, mbr (if any)	www.agcw.de/contest/hnyc/hnyc-engl
1	1400	1	1800	144, 432	AGCW VHF/UHF Contest	CW	RST, serial, power class, 6-char grid	www.agcw.de/contest/vhf-uhf
2	0000	2	0100	1.8-28	K1USN Slow Speed Test	CW	Max 20 WPM; name, SPC	www.k1usn.com/sst.html
3	0100	3	0159	1.8-28, 50	Worldwide Sideband Activity Contest	Ph	RS, age group (OM, YL, Youth YL or Youth)	wwsac.com/rules.html
3	0200	3	0400	3.5-28	ARS Spartan Sprint	CW	RST, SPC, power	arsqrp.blogspot.com
4	0200	4	0330	7	QRP Fox Hunt	CW	RST, SPC, name, power	www.qrpfoxhunt.org
4	1300	4	1400	1.8-28	CWops Test (CWT)	CW	Name, mbr or SPC	cwops.org/cwops-tests
4	1700	4	2100	144	VHF-UHF FT8 Activity Contest	Dig	4-char grid square	www.ft8activity.eu/index.php/en
4	1900	4	2000	1.8-28	CWops Test (CWT)	CW	Name, mbr or SPC	cwops.org/cwops-tests
4	2000	4	2100	3.5	UKEICC 80-Meter Contest	Ph	6-char grid square	www.ukeicc.com/80m-rules.php
5	0000	6	0300	7	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or power	qrpcontest.com/pigwalk40
5	1800	5	2200	28	NRAU 10-Meter Activity Contest	CW Ph Dig	RS(T), 6-char grid square	nrrlcontest.no
5	2000	5	2200	1.8-28, 50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
6	0200	6	0330	3.5	QRP Fox Hunt	CW	RST, SPC, name, power	www.qrpfoxhunt.org
6	2000	6	2100	1.8-28	K1USN Slow Speed Test	CW	Max 20 WPM, name, SPC	www.k1usn.com/sst.html
7	0000	7	2359	3.5-28	PODXS 070 Club PSKFest	Dig	RST, SPC	www.podxs070.com
7	1200	8	1200	1.8-28	WW PMC Contest	CW Ph	RS(T), PMC abbrev or CQ zone	www.s59dcd.si/index.php/sl/ww-pmc
7	1200	8	2359	1.8-28, 50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
7	1300	7	1700	3.5, 7	RSGB AFS Contest, CW	CW	RST, serial	www.rsgbcc.org
7	1500	8	1500	3.5-14	Original QRP Contest	CW Ph	RST, serial, power category	www.qrpcc.de/contestrules/oqrpr.html
7	1600	7	2359	3.5-14, 18, 21, 24, 28, 2 repeaters	ARRL Kids Day	Ph	name, age, QTH, favorite color	www.arrl.org/kids-day
7	1800	8	2359	3.5-28	ARRL RTTY Roundup	Dig	W/VE: RST, SP; non-W/VE: RST, serial	www.arrl.org/rtty-roundup
7	2000	8	0700	1.8	EUCW 160-Meter Contest	CW	RST, name, member or "NM"	www.eucw.org/eu160.html
8	0630	8	0830	3.5, 7	NRAU-Baltic Contest, SSB	Ph	RST, serial, fylke/län/province/region	www.nraubaltic.eu
8	0900	8	1059	28	DARC 10-Meter Contest	CW Ph	RS(T), serial, DOK (if any)	www.darc.de/der-club/referate/conteste
8	0900	8	1100	3.5, 7	NRAU-Baltic Contest, CW	CW	RST, serial, fylke/län/province/region	www.nraubaltic.eu
9	0100	9	0300	1.8-28	4 States QRP Group Second Sunday Sprint	CW Ph	RS(T), SPC, mbr or power	www.4sqrp.com/SSS/sss_rules.pdf
11	1700	17	2100	432	VHF-UHF FT8 Activity Contest	FT8	4-char grid square	www.ft8activity.eu
14	0000	14	2359	3.5-28	YB DX Contest	Ph	RS, serial	ybdxcontest.com
14	1200	15	1200	3.5-28	UBA PSK63 Prefix Contest	Dig	RSQ, UBA section or serial	www.uba.be/en/ht/contest-rules
14	1800	15	0559	1.8-28	North American QSO Party, CW	CW	Name, SPC	www.ncjweb.com/NAQP-Rules.pdf
15	1300	15	1700	3.5, 7	RSGB AFS Contest, Data	Dig	RST, serial	www.rsgbcc.org
15	2300	16	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or power	qrpcontest.com/pigrun
18	1700	18	2100	1.2G	VHF-UHF FT8 Activity Contest	Dig	4-char grid square	www.ft8activity.eu/index.php/en
19	0000	20	0300	14	Walk for the Bacon QRP Contest	CW	Max 13 WPM; RST, SPC, name, mbr or power	qrpcontest.com/pigwalk20
19	0130	19	0330	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or power	naqcc.info
21	1200	22	1159	1.8-28	Hungarian DX Contest	CW Ph	RS(T), HA county or serial	ha-dx.com/en/contest-rules
21	1200	22	1159	3.5-28	PRODigi Contest	Dig	RST, serial, "M" if a mbr	www.procontestclub.ro
21	1300	21	1700	3.5, 7	RSGB AFS Contest, SSB	Ph	RS, serial	www.rsgbcc.org
21	1800	22	0559	1.8-28	North American QSO Party, SSB	Ph	Name, SPC	www.ncjweb.com/NAQP-Rules.pdf
21	1800	22	0559	1.8-28	NA Collegiate Championship, SSB	Ph	Name, SPC	www.w9smc.com/nacc
21	1900	23	0359	50 and up	ARRL January VHF Contest	CW Ph Dig	4-char grid square	www.arrl.org/january-vhf
21	2000	22	0559	1.8-7	Feld Hell Sprint	Dig	(See rules)	sites.google.com/site/feldhellclub
25	0000	25	0200	1.8-28, 50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	www.skccgroup.com
25	2000	25	2100	3.5	UKEICC 80-Meter Contest	CW	6-char grid square	www.ukeicc.com/80m-rules.php
25	2300	29	2300	1.8-7	AWA Linc Cundall Memorial CW Contest	CW	RST, eqpt year, input power	antiquewireless.org
26	0130	26	0330	1.8	NAQCC CW Sprint	CW	RST, SPC, mbr or power	naqcc.info
27	2200	29	2200	1.8	CQ 160-Meter Contest, CW	CW	RST, SP or CQ zone	www.cq160.com/rules.htm
28	0600	29	1800	3.5-28	REF Contest, CW	CW	RST, French dept or serial	concours.r-e-f.org/reglements
28	1200	29	1200	3.5-28	BARTG RTTY Sprint	Dig	Serial	bartg.org.uk
28	1300	29	1300	3.5-28	UBA DX Contest, SSB	Ph	RST, serial, section (if ON)	www.uba.be/en/ht/contest-rules
28	1900	29	1900	All	Winter Field Day	CW Ph Dig	Category, ARRL section or "DX"	www.winterfieldday.com

There are a number of weekly contests not included in the table above. For more info, visit: **www.qrpfoxhunt.org**, **www.ncccsprint.com**, and **www.cwops.org**.
All dates and times refer to UTC and may be different from calendar dates in North America. Contests are not conducted on the 60-, 30-, 17-, or 12-meter bands. Mbr = Membership number. Serial = Sequential number of the contact. SPC = State, Province, DXCC Entity. XE = Mexican state. Listings in blue indicate contests sponsored by ARRL or *NCJ*. The latest time to make a valid contest QSO is the minute listed in the "Finish Time" column. *Data for Contest Corral is maintained on the WA7BNM Contest Calendar at* **www.contestcalendar.com** *and is extracted for publication in QST 2 months prior to the month of the contest. ARRL gratefully acknowledges the support of Bruce Horn, WA7BNM, in providing this service.*

Amateur Radio Special Event Stations!

01/01/2023 | American Revolution - Battle of Princeton

Jan 1-Jan 8, 0000Z-2359Z, W2P, Trenton, NJ. Delaware Valley Radio Association. 14.250. Certificate & QSL. DVRA, PO Box 7024, West Trenton, NJ 08628-0024. Certificate of Commission in the Continental Army Signal Corps available. See website. www.w2zq.com

01/02/2023 | 17th Annual Straight Key Month

Jan 2-Jan 31, 0000Z-2359Z, K3Y +, Ellicot City, MD. SKCC - Straight Key Century Club. 3.550 7.055 14.050 21.050. Certificate & QSL. SKCC c/o Ted Rachwal, K8AQM, 6237 Twin Lakes Dr, Smiths Creek, MI 48074. K3Y/0 thru 9 plus KH6, KL7, KP4 and DX member stations in six WAC areas operating straight key, bug and cootie keys. QSL card confirms one QSO per area, up to 19 for all-area sweep. See URL for op sched/map, stats, etc. https://www.skccgroup.com/k3y

01/07/2023 | W8MRM Motor City Radio Club 90th Anniversary

Jan 7, 1700Z-2100Z, W8MRM, Wyandotte, MI. Motor City Radio Club. 7.190 14.290. Certificate. Motor City Radio Club, P.O. BOX 1337, Southgate, MI 48195. www.w8mrm.net

01/08/2023 | 122st Anniversary of the Lucas Gusher

Jan 7-Jan 8, 1500Z-2000Z, K5S, Beaumont, TX. Beaumont Amateur Radio Club. 7.245 14.245 10.136 14.030. Certificate & QSL. Greg Pritchett, 4839 Hwy 326N, Kountze, TX 77625. k5s.lucasgusher@gmail.com or w5rin.com

01/14/2023 | Commemorating last MIG shoot down in VietNam war by Midway F-4

Jan 14, 1700Z-2359Z, NI6IW, San Diego, CA. USS Midway Museum Ship. 14.320 7.250 14.070 PSK31 DSTAR on Papa system repeaters. QSL. USS Midway Museum Ship COMEDTRA, 910 N Harbor Drive, San Diego, CA 92101. www.qrz.com/db/ni6iw

01/15/2023 | 100th Anniversary of the Door County Amateur Radio Club

Jan 15-Jan 31, 1300Z-0300Z, W9DOR*, Sturgeon Bay, WI. Door County Amateur Radio Club. All HF bands, all modes. Certificate. Jef Fox, KC9GBX, 5073 Bluff Court Terrace, Sturgeon Bay, WI 54235. * and TM100DOR in Bertrichamps, France. kc9gbx@aol.com or www.w9dor.org

01/15/2023 | 100th Anniversary of the Door County Amateur Radio Club

Jan 15-Jan 31, 1300Z-0300Z, TM100DOR*, Bertrichamps, FRANCE. Door County Amateur Radio Club. All HF bands, all modes. Certificate. Jef Fox, KC9GBX, 5073 Bluff Court Terrace, Sturgeon Bay, WI 54235. * and W9DOR in Sturgeon Bay, WI. kc9gbx@aol.com or www.w9dor.org

01/21/2023 | MRAC 106th Anniversary

Jan 21-Jan 22, 1700Z-2300Z, W9RH, Milwaukee, WI. Milwaukee Radio Amateurs' Club. 14.250 7.250 145.390. Certificate. Email specialevent@w9rh.org, for, MRAC/106 certificate. Including WIRES-X room #43588. Commemorative certificate available. Event details at https://www.w9rh.org/special-event-station

01/21/2023 | Western Mass Council Scouts BSA WHOA Saturday

Jan 21, 1400Z-2000Z, W1W, Russell, MA. Western Mass Council Scouts BSA. 7.190 10.115 14.060 14.290. QSL. Tom Barker, 329 Faraway Road, Whitefield, NH 03598. Monthly outdoor skills and activity weekend open to scouts and the general public. Qsl via eqsl and sase.

01/22/2023 | QuartzFest Distance Challenge

Jan 22-Jan 28, 1500Z-2159Z, W7Q, Quartzsite, AZ. Northern Arizona DX Assn. 14.266 7.266 21.266 28.266. QSL. Tom Luther, 7690 W Derry Dr, Kirkland, AZ 86332. The 4th annual DISTANCE CHALLENGE(DC) competition will be held at QUARTZFEST(QF), 2023, in January and you are invited to participate. The event is conducted by the NORTHERN ARIZONA DX ASSOCIATION and

Amateur Radio Special Event Stations!

runs for 3 days of the week long QF campout. Any licensed attendee can enter, and it is a fun, exciting, competitive event to see who can make the longest distance contact from QF, in the Sonoran Desert, using your HF radios and antennas brought to the QF site. If you don't bring any equipment, you can still enter by using the equipment available at the QF special event station W7Q. Enter one of the four categories including, (1) SSB or CW-100 watts max, (2) FT-8, (3) QRP -5 watts or less, and the (4)W7Q station where most modes are available. We will have prizes for each of the 4 category winners and the 4 runners up, so bring your best antenna, any kind, including commercial, homebrewed, wire, yagis, spider-beams, kites, balloon, verticals, mobile, (sorry no remote allowed) and win prizes (and bragging rights). Each year, we provide a unique trophy hat for the 4 category winners. and each year the hats are different! KG7OH@arrl.net or NADXA.com
01/27/2023 | 169th Anniversary of the Gadsden Purchase from DM31, Organ Pipe National Monument and Winter Field Day

Jan 27-Jan 30, 2000Z-1400Z, KT7RC, Tucson, AZ. Tortolita Radio Club. 14.230; CW, SSB; FT8 on the WARC bands and 6 meters. Certificate. Email, contact@tortolita-rc.com, for certificate. No paper QSL. Operating from the fairly rare DM31 Grid Square! DM31 occupies the southern border with Mexico that the Gadsden purchase set. www.qrz.com/db/kt7rc or tortolita-rc.com
01/27/2023 | Orange Amateur Radio Club 75 years affiliation with ARRL

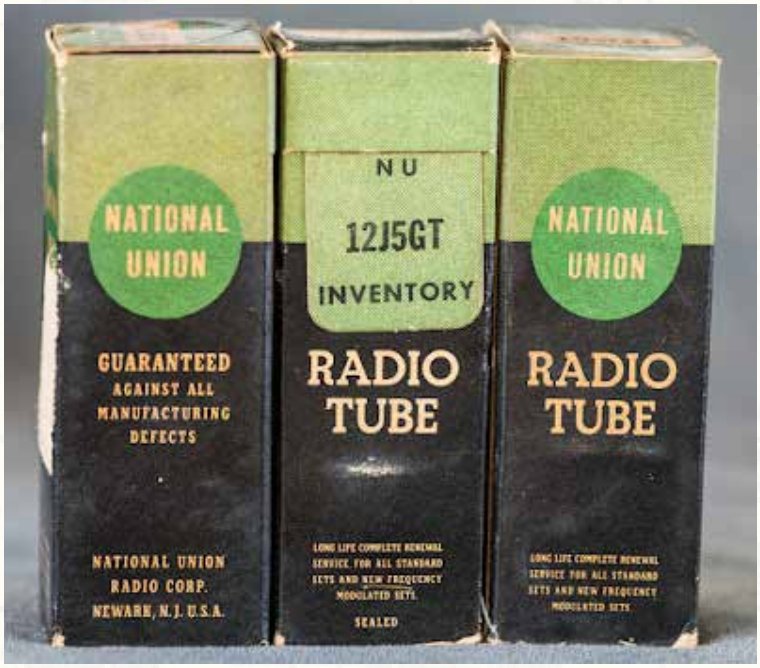
Jan 27-Jan 28, 0200Z-0200Z, W5ND, Orange, TX. Orange Amateur Radio Club. 20M - 14.225 - 14.350 MHz 40M - 7.175 - 7.300 MHz 15M - 21.275 - 21.450 MHz 10M - 28.300 - 28.800 MHz. QSL. Orange Amateur Radio Club -75 yrs, P.O. Box 232, Orange, TX 77631-0232. operating on the General class frequencies OrangeARC@live.com
01/28/2023 | California Discovery of Gold

Jan 28-Jan 30, 1700Z-0100Z, AG6AU, Coloma, CA. El Dorado County Amateur Radio Club. 7.248 14.248 21.348 28.348. QSL. El Dorado County ARC, P.O. Box 451, Placerville, CA 95667.

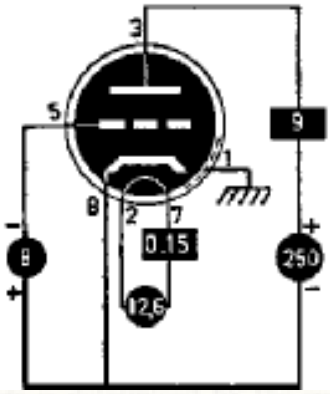
12J5 Triode

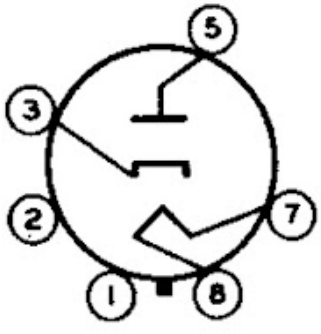
The 12J5 is electrically identical to the 6J5 except for the heater voltage. Like the 6J5 the 12J5 was made with metal shell and glass envelope, the latter dubbed 12J5GT. It comes with the same Octal base, pinout shown on the left. The heater voltage is twice that of the 6J5, 12,6V and consumes just 150mA. No sonic disadvantages are to be expected from 12.6V tubes vs 6.3V tubes. The 12J5 is as linear as it's 6.3V counterpart.

Principal application: the 12J5 is a medium-mu general-purpose triode designed for use as an amplifier, an oscillator, or a detector. Except for heater ratings, the 12J5 is identical to the 6J5.



S= 2.6mA/V
μ= 20
Ri= 7.7k
Wa= max.2.5W
Radiomuseum.org





TUBE OF THE MONTH

Electronic TUBE

12J5

Description and Rating

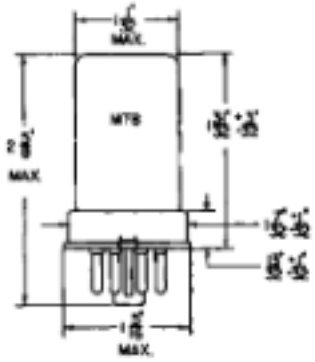
GENERAL-PURPOSE TRIODE

GENERAL DESCRIPTION

Principal Application: The 12J5 is a medium-mu general-purpose triode designed for use as an amplifier, an oscillator, or a detector. Except for heater ratings, the 12J5 is identical to the 6J5.

Cathode:	Coated Unipotential
Heater Voltage (A-C or D-C)	12.6 Volts
Heater Current	0.15 Ampere
Envelope:	MT-8, Metal Shell
Base:	B6-23, Small Wafer Octa 5-Pin
Mounting Position:	Any
Direct Interelectrode Capacitances: *	
Grid to Plate	3.4 μμf
Input	3.4 μμf
Output	3.6 μμf

PHYSICAL DIMENSIONS

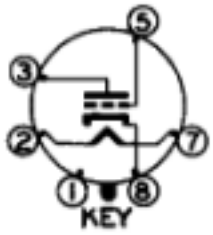


RMA B-1

TERMINAL CONNECTIONS

Pin 1 - Shell
Pin 2 - Heater
Pin 3 - Plate
Pin 5 - Grid
Pin 7 - Heater
Pin 8 - Cathode

BASING DIAGRAM



RMA 6Q
BOTTOM VIEW

MAXIMUM RATINGS

DESIGN CENTER VALUES:

Plate Voltage	300	Volts
Positive D-C Grid Voltage	0	Volts
Plate Dissipation	2.5	Watts
Total Cathode Current	20	Milliamperes
D-C Heater-Cathode Voltage	90	Volts

CHARACTERISTICS AND TYPICAL OPERATION

CLASS A_1 AMPLIFIER

Plate Voltage	90	250	Volts
Grid Bias Voltage **	0	-8	Volts
Amplification Factor	20	20	
Plate Resistance	6700	7700	Ohms
Transconductance	3000	2600	Micromhos
Plate Current	10	9.0	Milliamperes

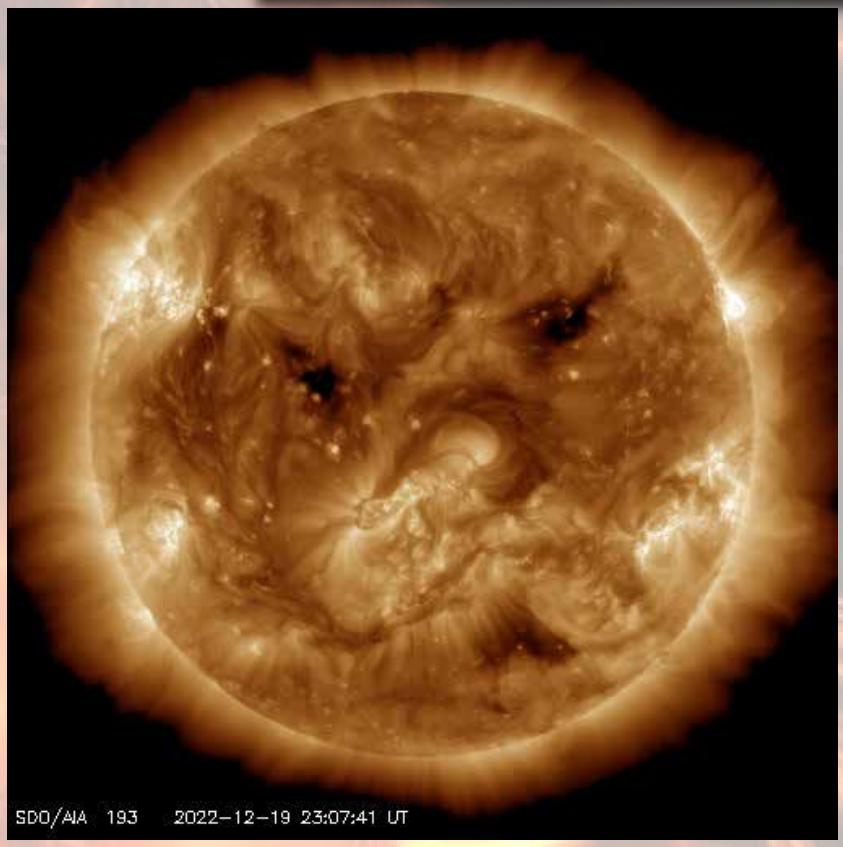
* *With shell connected to cathode*

** *The d-c resistance in the grid circuit under maximum rated conditions should not exceed 1.0 megohm.*

GENERAL ELECTRIC

from RMA release #850, April 6, 1950

K7RA Solar Update



Heightened sunspot activity over the past week no doubt produced the great conditions during last weekend's ARRL 10 Meter contest.

Compared to the previous seven days, average daily sunspot numbers jumped from 85 to 136.9, while solar flux averages increased from 137.5 to 150.

Geomagnetic indicators were lower, with planetary A index decreasing from 14.4 to 7.7, and middle latitude A index from 9.1 to 6.

Higher sunspot numbers and lower geomagnetic indicators is an ideal combination for favorable HF propagation.

New sunspots appeared every day except December 12, with one new sunspot on December 8, another on December 9, and three more on December 10, another on December 13 and one more on December 14.

N0JK commented on the ARRL 10 Meter contest:

"What a difference a year makes. 10 was wide open this year for the ARRL 10M contest with strong single hop F2 from Kansas to both coasts. Europe and Japan in, and I completed WAC (Worked All Continents). Operated fixed mobile with 1/4 wave whip. Solar flux this year was 148, last year only 78."

The latest prediction from the USAF via NOAA shows solar flux at 164, 162, 160, 158, 154, 152 and 150 on December 16-22, then 120 on December 23-28, then 125, 130 and 135 on December 29-31, 145 on January 1-8, 2023, then 140, 130, 125 and 120 on January 9-12, and 115 on January 13-18, then 120 on January 19-24.

Predicted planetary A index is 5 on December 16-17, 10 on December 18, 8 on December 19-20, then 12, 8, and 15 on December 21-23, 20 on December 24-28, then 12, 10, 12, 8, 5 and 18 on December 29 through January 3, 2023, 10 on January 4-5, 8 on January 6, 5 on January 7-14, 10 on January 15-16, then 5, 20, 15 and 12 on January 17-20, and 20 on January 21-24.

HIGH FREQUENCY ACTIVE AURORAL RESEARCH PROGRAM

University of Alaska Fairbanks
GEOPHYSICAL INSTITUTE

HAARP Program Office
University of Alaska Fairbanks
Geophysical Institute
2156 Koyukuk Drive
Fairbanks, Alaska 99775
UAF-GI-HAARP@alaska.edu
https://haarp.gi.alaska.edu/
Phone | 907-474-1100
www.facebook.com/pg/UAFHAARP
Twitter | @UAFHAARP

Date: December 21, 2022

To: Amateur Radio and Radio Astronomy Communities

From: HAARP Program Office

Subject: Notice of Transmission

The High-frequency Active Auroral Research Program (HAARP) will be conducting a research campaign on December 27, 2022, with transmissions between 1100-2300 UTC (0200-1400 AKST). Actual transmit times are highly variable based on real-time ionospheric conditions. All information is subject to change.

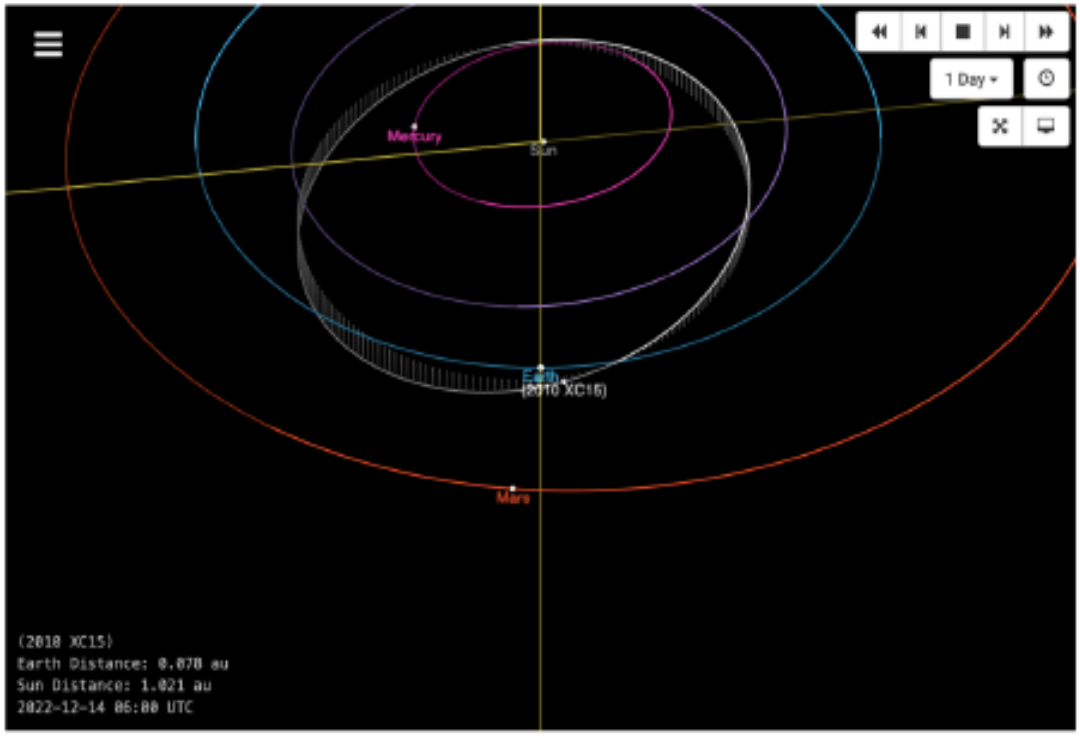
This campaign will be in support of a NASA Jet Propulsion Laboratory project, in collaboration with Caltech's Owens Valley Radio Observatory Long Wavelength Array (OVRO-LWA) and the University of New Mexico Long Wavelength Array (UNM-LWA), testing the potential use of HAARP/OVRO-LWA/UNM-LWA for interior sensing of near-Earth asteroids (NEAs). This experiment will reflect HAARP transmissions off of NEA 2010 XC15, and the echo will be received by OVRO-LWA and UNM-LWA. The target asteroid will be roughly two lunar distances away from Earth at the time of transmission.

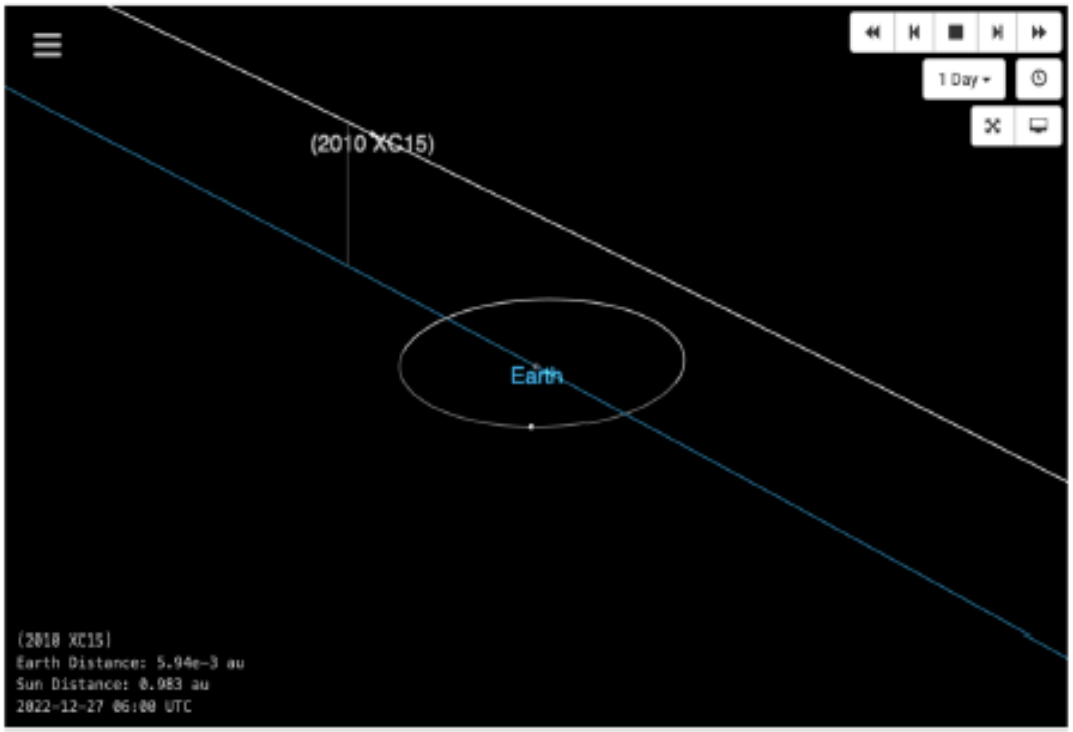
Characterizing the interior structure and composition of NEAs is critical for advancing our understanding of solar system evolution and aiding in planetary defense. Multiple lines of evidence indicate that many, if not most, NEA interiors are rubble piles, with a subset that are monolithic solids, but definitive answers will influence the response to potentially hazardous objects. Approximately 80 known NEAs passed within one lunar distance in 2019. This will increase as new search observatories come online (e.g., the Large Synoptic Survey Telescope and NASA's NEO Surveillance Mission). In particular, the asteroid Apophis will pass Earth at 34,000 km (~5 Earth radii) in 2029 and presents one of the best opportunities for direct observations of an NEA. The proximity and frequency of NEA flybys creates opportunities to repeatedly probe and study the interiors of NEAs using ground-based radar systems and to fill a strategic knowledge gap in our understanding of these objects.

Amateur radio and radio astronomy enthusiasts are invited to listen to the transmissions/echoes and submit reception reports to the HAARP facility at uaf-gi-haarp@alaska.edu, or by mailing a report to the address at the end of this document.

Experiment	Dates/Times (UTC)	Frequency (MHz)	Notes
Asteroid Bounce (2010 XC15)	Dec. 27, 1100-2300	9.6 LFM, 0.5 Hz WRF, 30 kHz bandwidth	Reports recording echo encouraged; demodulated recordings in .wav or .mp3 recommended

For real-time ionospheric conditions in Gakona, please consult ionograms from the HAARP Diagnostic Suite: https://haarp.gi.alaska.edu/diagnostic-suite





https://ssd.jpl.nasa.gov/tools/sbdb_lookup.html#/?sstr=2010%20XC15&view=VOP

To request a HAARP QSL card, send reception reports to:
HAARP
P.O. Box 271
Gakona, Alaska 99586
USA

Bouncing an FM Signal Off an Asteroid with HAARP - de KD2FTA

HAMs often talk about (EME) moon bounce being probably the coolest thing they've done, but can you imagine bouncing a signal off an asteroid?

On December 27th between 1100 and 2200 UTC the High-frequency Active Auroral Research Program, or HAARP was used to "paint" with radar an asteroid known s 2010 XC15. HAARP is a scientific endeavor aimed at studying the properties and behavior of the ionosphere however on Tuesday the 27th it was used for another purpose.

2010 XC15 is an Aten near-Earth asteroid and potentially hazardous object that spends most of its time inside of the orbit of Earth. It has an observation arc of 10 years and an uncertainty parameter of 1. The **uncertainty parameter** *U* is introduced by the Minor Planet Center (MPC) to quantify the uncertainty of a perturbed orbital solution for a minor planet. The parameter is a logarithmic scale from 0 to 9 that measures the anticipated longitudinal uncertainty in the minor planet's mean anomaly after 10 years. The larger the number, the larger the uncertainty.

2010 XC15
Position uncertainty and increasing divergence

Date	JPL SBDB nominal geocentric distance (AU)	uncertainty region (3-sigma)
1907-12-26	0.011466 AU (1.7153 million km)	±640 thousand km
2064-12-26	0.008920 AU (1.3344 million km)	±80 thousand km
1976-12-27	0.006253 AU (935.4 thousand km)	±260 km
2022-12-27	0.005160 AU (771.9 thousand km)	±320 km
1914-12-27	0.005121 AU (766.1 thousand km)	±21 thousand km
2096-12-27	0.004309 AU (644.6 thousand km)	±660 thousand km

2010 XC15 was discovered on 5 December 2010 by the Catalina Sky Survey at an apparent magnitude of 17.5 using a 0.68-metre (27 in) telescope. The HAARP experiment to bounce a radio signal off an asteroid on Dec. 27 served as a test for probing a larger asteroid that in 2029 will pass closer to Earth than the many geostationary satellites that orbit our planet. So can 2010 XC15 hit us?

Perhaps a few centuries from now (or as early as 2096), but the HAARP experiment was meant to measure the composition of the asteroid and HAMs were invited to hear the signal and participate as well.

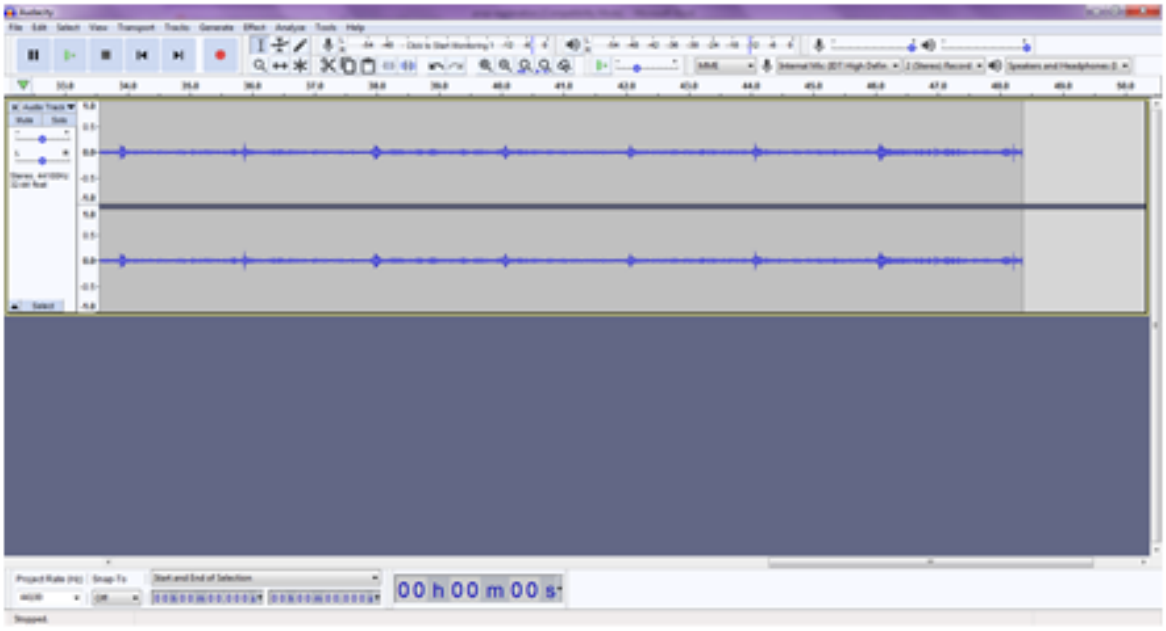
From the University of Alaska's website, "The University of Alaska Fairbanks operates HAARP under an agreement with the Air Force, which developed and owned HAARP but transferred the research instruments to UAF in August 2015. The test on 2010 XC15 is yet another step toward the globally anticipated 2029 encounter with asteroid Apophis.

https://solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/apophis/in-depth/

It follows tests in January and October in which the moon was the target of a HAARP signal bounce.

Apophis was discovered in 2004 and will make its closest approach to Earth on April 13, 2029, when it comes within 20,000 miles. Geostationary satellites orbit Earth at about 23,000 miles. The asteroid, which NASA estimated to be about 1,100 feet across, was initially thought to pose a risk to Earth in 2068, but its orbit has since been better projected by researchers. The test on 2010 XC15 and the 2029 Apophis encounter are of general interest to scientists who study near-Earth objects. But planetary defense is also a key research driver". For context the rock that made the crater in Arizona (meteor crater) was about the size of a small school bus so an 1100 foot long rock would be a problematic. So how do HAMs fit into this scenario?

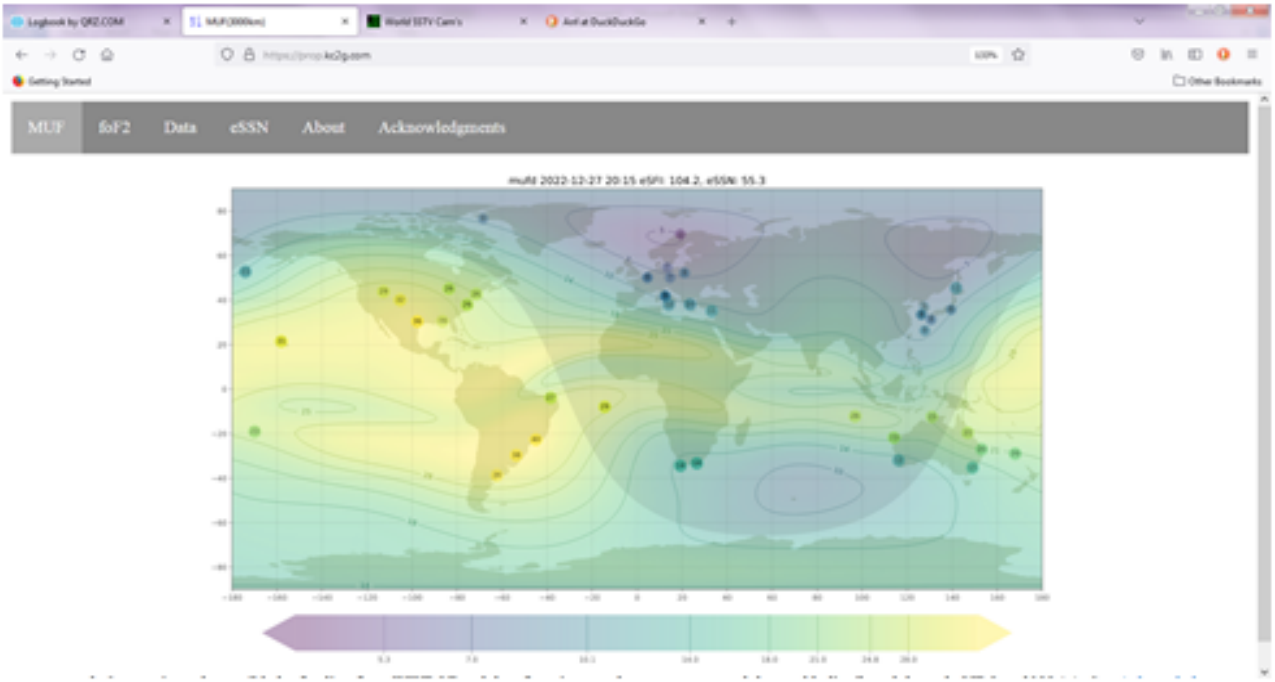
Well.. Several EPARA members did participate in the HAARP experiment and heard the 2 sec interval chirp produced by HAARP as the asteroid passed near Earth and reflected the signal. Using Audacity audio software I recorded the signal as shown below.



Setting the HF radio to 9.600 MHz FM early in the day I came across several foreign broadcasts interfering with the signal. Who knew that Chinese stations were transmitting 5 KHz above and other unidentified stations would be broadcasting as well! For most of the day if you were trying to listen in from points east of the Rockies you probabaly couldn't hear the signal even if HAARP had an effective radiated power of 3.6 Megawatts (holy cow). The reason the signal was

weak during the day was actually caused by our ionosphere! The same conditions that allow propagation to happen via a sky wave and skip can and will work in reverse when the signal is coming in from space. It all depends on the frequency and the MUF (Maximum Usable Frequency).

The website prop.kc2g.com provides near real-time maps and data about ionospheric conditions, for the use of amateur radio operators.



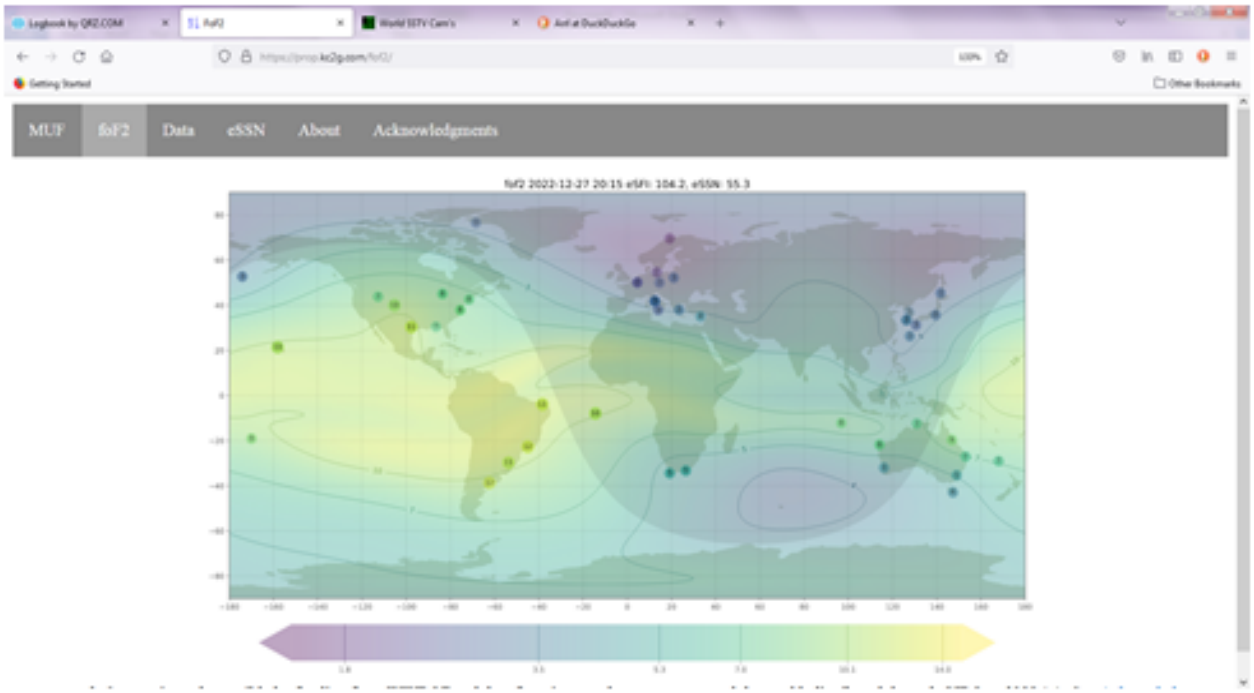
The MUF map shows the Maximum Usable Frequency using colors and contour lines. For example, if a given area on the map is greenish and lies between the contours labeled "15" and "17", then the MUF is around 16MHz in that location. The readings from each individual station are shown as colored dots with numbers inside them, so you can see where the information is coming from. If a dot is faded out, then that station currently has a low "confidence score".

MUF is the highest frequency that is expected to bounce off of the ionosphere on a path 3000km long. So the MUF along a path between two points shows the possibility of long-hop DX between those points on a given band. If the MUF is 12MHz, then 30 meters and longer will work, but 20 meters and shorter won't. For long multi-hop paths, the worst MUF anywhere on the path is what matters. For single-hop paths shorter than 3000km, the usable frequency will be less than the MUF, because higher-angle signals "punch through" the ionosphere more easily. As you get closer to vertical, the usable frequency drops to the Critical Frequency (foF2).

The **foF2** page shows a map similar to the MUF map, except that it displays **the Critical Frequency (foF2)**. This one is simpler: it's the highest frequency that you can use for NVIS (skywave communication "in your own backyard"). When foF2 gets up to 7MHz and above them 40 meters "goes short" and can be used for local contacts; if it goes down below 3MHz

then 80 meters "goes long" and local stations disappear but far-away ones can still be reachable. Finally, both maps show which parts of the Earth are in daylight, and which are in the night. Pay special attention to the line dividing day and night (the terminator, or as hams call it, the "greyline"). Unique propagation opportunities are often available when one station, or both, are sitting nearly under this line. The near-real-time ionospheric data that powers the site is collected by ionosondes (ionospheric radars) around the world, and compiled by the NOAA National Centers for Environmental Information and the Lowell Global Iosnopheric Radio Observatory (GIRO).

The ionospheric physical model for the "IRI" plots is the International Reference Ionosphere 2020, produced by a joint task group of the Committee on Space Research (COSPAR) and International Union of Radio Science (URSI).



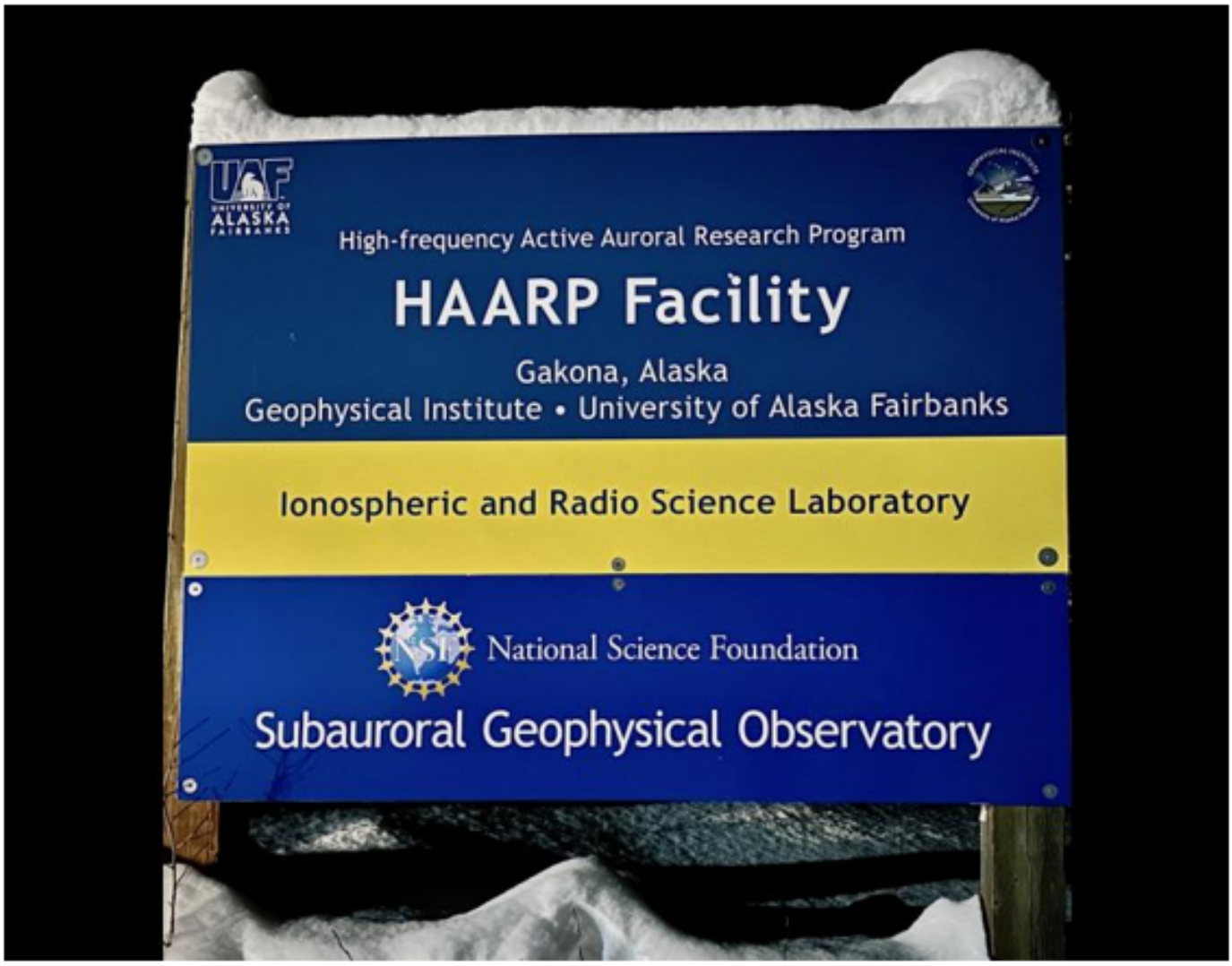
The map shown here depicts the FoF2 for the afternoon of December 27th. After 4 p.m. the conditions improved significantly. The bounced signals were now able to pass through the ionosphere and signal strength improved allowing reception.

HAMs can submit reception reports to the HAARP facility at uaf-gi-haarp@alaska.edu and request a QSL card by mailing a report to:

HAARP
P.O. Box 271
Gakona AK 99586
USA

73! KD2FTA

CLICK HERE TO
Listen Live!



NASA and HAARP conclude asteroid experiment

December 29, 2022 / Rod Boyce

A powerful transmitter in remote Alaska sent long wavelength radio signals into space Tuesday with the purpose of bouncing them off an asteroid to learn about its interior.

The asteroid, 2010 XC15, is estimated to be about 500 feet across and is passing by Earth at two lunar distances, which is twice the distance between the Earth and the moon.

Results of Tuesday's experiment at the High-frequency Active Auroral Research Program research facility at Gakona could aid efforts to defend Earth from larger asteroids that could cause significant damage.

"We will be analyzing the data over the next few weeks and hope to publish the results in the coming months," said Mark Haynes, lead investigator on the project and a radar systems engineer at NASA's Jet Propulsion Laboratory in Southern California. "This experiment was the first time an asteroid observation was attempted at such low frequencies.

"This shows the value of HAARP as a potential future research tool for the study of near-Earth objects," he said.

Several programs exist to quickly detect asteroids, determine their orbit and shape and image their surface, either with optical telescopes or the planetary radar of the Deep Space Network, NASA's network of large and highly sensitive radio antennas in California, Spain and Australia.

Those radar-imaging programs don't provide information about an asteroid's interior, however. They use signals of short wavelengths, which bounce off the surface and provide high-quality external images but don't penetrate an object.

Long wavelength radio signals can reveal the interior of objects.

HAARP, using three powerful generators, began transmitting chirping signals of long wavelength at 2 a.m. Tuesday and continued sending them uninterrupted until the scheduled end of the 12-hour experiment.

The University of New Mexico Long Wavelength Array near Socorro, New Mexico, and the Owens Valley Radio Observatory Long Wavelength Array near Bishop, California, are also involved in the experiment.

Data analysis is expected to take several weeks.

The Tuesday experiment also served as a test for probing an asteroid larger than 2010 XC15.

Asteroid Apophis, discovered in 2004, will make its closest approach to Earth on April 13, 2029. It will come within about 20,000 miles of Earth, closer than the many geostationary satellites orbiting the planet.

Apophis, which NASA estimated to be about 1,100 feet across, was initially thought to pose a risk to Earth in 2068, but its orbit has since been better projected by researchers and is now not a risk to the planet for at least a century.

Tuesday's test follows tests in January and October in which scientists bounced long-wavelength signals off the moon in preparation for this week's experiment.

Haynes said understanding the makeup of an asteroid's interior, especially of an asteroid large enough to cause major damage on Earth, can increase the chances of an effective defense. Knowing the distribution of mass within a dangerous asteroid could help scientists target devices designed to deflect an asteroid away from Earth.

Amateur scientists from around the world reported receiving the outgoing transmission, said Jessica Matthews, HAARP's program manager. The reports will help infer the conditions of the ionosphere during the experiment.

"Our collaboration with JPL is not only an opportunity to do great science but also involves the global community of citizen scientists," she said. "So far we have received over 300 reception reports from the amateur radio and radio astronomy communities from six continents who confirmed the HAARP transmission."

The University of Alaska Fairbanks operates HAARP under an agreement with the Air Force, which developed and owned HAARP but transferred the research instruments to UAF in August 2015.

Credit: https://www.gi.alaska.edu/news/nasa-and-haarp-conclude-asteroid-experiment

HAARP Antenna Array ~ Photographic Tour

Whitham D. Reeve

1. Introduction

The High Frequency Active Auroral Research Program (HAARP) site in Alaska originally was to be used by the US Air Force for an Over-The-Horizon Radar (OTHR), and a large power plant building was constructed in the late 1980s for that purpose. However, with the temporary end of the Cold War in the early 1990s the facility was repurposed for scientific research. HAARP's roots are entirely political but, nevertheless, it has served a valid scientific purpose. Its primary application has been aeronomy, the science of the upper atmosphere where ionization occurs (figure 1). HAARP is not an OTHR but it does have some radar capability.

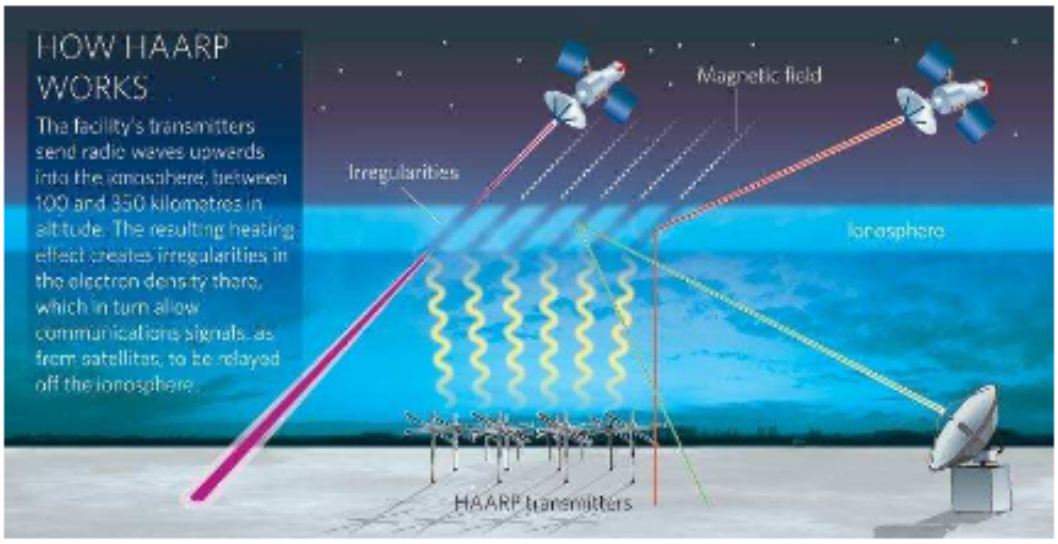


Figure 1 ~ HAARP is used to study the upper atmosphere between 100 and 350 km, which is too high for balloon sensors and too low for satellite sensors. Very little is known about the high-latitude ionosphere, so HAARP at 63° north magnetic latitude is in a good position to study it. Image source: {Nature}

HAARP always has been controversial. It is well-known in this and every other country that as soon as the government sponsors research, there must be a conspiracy. Indeed, several books have been published that describe vast government conspiracies to use HAARP to control everything from the weather to earthquakes to human behavior. I briefly discuss this in the next section.

The construction of HAARP itself started in 1993 with first operation in late 1994. It had been in operation for almost 20 years when shuttered in 2013 after the US Air Force completed its mission. The Air Force left all the antennas, transmitters and power plant mostly intact. In mid-2015 the facility was transferred to University of Alaska Fairbanks for operation by the UAF Geophysical Institute. The Geophysical Institute plans to return HAARP to full research service by spring 2017.

I drove from Anchorage to Glennallen on the afternoon of 26 August 2016, a distance of about 190 mi (306 km) to attend a HAARP open house. Glennallen is a small community about 25 mi (40 km) southwest of the HAARP facility and the site of a presentation that evening by UAF-GI about HAARP. The next morning I drove to the HAARP facility. Since the facility was not yet back in full operation, people attending the open house could self-tour the entire site. Guided tours also were available by UAF-GI staff. My main interest during the open house

was the antenna array (figure 2). The array will be the focus of this photographic tour but I also briefly discuss the facility power plant.

Figure 2 ~ The HAARP antenna array covers 1.33 million ft^2 (123.7 thousand m^2) of real estate. Image © 2016 W. Reeve

2. Public Involvement

While in operation HAARP had some public involvement, but not much. In particular, in early 2008 HAARP conducted a *Lunar Echo Experiment* that encouraged public participation {ReeveLEE}. HAARP also maintained a website that included data from its many sensors. Many scientific papers associated with HAARP experiments are publicly available (for example, search in the abstracts field in {NASA-ADS} for keyword *HAARP*). UAF-GI, as new owner, intends to be more open about HAARP's operation. The *get-started* presentation at Glennallen on 26 August was to inform the local population of their plans. Geophysical Institute Director Dr. Robert McCoy made introductory remarks, and Assistant Research Professor Dr. Chris Fallen discussed the science involved. At the outset Dr. Fallen made it clear he was not going to prove the facility could not be used for mind control as asserted on 25 August 2016 by Alaska Dispatch News (figure 3). His main point, *How do you disprove absurdity?*

The presentation was held at the National Park Service's Wrangell-St. Elias National Park Visitor Center (a federal park facility a few miles south of Glennallen) and attended by upwards of 100 people or maybe more. According to the desk attendant at the Caribou Hotel, one of the few hotels available in the area, people came "from all over but mostly Fairbanks and Anchorage". During the audience question and answer session at the end of Dr. Fallen's presentation, almost all questions had to do with HAARP's alleged nefarious purposes, harmful effects and surrounding conspiracies. We also listened to attendees who had done "a lot of internet research" that conclusively proved the Air Force used HAARP to locate caves in Afghanistan and to cause earthquakes in other

parts of the world. It appeared that many people were convinced the facility was (and will be) used for mind control and to cause global calamities and other harmful effects. I asked the only question of an ordinary nature, "*Will the transmitting schedule be publicly available?*" Answer: "*Yes*".

Figure 3 ~ Alaska Dispatch News headline from 25 August 2016. This is how I found out about the HAARP presentation and open house on 26 and 27 August. The quotes in the headline imply that HAARP's new owner made the statement but that was not the case. Of course, this type of reporting is normal for the hysterical news media. Image source: Alaska Dispatch News {ADN}

3. Antenna System

The original research facility was comparatively small, consisting of only 18 high frequency crossed-dipole antennas and associated transmitters with total power of 360 kW. Later developments expanded the array to 48 antennas and 960 kW and finally to 180 antennas with 3.6 MW total power. When the Air Force shut down the site in 2013, it removed some equipment, including the vacuum tubes from the transmitters, but apparently did no irreparable damage that would prevent reactivation of ionospheric research by UAF-GI.

The center of the antenna array is at geographic coordinates 62° 23' 32.66" N, 145° 09' 01.95" W and about 570 m above mean sea level on a broad plain overlooking the Copper River to the south and east (figure 4). The 180 crossed-dipole antennas are arranged in a 12 x 15 matrix covering an area of 1.33 million ft^2 (123.7 thousand m^2). The dipole elements are oriented north-south and east-west.

The array is directional. Its main pattern points vertically with steering up to 30° from vertical (all technical data from {HAARP}). The pointing direction can be steered at a rate up to 15° in 15 µs. The main lobe beamwidth varies with frequency from about 15° at 3 MHz to 5° at 10 MHz, and directivity varies from 20 dB at 3 MHz to 30 dB at 10 MHz.

The transmitter frequency and antenna array tuning are based on the characteristics of the ionosphere at the time of the experiment, so it is often impossible to know the exact frequencies in advance. The effects of HAARP transmissions on the ionosphere are similar to those caused by strong solar flare events except that the HAARP

transmissions cover only a relatively small local area and occur at prearranged times for comparatively easy study and not randomly as are solar events.

HAARP is powerful enough to heat and alter the ionosphere above the facility. For illustration, assume a 10° beamwidth and 200 km ionosphere height. The projected area above the facility that is affected has a radius of about 17 km or an area of about 900 km^2, a small spatial extent that barely reaches above Glennallen.

Figure 4 ~ Satellite image of the area surrounding the HAARP facility (north is up). The map is about 50 km across. The river system from upper-right to lower-left is the Copper River, which is intersected by the Sandford River that flows from lower-right. The Gaknona River flows southward from top of image. The nearest community is Gakona about 8 mi (13 km) southwest of HAARP where the Gakona River flows into the Copper River. Image source: Google Earth

The transmitters are located in enclosures near the antennas. Each of thirty such enclosures (figure 5) contains six pairs of 10 kW transmitters (figure 6 and 7). Each transmitter pair feeds a crossed-dipole antenna through semi-flexible coaxial cable (figure 8). The coaxial cables exit through the sides of the enclosures (figure 9) and are direct buried to the antenna supports (figure 10). The coaxial cables have to be relatively large to handle the 10 kW transmitter power and the higher voltages associated with a maximum antenna VSWR of 3.2:1 (the peak mismatch voltage in this case is about 1.5 times the matched voltage).

Figure 5 ~ The white transmitter enclosures appear to be modified shipping containers, 40 ft (12 m) long. The green enclosures near the center of this image are step-down power transformers and medium voltage (12.5 kV) sectionalizing terminals that serve two enclosures. Image © 2016 W. Reeve

Figure 6 ~ Interior view of a typical transmitter enclosure. A central aisle provides front access to equipment cabinets on either side. On the near-right, one of the transmitter cabinets has been opened for examination. I believe the exposed components in the two upper compartments are motorized tuning inductors or capacitors (or both). Image © 2016 W. Reeve

Figure 7 ~ Interior view of a transmitter cabinet. The HAARP transmitters use vacuum tube HPAs (high power amplifiers), and I believe this image shows two of the tubes with what appear to be cooling stacks. Image © 2016 W. Reeve

Figure 8 ~ Typical coaxial cable coupling at a transmitter. There are two connectors but only one is used. The coax appears to be 1-1/4 or 1-5/8 in air dielectric corrugated semi-flexible cable; however, I did not see any cable pressurization system manifolds or gauges so the cables may have a foamed polyethylene (PE) dielectric. The jack-screw tuning rods for the matching inductors (or capacitors) are visible in the open cabinet to the left of the cable. Image © 2016 W. Reeve

Figure 9 ~ Cable exits at a transmitter enclosure. The stacked timbers underneath the enclosures indicate the enclosures are free-floating and do not have thermal piles for foundation support. Image © 2016 W. Reeve

Figure 10 ~ Coaxial cables from the transmitter enclosures to the antennas are direct buried and emerge from the ground near a thermal pile, where they are attached to the tower and rise for connection to the baluns and antenna matching units associated with the crossed-dipoles. Note the numerous guy attachments from adjacent towers. The piles not only support a tower base but also are anchors for adjacent tower guy wires. Image © 2016 W. Reeve

To cover the full frequency range, each crossed-dipole actually has high and low frequency elements supported together on 22 m (72 ft) towers (figure 11). The HAARP dipole antennas can be configured for circular (left and right) and linear (horizontal) polarizations. The upper low frequency dipoles use horizontal metal pipes (figure 12), which I believe are heavy-duty aluminum, supported by non-conductive Kevlar guys. Each dipole, including the lower high frequency dipole, has aluminum wires that fan out from the central support structure. These electrically thicken the dipoles to broaden their bandwidth and to control antenna pattern sidelobes (figure 13).

The aluminum wires are supported by each other and insulated strands that stretch between the wire terminations and their anchors in a mechanically complicated self-supporting arrangement (figure 14). Mounted on each tower are four antenna matching units and baluns for antenna tuning and for converting from the unbalanced coaxial feeds to the balanced antennas (figure 15 and 16).

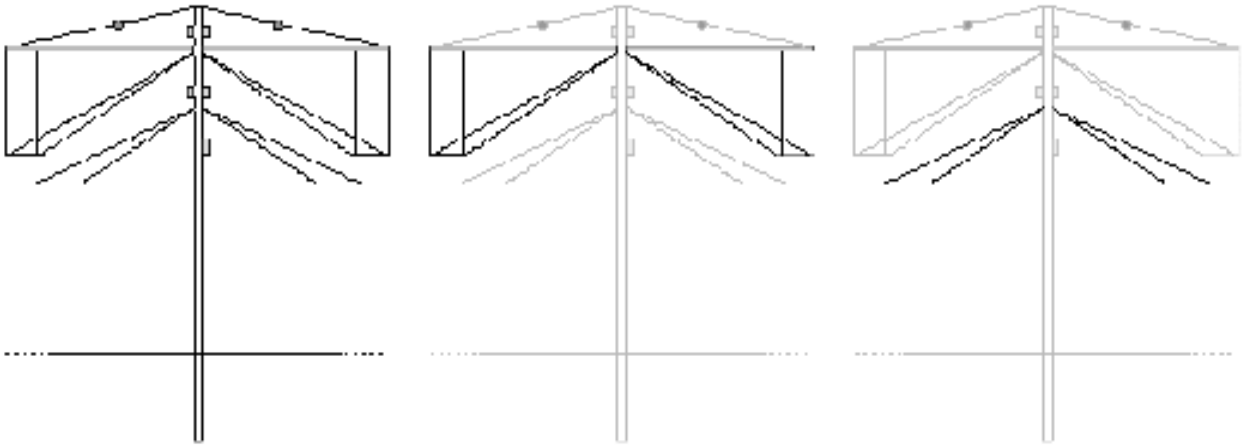


Figure 11 ~ Elevation drawing of the crossed-dipoles used in the HAARP antenna system. The antennas consist of two sets of elements (shown together in the left image). One set is optimized for lower frequencies (highlighted in middle image) and the other for higher frequencies (highlighted in right image). These images show one of the two crossed-dipoles; the other dipole is at a right angle out of and into the page. The ground plane is shown as a line below the antennas. Images source: {HAARP}.

Figure 12 ~ The cobwebs of conductive antenna wires and non-conductive guy wires and messenger strands associated with the antennas and supporting structures are apparent in this image. Seen here are the main crossed-dipole pipe elements near the structure top and bandwidth broadening wire elements, supporting guys, antenna matching units and baluns and the elevated ground plane. It is quite difficult to visually separate them even when standing below. Image © 2016 W. Reeve

Figure 13 ~ Another view of the antenna array shows the intricate antenna components. The green enclosures near the center of this image are step-down transformers and a medium voltage sectionalizing terminal that feeds the transformers. The heat dissipating loop of a thermal pile can be seen on the near-right. Image © 2016 W. Reeve

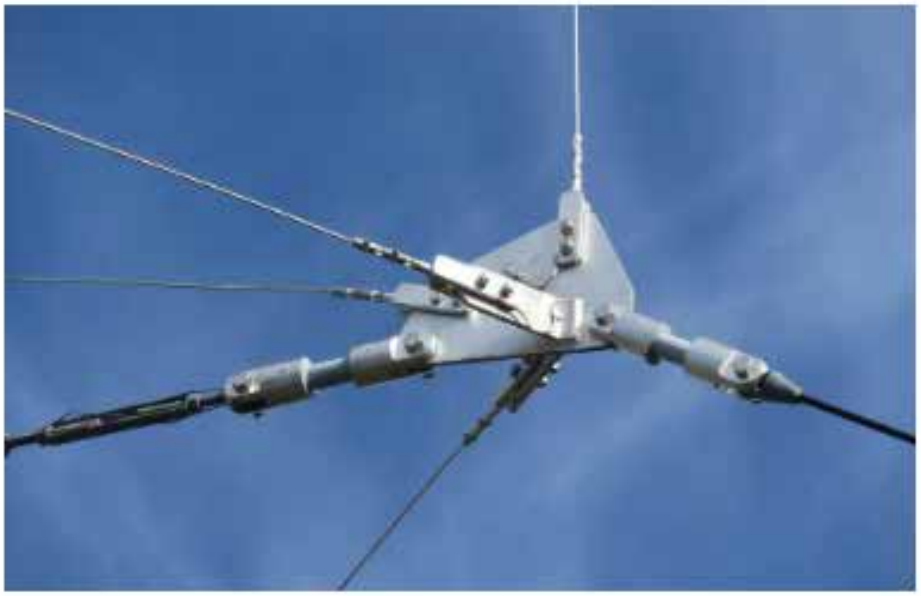


Figure 14 ~ The HAARP antennas are mechanically interlinked for mutual support. This image shows a typical support for four conductive bandwidth broadening elements (silver parts) and two insulated guy wires. It is no surprise the facility cost US taxpayers almost 300 million USD. Image © 2016 W. Reeve

Figure 15 ~ Cylindrical antenna matching units, one for each upper and lower frequency crossed-dipole elements. Note the straps from the matching units to the dipole elements. The ground plane wires are closest to the camera and form a square pattern or mesh. Image © 2016 W. Reeve

Figure 16 ~ UAF-GI information indicates the balun transformer is the small gray rectangular enclosure in the lower-center directly below the cylindrical antenna matching unit; however, I believe they actually are power splitters and the baluns are inside the Antenna Matching Units. The straps from the antenna matching units to the dipole elements on each side are more easily seen than the previous image. Note also the complex assemblies for joining the bandwidth broadening elements on each of the four sides of the support structure. Image © 2016 W. Reeve

The terrain in an around the HAARP site has permafrost to about 44 m depth. Permafrost is ground that remains frozen year-around. Permafrost is covered by an active layer that melts during summer; the active layer depth depends on the insulating values of the foliage and soils. Once the insulating surface foliage is disturbed or removed, for example during construction, the permafrost near the surface melts during summer and the water-saturated soils underneath the surface provide no structural support. Therefore, the antenna supporting

structures and associated anchors are set on thermal piles that remove heat from the soil and keep the ground frozen year-around (figure 17).

Figure 17 ~ Thermal piles are the white pipes shown here. The larger pipe provides mechanical support for each antenna support structure and keeps the ground frozen year-around. The galvanized steel tower base is mounted directly to the top of the pile and guy wires from adjacent towers connect to it for anchoring; the mechanical loads are symmetrical. The heat absorbing portion of the piles probably is buried a few tens of meters, and the heat is dissipated by the loop to the right. The black tubing behind the pile is the coaxial cable feeding the dipoles. Image © 2016 W. Reeve

4. Antenna Ground Plane

The HAARP antenna system has an elevated ground plane at a height of 4.6 m (15 ft) above ground level (figure 18 and 19). The plane actually is a mesh of fairly small wires that appear to be the same size as the antenna element wires.

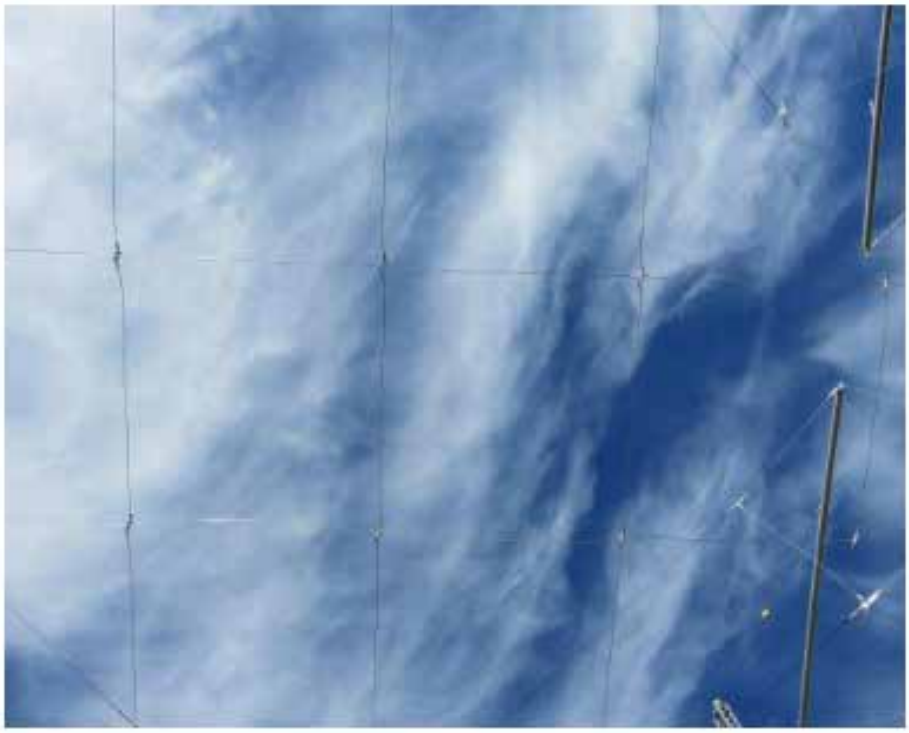


Figure 18 ~ Ground plane (or ground screen) against a background of high thin clouds. The mesh is about 1 m (3 ft), and the wire intersections are held together with special ferrule-type connectors (inset below). Images © 2016 W. Reeve

Figure 19 ~ View of one edge of the ground plane against a blue sky. The ground plane extends from the center to left side of the image. It covers a larger area than the antennas. The thermal piles shown here provide support for the ground plane and also are anchors for the antenna support structures. Image © 2016 W. Reeve

5. RF Radiation Safety

Access to the antenna array is restricted for obvious reasons. According to UAF's Dr. Fallen, the RF radiation levels outside the perimeter fence meet federal RF safety guidelines when the transmitters are operating at full 3.6 MW power levels (figure 20). He also said that technical workers can safely work under the ground plane

while the transmitters are operating. I would prefer to verify the calculations before wandering around the site during operation.

Figure 20 ~ I am standing next to the eastern perimeter fence about 0.8 km (0.5 mi) from the main building; this portion of the fence runs north-south parallel to the antenna array access road. Image © 2016 W. Reeve

6. Operations Building and Power Plant

The Air Force left a 13.5 MW power plant with five diesel engine-generator sets completely intact. The sets are located in the main building (figure 21), which originally was designed to house a much larger power plant for an OTHR.

Figure 21 ~ The Operations Building shown here was designed originally for an Over-The-Horizon-Radar facility but was repurposed for the HAARP scientific mission. Five exhaust stacks for the diesel engine-generator sets can be seen on the right side of the picture. Image © 2016 W. Reeve

The HAARP facility is connected to the local rural electric cooperative (Copper Valley Electric Association, CVEA), which supplies power to the site at all times (at a cost of 50 000 USD/mo) except when the transmitters are operating during experiments. At that time, the facility switches to standalone operation. The electric utility intertie presently does not have reciprocal capability but UAF intends to change the interconnection so HAARP can provide emergency backup to CVEA's local grid, which consists of hydro and diesel electric plants and transmission and distribution lines that extend a few miles north and 145 miles south of the HAARP site.

Each engine-generator set has a 4000 hp (3000 kW) engine driving a 2600 kW generator (figure 22). The engines are relatively low time with 3700 to 4200 h per unit and are named "Angel 1", "Angle 2", and so on. As told to me by HAARP staff "The Angels DO play this HAARP!", a humorous retort to the ridiculous book by conspiracy gadfly Nick Begich titled ***Angels Don't Play This HAARP: Advances in Tesla Technology***.

Figure 22 ~ Left: One of the five 4000 hp (3 MW) diesel engines. Right: A 2.6 MW electrical generator. The generators were originally designed for pulsed loading from an OTHR. Images © 2016 W. Reeve

7. References

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Return Loss Explained, and Why We Should Care

A concise breakdown of when to use return loss, rather than SWR, to evaluate your station's impedance match.

Figure 2 — My NanoVNA displays the return loss (labeled **LOGMAG**) as –29.93 dB, and the SWR as 1.06 to 1. The SWR scale is set for .5 units per division, and the **LOGMAG** as 10 dB per division. The default display of the NanoVNA is **LOGMAG**, the negative of return loss. You can select the SWR plot using the **DISPLAY/FORMAT** menu. The authors of the NanoVNA software must consider **LOGMAG** as the more useful type of display. Other instruments often default to SWR. The antenna being measured is my version of the "Stealth Rooftop Antenna" described in this issue.

John Stanley, K4ERO

Virtually all antenna analyzers include both return loss (RL) and SWR displays that measure the quality of a transmission line or antenna. Those experienced in network and circuit analysis can easily switch between the two, but others may still be learning about RL. RL and SWR are both ways of looking at impedance matches, and are related by the following formulas:

$$RL = -20\log_{10}[(SWR-1)/(SWR+1)]\ dB$$

$$VSWR = (10^{RL/20}+1)/(10^{RL/20}-1)$$

It is interesting to compare the SWR and RL scales side by side (see Figure 1). As you can see, the RL scale is compressed at the right end, and the SWR scale is compressed at the left end. SWR and RL can go to infinity, and any graph of an infinite value will have this issue. Of course, it is difficult for an analog meter scale to accurately display high SWR values. Digital readouts handle this problem much better. Modern vector network analyzers (VNAs) can display both analog responses and digital scales (see Figure 2).

Why We Use SWR

Before antenna analyzers were invented, some amateurs realized that RF sent up a transmission line to an antenna did not always totally radiate. This was because a mismatch results in part of the energy being reflected toward the transmitter. The phenomenon was recognized as early as 1899, in Lee DeForest's PhD dissertation, "Reflection of Hertzian Waves at the Ends of Parallel Wires." One method used to observe this reflected energy was to sample the voltage or current along a transmission line and take the ratio of the maximum-to-minimum values (VSWR if voltage was measured). The forward and reflected voltages add or subtract as the two waves go in and out of phase. In the laboratory, a slotted line was used to measure the ratio directly along a coax, as the slot allowed a voltage probe to slide along the transmission line. This method works best at higher

Figure 1— SWR and RL scale comparisons.

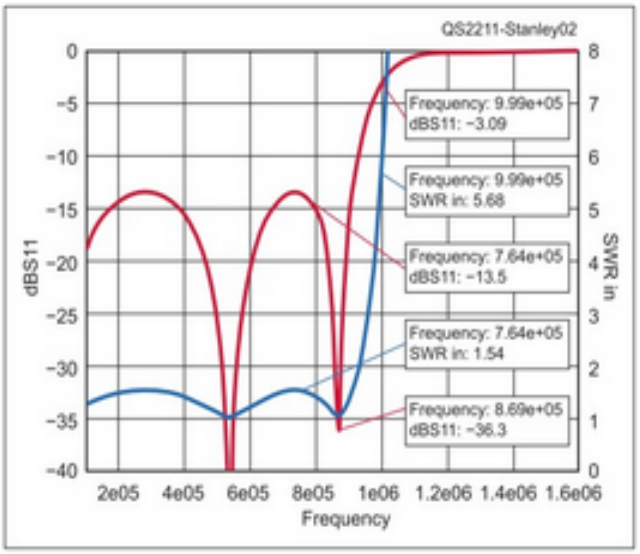


Figure 3 — RL and SWR plot of a simulated low-pass filter.

frequencies because a maximum and minimum voltage on the line is separated by a λ/4. Many modern SWR meters actually measure the forward and reflected waves separately using directional couplers. Circuitry then converts these readings to SWR before displaying the forward and reflected powers. However, SWR is not always the most helpful unit to measure reflections from a load.

One unit used to quantify the presence of a mismatch between a source and its load is reflected power, which is either the absolute value or the percent of power that comes back from the load. This misleads many into thinking power is lost — this is only true when the load is not matched with a network. Some mistakenly think this power goes back into the transmitter, thereby damaging it.

S11 is another commonly used unit. This is the complex voltage reflected from a load, and it can be plotted on a Smith chart. For passive circuits, S11 will lie between +1 and –1, along with an imaginary component between +*j*1 and –*j*1. S11 can also be expressed as a magnitude and a phase. The absolute magnitude of S11, denoted by Γ (the capital Greek letter gamma), will be between 0 and 1. Converting Γ to dB and losing the negative sign gives us RL, which is the power in dB of the incident wave compared to the reflected wave. With a lossless transmission line feeding an open or short, the returned signal ratio will be 1 (0 dB down) — that is, the reflected wave will be the same as the incident wave. With SWR, we strive for 1:1. With RL, we want all of the energy to be transferred into the load, so the incident to reflected ratio will be a large number in dB. An RL of 30 dB (SWR = 1:1.06) or more indicates that we have a practically perfect match. Sometimes we see RL being called S11. Though technically incorrect, it is a close comparison. If we take the magnitude of S11, convert it to dB, and reverse the sign, we get RL. We can resolve this issue by calling it dBS11 and understanding that loss reverses the sign.

Consider the screenshot of a low-pass filter simulation showing both RL (labeled as dBS11 because it is the S11 magnitude in dB format), and SWR (see Figure 3). The markers tell us that RL is 3.09 dB (changing the sign to positive) and the SWR is 5.68 at 746 kHz. At 999 kHz, the RL is 13.5 dB and the SWR is 1.54. We have an RL of 36.3 dB at 869 kHz, so the SWR is nearly 1:1. Though these values match, as confirmed by the formulas given earlier, the RL plot shows the finer details of the match.

When to Use RL

Why would we want to use RL instead of SWR if both values tell us the same thing? SWR is convenient for adjusting antennas. RL gives us a microscopic view of the match, which can be more useful in circuit design. There are also some measurements where RL is easier to use. For example, when we measure RL at the input of a shorted or opened coax transmission line, the matched loss of the coax will be half of the average RL. This is because the wave that travels down and back is attenuated twice. We can determine the loss by measuring SWR, but it is difficult to read small values of coax loss from the compressed part of the SWR scale. The math for finding the coax loss from SWR is also more complicated. For some applications, RL is clearly easier to use.

All photos by the author.

John Stanley, K4ERO, and his wife, Ruth, WB4LUA, retired to Rising Fawn, Georgia, after 45 years in international broadcasting. They did engineering, consulting, and training with Christian radio stations in many countries. As an ARRL Technical Adviser for the past 32 years, John has contributed to many ARRL publications. You can reach him at **k4ero@arrl.net**.

For updates to this article, see the *QST* Feedback page at www.arrl.org/feedback.

Preparing for Portable Operation Abroad

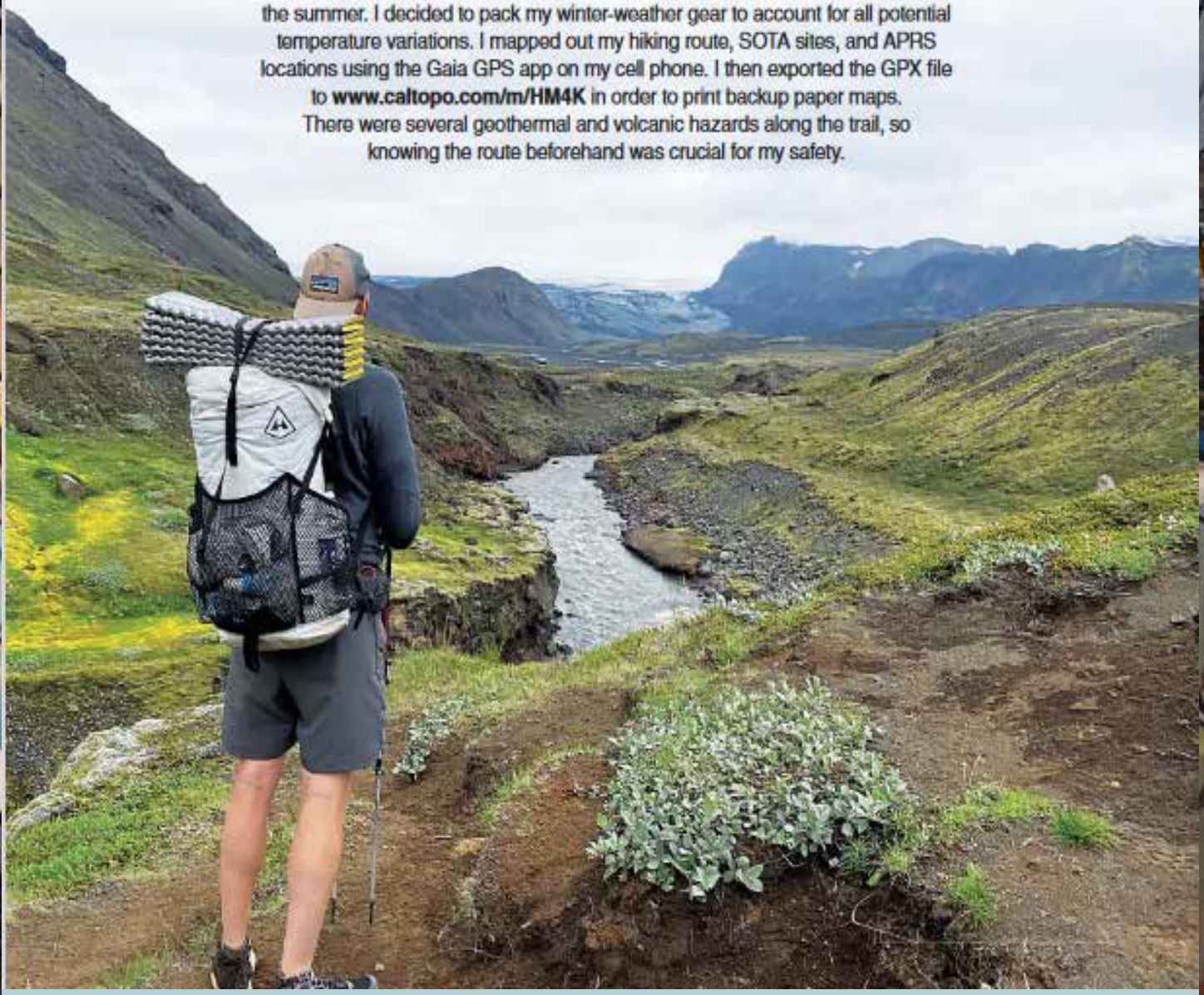
This author visited Iceland to activate a Summits on the Air site, but this wealth of travel tips can help US hams operate anywhere in the world.

Stuart Thomas, KB1HQS

In 2020, I had the chance to travel to Iceland for a week-long trip, including 3 days of hiking the world-famous Laugavegur trail, a remote trail in southern Iceland that features several Summits on the Air (SOTA) sites. A portable operation like this requires a lot of planning, especially because I would be operating under another country's communications rules.

Initial Research

Before departing, much of my preparation involved research about Iceland. Because it is so close to the Arctic Circle, the weather tends to be unpredictable, even in the summer. I decided to pack my winter-weather gear to account for all potential temperature variations. I mapped out my hiking route, SOTA sites, and APRS locations using the Gaia GPS app on my cell phone. I then exported the GPX file to **www.caltopo.com/m/HM4K** in order to print backup paper maps. There were several geothermal and volcanic hazards along the trail, so knowing the route beforehand was crucial for my safety.



Local knowledge is always the best, so I emailed Sigurdur "Siggi" Jakobsson, TF3CW, for his opinions regarding Icelandic weather, amateur radio, and SOTA. A helpful tip for finding locals to contact is to look at the SOTA sites' previous activators. Searching their call sign can often give you their contact information, including their email address.

Preparing to Leave

Regarding radio operation and licenses, the FCC primarily allows you to operate within the US. But once you arrive in another country, you must follow their specific licensing requirements. One exception to this rule is the group of European Conference of Postal and Telecommunications Administrations (CEPT) countries. As an Extra-class operator, I was allowed to operate in Iceland under the call sign TF/KB1HQS. No permits or other licenses were required. This is a great motivator for General- or Technician-class licensees to upgrade. Another useful tip is to bring a laminated copy of your FCC-issued license and the CEPT rules (see **www.arrl.org/cept**). I also carried copies of receipts for my HF and VHF radios. I packed all of my radio gear in my checked luggage, so I included copies of the above paperwork and a list of contents for the bag. I always take a picture of the bag when I check luggage. This way, if it goes missing, I can show the airline staff what it looks like without having to worry about language barriers.

With the pandemic present, there were several requirements for both the US and Iceland that we had to meet before flying. Iceland required a negative COVID-19 test 72 hours prior to flying, as well as immunization records. We had to get another COVID-19 test before leaving Iceland, too. COVID-19 travel rules may change frequently from country to country, so be sure to keep yourself informed.

I opted for emergency medical insurance with GeoBlue (see **www.geo-blue.com**) to supplement our stateside medical insurance. Having insurance abroad is never a bad idea in the event of an issue that requires emergency medical attention. Though Iceland has very good medical facilities, we were still a long way from home and wanted to be careful.

The author, Stuart Thomas, KB1HQS, activating Hjörleifshöfði for Summits on the Air (SOTA).

The village of Vík is located on the southern coast of Iceland, where black volcanic sand lines the beaches.

Final Precautions and Key Items to Pack

Medical preparation aside, I always carry a color copy of my US passport and an emergency card with personal contacts. Giving a safety plan to family members back home is an important additional precaution. Prior to leaving, I check the travel advisories page (see **www.travel.state.gov/content/travel/en/traveladvisories/traveladvisories.html**) and enroll in the Smart Traveler Enrollment Program (STEP), which gives me up-to-date information and allows the embassy to reach me in an emergency. For the US embassy in Iceland, I included a waypoint of the location in my digital maps, in case I needed assistance abroad.

Because we would be hiking 50 miles for 3 days, we uploaded a safety plan to the Iceland search and rescue (SAR) team (see **www.safetravel.is/travel-plan**). I used a Google Docs template to fill in relevant details about myself, my gear, and my emergency contacts. I then sent the document to both my family and the SAR team. Iceland also provides online resources for tourists and hikers, including road and weather conditions at **www.safetravel.is**. I used my Garmin InReach and **https://wx2inreach.weebly.com** to request weather reports for the hiking location.

For flying, we used the app of our chosen airline along with the TripIt app (see **www.tripit.com/web**) to keep track of our airfare, car rental, and hotel itinerary. For city navigation, we used a combo of Gaia GPS and **www.maps.me**. Old-school technology works best sometimes, so we also used a simple tourist map that we picked up in Reykjavík. Money in Iceland was primarily digital for us; having Apple Pay simplified payment so that we never needed local currency.

Power requirements for personal devices and amateur radio equipment need to be considered. The website **www.world-power-plugs.com** is a good resource for verifying the power requirements of various countries. I carried a travel adapter to plug in my standard USB charger.

For my HF radio power supply, I used a RAVPower power delivery pack that delivered 12.8 V dc to my radio. This battery pack can be charged with any USB charger, and it can be carried aboard a plane because it is under the TSA's 100 W hours threshold. My USB battery can also be used to charge my cell phone and InReach. Along with my amateur radios and InReach, I carried an Inmarsat satellite phone. All of these could have been used for emergencies, but we mainly used our cell phones. I was able to buy a SIM card, which gave me a local number and a generous data plan. Note that virtual SIM cards are now available. They allow both local and home numbers, and they do not require the physical SIM card to be removed. I also recommend a paper clip and SIM card holder if you remove your SIM card, as they are small and easy to lose.

Before the trip, I did a frequency search of Iceland. Their 2-meter simplex frequency was 145.500 MHz, and their APRS frequency was 145.800 MHz. It can be easy to forget that other countries have different frequency and band plans. As such, it is your responsibility to determine what is legal to operate in the host country.

Working 2-meter simplex in a remote area requires some pre-planning, especially in Iceland. Considering that the small population is mostly concentrated in Reykjavík, I plotted a bearing from the SOTA sites to the city. Being on the coast cut my potential working area in half due to the ocean. I did not anticipate making any 2-meter contacts as a result of the distance, which eventually proved true. But with that said, you never really know until you are at the site and operating.

A high-gain directional antenna such as an Arrow Yagi can help extend your reach. I also like to carry a 360-degree directional antenna such as an Ed Fong J-Pole.

For HF, I brought my five-band Mountain Topper and end-fed PackTenna with custom traps for 20, 30, and 40 meters. After striking out on 2 meters, I tried HF — the noise floor was so quiet that I thought something was wrong with the radio. After getting used to so many high-RFI environments, it was nice to have such an easy time operating. The SOTA site that I activated, Hjörleifshöfði (TF/SL-216), was an easy hike near the village of Vík. Though I had limited visibility, operating in Iceland was a rewarding experience. International travel is always a great opportunity, and amateur radio can enhance it by taking you to places the average tourist may never visit. For more information about my operating trip to Iceland, visit **www.kb1hqs.com/2021/09/29/complete-guide-to-traveling-hiking-in-iceland**.

ARRL member Stuart Thomas, KB1HQS, is a portable radio enthusiast and the author of *Portable Operating for Amateur Radio*. Stuart enjoys other outdoor operating activities, including Summits on the Air (SOTA) and ultralight backpacking. He holds an Amateur Extra-class license and has an amateur radio and adventure website at **www.kb1hqs.com**. He can be reached at **kb1hqs@arrl.net**.

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Ham Bootcamp

A beginner-friendly program to mentor new and upgraded hams, developed by the Nashua Area Radio Society.

Getting Hams On the Air

Fred Kommerer, AB1OC

For the last 5 years, the Nashua Area Radio Society (NARS) in Nashua, New Hampshire, has been actively providing licensing classes and training to help new amateur radio operators develop their skills. Our club has helped over 420 people earn or upgrade their licenses.

The Nashua Area Radio Society has spent quite a bit of time trying to understand why so many of the people who earn a license or an upgrade don't get on the air. The number one reason we discovered is that the amateur radio community isn't providing the mentoring that many hams need to get active. Some examples of the necessary mentoring include:

- Help getting a handheld transceiver or base radio programmed for repeater use
- Guided practice making contacts on the air
- Help to overcome "mic fright"
- Help choosing equipment for their first VHF/UHF or HF station
- Help setting up an effective first HF station

Beyond these basic items, the club has also found that mentoring in the following areas helps boost interest in getting on the air among new and upgraded hams:

- An introduction to foxhunting
- An introduction to low-Earth orbit (LEO) satellite operations
- An introduction to operating on the 6-meter band
- Getting set up and learning how to use *WSJT-X* and FT8/FT4 modes
- A basic introduction to contest participation
- A guide to working DX and confirming receipt of transmissions
- Help with basic physical station-building issues such as grounding, getting cables into a building, and putting up simple antennas and feed lines

Above: Mackenzie Pooler, KE1NZY, and her father, Dan Pooler, AC1EN, mentor hams by explaining how to get started with satellites at Ham Bootcamp.

Creating Ham Bootcamp

Our solution was a new program created by our club, called Ham Bootcamp. This program was designed to address the barriers preventing newly licensed and upgraded hams from getting on the air. The addressed barriers were shared by the club's license students via surveys.

Creating this type of program is not difficult. Before agreeing to launch Ham Bootcamp, the concept was discussed among license-class instructors. The initial program was taught by three volunteers from our instructor pool.

We took the most noted feedback items and scheduled a three-session inaugural Ham Bootcamp. It was taught at our station (AB1OC-AB1QB) in New Hampshire. Ham Bootcamp is free to anyone who wants to participate. The club learns more about what topics best meet the needs of attendees each time the program is offered, and the items covered are continuously improved upon.

Effective mentoring needs to be hands-on and personal. This requires spending time with hams to understand what they want to do with amateur radio, and each Ham Bootcamp begins with this discussion.

Program Structure

Ham Bootcamp includes hands-on demonstrations of the on-air activities that new licensees seem to enjoy most. This is done so that attendees can figure out what interests them. We also spend time talking about and demonstrating the basics of building VHF/UHF and HF stations.

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New and recently upgraded hams are interested in a broad range of topics. With this in mind, NARS created specific activities for each level of ham radio licensees. The topics are taught via demonstrations and hands-on activities. For example, instructors conduct a practice repeater chat net on a UHF simplex channel, where all program attendees can check in and practice participating in a net. During the program, hams assemble and work with demonstration HF stations and the associated computer and software applications for logging and digital operation. This approach gives them a chance to work with similar gear that they'll be using to build and operate their own stations.

Most young and new hams come to Ham Bootcamp with a great deal of concern about making mistakes while operating on the air. To help with these problems, a focus is placed on practicing basic operating techniques to get attendees comfortable with being on the air.

James Finchum, AC1DC, explains how to assemble an HF station at Ham Bootcamp.

Program Locations

NARS has been scheduling a Ham Bootcamp series after each set of our spring and fall license classes. This gives the Technician-, General- and Amateur Extra-class licensees (as well as other hams) a chance to participate in the program shortly after they earn their licenses or upgrades. Each Ham Bootcamp series consists of two Saturday meetings to cover the Technician-, General-, and Amateur Extra-class license items, and an evening visit to the local Ham Radio Outlet store. This

The start of Ham Bootcamp at the 2019 New England HamXposition in Boxborough, Massachusetts.

format is offered to small groups of 10 – 20 attendees and is taught at our station, where they have access to a complete set of equipment for hands-on demonstrations and use.

Ham Bootcamp is also offered at the Northeast HamXposition in a group format. The program occurs on a Saturday morning with about 80 people, and the format consists of two tracks — one for Technicians and unlicensed hams and one for Generals and Amateur Extras. After the main sessions, attendees receive a guided tour of NARS's ham radio display and vendor area at the show.

The hamfest format is delivered in a large conference room with groups of about eight hams at each table. The instructors rotate from table to table delivering their elements of the hands-on presentation and demonstration of their topics. This format requires 8 – 10 instructors, which the club staffs from our license-class instructor pool.

Ham Bootcamp and Social Distancing

Ham Bootcamp has continued safely during the COVID-19 pandemic. The program is offered as an online activity via three Zoom sessions, structured the same way as the in-person program. The Ham Radio Outlet trip is replaced with an online shopping trip where attendees look at various equipment choices online using vendor websites. The topics for the online shopping trip are chosen through Zoom polls completed by program participants.

Getting On the Air After Ham Bootcamp

The Ham Bootcamp program is only 2 years old, so it's still relatively new. Program results have been encouraging, however. More than half of the program attendees are building stations and getting on the air. Ham Bootcamp has a been an effective motivator for both newly licensed and upgrading hams, as well as those who had their license for a while and weren't active before attending the program.

Conclusion

Ham Bootcamp is continuously evolving as time goes on. NARS will be opening online license classes and online Ham Bootcamp to all licensed and prospective hams in North America. Contact **classes@n1fd.org** to sign up for the next set of license classes and the next online Ham Bootcamp. For more information on Ham Bootcamp, visit **www.n1fd.org/ham-bootcamp**.

All photos provided by the author.

Fred Kemmerer, AB1OC, earned his Amateur Extra-class license in 2010. He's an electrical engineer and has held positions as a technology and business executive in the telecommunications industry. He enjoys building stations and space communications, and he has a blog dedicated to these interests, which can be found at **https://stationproject.blog**. Fred also serves as president of the Nashua Area Radio Society. He can be reached at **ab1oc@arrl.net**.

For updates to this article, see the *QST* Feedback page at www.arrl.org/feedback.

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73 AMATEUR RADIO ANTENNA ARCHIVES #54

Dual-Band Sloper for 60 and 17 Meters

An abridged half-sloper antenna that can help fulfill the needs of hams with space limitations.

Patrick Brannick, N2BZD

Operating HF from my suburban lot requires some creativity. I reside in Wall Township, New Jersey, and my local codes don't allow for antennas — or their free-standing supports — to exceed 21 feet. And should an antenna fall, it must be completely contained within the boundaries of my property. My wife, Maura Grady, KC2VKN, and I have been operating within these local regulations with a 40-, 30-, 20-, 15-, and 10-meter multiband vertical. As we were interested in adding additional HF bands, Maura suggested using a tree in the center of our property as a potential support for another antenna.

Research and Design

In our research, we read two *QST* articles: "A Reduced-Size Half Sloper for 160 Meters" by Don Kirk, WD8DSB, from the March 1998 issue, and "The Half Sloper — Successful Deployment is an Enigma" by John Belrose, VE2CV, from the May 1980 issue. Both articles discussed restricted-space antennas and suggested a half sloper that's reduced in size, where one leg is ⅛ wavelength, and a counterpoise is attached on the shield side of the coax. Unfortunately, the height requirements precluded operation on 160 and 80 meters. However, it appeared that a reduced-size half sloper for 60 meters was a viable option.

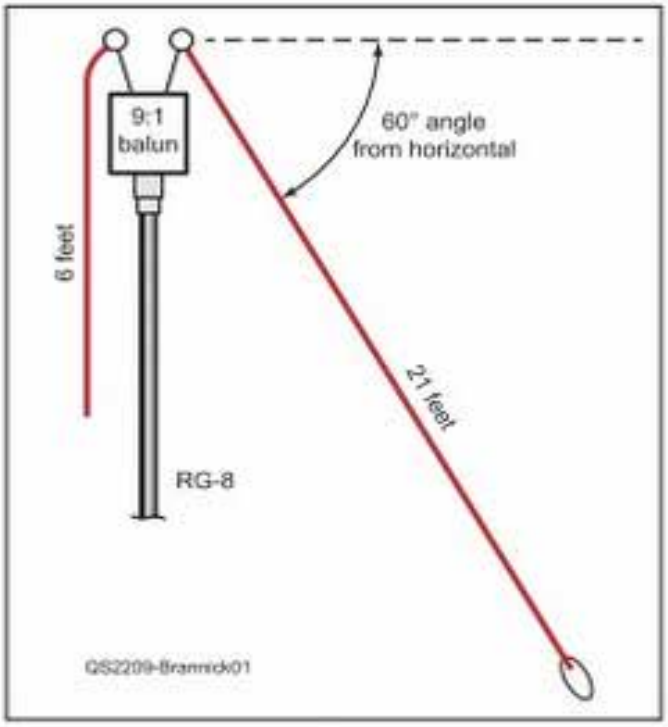

Figure 1 — Assembly details of the dual-band sloper antenna for 60 and 17 meters. This figure is not to scale.

A ½-wavelength antenna cut for the lowest 60-meter frequency of 5.332 MHz is 21 feet and 11 inches. Because of my space constraints, I was only able to use a 6-foot counterpoise. Normally, a reduced-size half sloper requires inductive loading (inserting a loading coil in series with the antenna), as it is a shortened antenna. Without inductive loading, the antenna has a high impedance due to its capacitive reactance. Further, this antenna

Table 1 — 60-Meter SWR, Impedance, Resistance, and Reactance

Channel	Frequency (MHz)	SWR	Impedance Ω	Resistance Ω	Reactance Ω
1	5.332	2.6	55.0	37.5	40.2
2	5.348	2.5	56.4	39.6	40.1
3	5.358	2.4	58.2	41.7	40.7
4	5.373	2.3	59.2	43.7	39.9
5	5.405	2.1	63.0	49.5	38.9

MEMBERSHIP APPLICATION

E P A R A

Eastern Pennsylvania Amateur Radio Association
Address: PO Box 521, Sciota, PA 18354
Email: N3IS@qsl.net
Website: www.qsl.net/n3is

Date: _____

Name: _____ **Callsign** _____

License: Novice Technician General Advanced Extra

Address: _____

City: _____ **State:** _____ **Zip:** _____

Home Phone: _____

Cell Phone: _____

Email: _____

* **Note:** We do not publicize your phone or email information.

ARRL Member: _____ **Skywarn Spotter:** _____ **ARES/RACES Member:** _____ **VE:** _____

Interests:
DX _____ Contest _____ CW _____ QRP _____ Digital Modes_____ Antique Radio Equipment _____
Building Antennas _____ Electronic Repairs _____ Elmering _____ Kit Building _____ EmComm: ____

Others: _____

How did you get interested in Ham Radio?

_____

Please list any relevant qualifications or assets you have or are willing to share/contribute to the club.

Use reverse side if needed:

_____

_____

_____

Sponsored or Reviewed by: _____ **Callsign:** _____

Membership Rates,

Membership: **$20.00** per year Spouse: **$10.00** per year
Full time Student: **$15.00** per year Senior:(Over 62 years of Age): **$15.00** per year