



SHORT SKIP

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REPEATERS

Freq	Location
147.000	Merrillville
147.240	St. John
442.075	Merrillville

All Lake County ARC Repeaters are open to all amateurs. All repeaters must have a PL of 131.8 set in order to access.

FROM THE PARADE STAND

by Tim, N9CA, LCARC President



Hello everyone,
 Did you know ?

ARRL Audio News. The ARRL has weekly 15 minute podcasts. Listen on your smart phone, or tablet. Found on iTunes, www.arrl.org/arrl-audio-news

Morse Code Qualifying Runs. The ARRL and W1AW will be offering these 6:00pm CST Wednesday February 8th and 3:00pm CST Thursday February 22nd. Sending speeds are from 10 to 35 WPM. Solid copy for one minute (by hand). Receive certificate and/or endorsement stickers. Info at www.arrl.org

Technician Licensing Class LCARC is hosting this. Begins Thursday February 22nd. Info www.LCARC.org

The LaPorte ARC "Cabin Fever Hamfest" will be Saturday February 24th from 7:00am – 1:00pm at the LaPorte Civic Auditorium 1001 Ridge St. Talk in 146.61 PL 131.8 Tickets \$7. www.lparc.org for more info.

Raffling 2 tickets to the "Cabin Fever Hamfest" at our February 9th meeting.

Local HR license testing hosted by the LCARC ; Technician, General, and Extra class on April 12th.

50% of US amateur radio operators say they have tried digital modes such as FT8.

Two more CubeSats are operational. FOX-1d (AO-92) and PicSat. Launched January 12th. AO-92 is for amateur use and offers camera images. UL 145.910 (1750 tone) DL 435.525. Both data and FM voice.

Next LCARC meeting is Friday February 9th at 7:30pm. Our program will be "APRS" by Mark Skowronski K9MQ. Mark has a lot of experience with APRS and how we can all put it to use. CU at the meeting!

73, Tim/N9CA President LCARC

FCC IS LISTENING UP

By WBØRUR, on the scene



TEMECULAH, California – The Federal Communications Commission today formalized a program to assist amateur radio operators in achieving better operating practices. The "UP Monitor" program will pair each DX radio operator working "split frequency" with one official representative of the U.S. federal government.

The representative's duties are to constantly monitor the DX station's transmit frequency. If an operator – hoping to work the DX – accidentally transmits simplex, the "UP Monitor" will announce "HE'S WORKING SPLIT! HE'S WORKING SPLIT!"

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MEETING MINUTES

January 12, 2018

Meeting called to order at 7:32PM

Introductions were made with 21 attending the meeting

The club will have a Tech Class License class with VE testing for Tech, General and Extra class license. Classes will begin Feb. 22 Thursday at the Lake County Public Library and will be meeting on the lower level which is handicap accessible in Room C. The classes will run for 8 weeks and Finish on April 12. Will receive all testing material from the ARRL and will be using the ARRL license manual to study from.

Suggestions for future programs from club members are:

- The February program will be introductions into APRS given by Mark which was used in the balloon launches from Hobart School.
- In March the program will be the use of a Hot Spot.

The report from Solar Eclipse showed that the dark sport did not effect radio propagation very much.

Letters have been sent out to 5 new License Amateurs in hope that we will have them attend meeting.

Nick Report on DX is it is out their to work.

The club Net has been suspended for awhile.

Kerry had a show and tell on a cricket 80 meter transceiver and the trouble putting it together.

The program was on RFID tags and ELF sounds the earth makes start at 7:50PM

Nick asked about the 25 dollar donation to Red Cross and Salvation Army. Jim issued a check to both Salvation Army and Red Cross.

The Herb Briar award was asked about and suggestions about a parking lot Hamfest.

Meeting adjourned at 8:35PM



**Get your HAM
Radio License**

Technician Classes will be from 6:30 pm to 8:30 pm at the Lake County Public Library 1919 W. 81st US Rt. 30 Merrillville Indiana 46410 lower level room "C" Handicapped accessible.

Classes are over eight consecutive Thursday nights beginning Thursday February 22nd through Thursday April 12.

On April 12th, The Technician test will be available for a cost of \$15.00 at 7:00pm sharp.

My contact number is:
219-769-0673.

My email is: tim2020@sbcglobal.net

Prepare to Get Your Grid On!

from ARRL Letter 12/29/2017

What's your grid square? Be prepared to answer that question a lot in 2018. The ARRL International Grid Chase 2018 begins this weekend and continues throughout the year. The Grid Chase kicks off at 0000 UTC on Monday, January 1, which is New Year's Eve in US time zones, so get ready to hit your grid running.

This is an event for all radio amateurs, and taking part is as simple as just getting on the air and making contacts: The objective of the year-long event is to work stations on any band (except 60 meters) in as many different Maidenhead grid squares as possible, and then upload your logs to ARRL's Logbook of The World (LoTW). All contacts on all permitted Amateur Radio bands, except 60 meters, are eligible for award credit. This includes contest contacts.

Each new grid square contact confirmed through LoTW will count toward your monthly total. Stations do not have to exchange grid squares for a valid contact, although it's anticipated that many operators will do so. Some grid squares will be "rare ones," however, and will be in demand. How about yours? Get on the air, and get behind your grid! If you can, get out there, and activate the scarce ones.

Marconi Cape Cod Radio Club KM1CC at the Cape Cod National Seashore has just announced that its members will activate rare grid square FN51 January 18-19 for the International Grid Chase.

Complete details of the ARRL International Grid Chase 2018 appeared in the December 2017 issue of QST. For more information, contact the ARRL Contest Branch.

FEBRUARY PROGRAM

presented by Mark, K9MQ - Topic, APRS

This is a program you don't want to miss. Our own Mark, K9MQ, will be giving a presentation on APRS and Balloon Tracking. Mark has successfully assisted the folks at Hobart HS on a number of balloon launches and recovery.

APRIL FOOL QUICK STATS POLL

ARRL News 01/02/2018

It may seem early to be considering April Fools humor, but that's exactly the theme of the new QST QuickStats survey now available at the QuickStats page at <http://www.arrl.org/quickstats>. The results of this survey will appear in the April issue of QST, of course. So, needless to say, this poll is a little . . . out of the ordinary!

- Have you ever tattooed yourself with a soldering iron?
- What is the meaning of the new Q signal QZZ?
- How does your cat or dog tell you when it is time to turn off your radio?
- Do you calibrate your station clock to National Institutes of Standards and Technology station WWV?

Visit the [QuickStats page](#) and be sure to bookmark it in your browser!

Check out the LCARC website at www.w9lj.org and the Hoosier DMR Best Practices Guide at <http://tinyurl.com/nbvo7xh>

Introducing the Android HT

by Bob, KONR

Some exciting news wandered into my inbox this past week concerning a handheld radio driven by the Android operating system. The RFinder H1 is an FM plus DMR radio to be released at the end of this month. Click to enlarge the photo to the left to get a better view. I had proposed a similar concept back in 2012: The Android HT, so this radio immediately grabbed my attention.

Details are still a bit thin on the RFinder H1 (pronounced “Ar Finder H 1”) but this video gives you a glimpse of its operation. The 70cm band radio apparently also supports GSM and 4G/LTE mobile phone formats.

There are a few other YouTube videos available, one of which emphasizes the easy programming of the radio using the RFinder



Click on picture above for video

online repeater directory. This makes perfect sense and is a great example of the power of a connected device. This feature would be very handy for programming up FM repeaters on the fly and outstanding for dealing with the

complexity of DMR settings.

The RFinder H1 includes DMR capability, something I wasn't thinking of back in 2012. That also makes perfect sense...embracing the growing amateur radio format that is based on industry standards.

VERTEX STANDARD RADIOS ROLLED INTO MOTOROLA SOLUTIONS

As of Jan. 1, Motorola Solutions had combined the best of Vertex Standard's precision-engineered portfolio with its industry-leading two-way radio lineup, and those products will carry the Motorola Solutions brand. This alignment maximizes the strengths of both names to best serve the marketplace.

What does this mean for current Vertex Standard users? You can expect to see your favorite models as part of a focused portfolio – finely tuned to include the best of the best, rebranded and supported by Motorola Solutions' expanded network.

The following models are now under the Motorola Solutions name:

- VX 2100 & 2200
- VX 450 Series
- VX 260 Series
- EVX 260 Series
- EVX S24

AREA HAM USES ALL CAPS TO MAKE POINT

By K5KVN, on the scene

OMAHA, NEBRASKA — A local ham radio operator is feeling euphoric after making his point in an online forum in a very strong way.

“I got through to them,” says Mike Yunes. He was browsing a popular amateur radio forum that focuses on radio frequency propagation through Earth's magma when he saw a thread that he thought was “going off the rails.”

“It was a mess and I had to assert my authority on the subject matter with a radical approach. My reply in all caps and strategically bolded text got their attention,” he says.

Asked if he'll do it again, he says, with authority “YES I WILL.”

LISTENING UP

from page 1



“We closely examined current operating procedures,” says FCC Field Agent John Ranklestein.

Based at the FCC's California bureau, Ranklestein says, “We have recordings of hams who were rude, crude and downright obnoxious when someone accidentally transmitted simplex. In fact, the list of obscenities would fill a binder the size of most ham's logbooks.”

Ranklestein adds the FCC opted to provide the service as a means of cleaning up the bands and eliminating crass language and QRM.

For a small fee, U.S. hams may request an “UP Monitor” be assigned when they activate special event 1x1 call signs (and operate split).

A spokesman for the National Radio Retransmission Legion (NRRRL) says they support the program, but are concerned about what all the hams now performing this function as volunteers will do with their time.

“Removed from their police duties, we doubt seriously they will make actual QSOs,” says the agency.

Ranklestein says the “UP Monitor” program is open to both CW and SSB DX operations, but is not available to QRP operations, since “no one can actually hear those signals anyway.”

hamhijinks.com



Scan this code to go directly to our web page w9lj.org

AMATEUR RADIO: NARROWBAND COMMUNICATIONS IN A BROADBAND WORLD.

73, Bob K0NR



For my day job in the test and measurement industry, I get involved in measurement solutions for wireless communications. Right now, the big technology wave that is about to hit is known as 5G (fifth generation wireless). Your mobile smartphone probably does

4G or LTE as well as the older 3G digital mobile standards. For more detail on LTE, see [ExtremeTech explains: What is LTE?](#)

5G will be the next cool thing with early rollouts planned for 2018. The design goals of 5G are very aggressive, with maximum download speeds of up to 20Gb/s. (See what I did there: I used the words “up to”, so don’t expect this performance under all conditions.) The actual user experience has yet to play out but we can assume that 5G is going to be blazing fast. For more details see: [Everything You Need to Know About 5G](#). To achieve these high bandwidths, 5G will use spectrum at higher frequencies. Move up in frequency and you inherently get more spectrum. The FCC recently allocated 11 GHz of new spectrum for 5G, including allocations at 28 GHz, 37 GHz, 39 GHz and 64-71 GHz: FCC 5G spectrum allocation demands 3 breakthrough innovations. Yes, those frequencies are GHz with a G...that’s a lot of cycles per second.

Amateur Radio

So my day job is focused on wider bandwidths and higher frequencies. Then I go home and play amateur radio which is a narrowband, low frequency activity. The heart of ham radio operation is on the HF bands, 3 to 30 MHz, almost DC by 5G standards. Many of us enjoy VHF and UHF but even then most of the activity is centered on 50 MHz, 144 MHz, maybe 432 MHz. I recently started using 1.2 GHz for Summits On The Air, so that at least gets me into the GHz-with-a-G category.

Not only does ham radio stay on the low end of the frequency range, we also use low bandwidth. The typical phone emission on the HF bands is a 3-kHz wide SSB signal. That’s kHz with a k. As we go higher in frequency, some of our signals are “wideband” such as a 16-kHz wide FM signal on the 2m band. In terms of digital modes, [AX.25](#) packet radio and [APRS](#) typically use 1200 baud data rates but sometimes we go with a “super-fast” 9600 transmission mode. (Not really.)

CW is still a very popular narrowband mode with bandwidths around 200 Hz, depending on Morse code operating speed. Lately, the trend has been to go even narrower in bandwidth to keep the noise out and operate at amazingly low signal-to-noise ratios. Some of the [WSJT modes](#) use bandwidths in the range of 4 to 50 Hz.

There are some good reasons that amateur radio remains narrowband. The two most important are:

We love the ionosphere and what it does for radio propagation. The HF bands are great for making radio signals go around the world but they are narrow spectrum. For example, the 20m band is 350 kHz wide, going from 14.000 to 14.350 MHz. Operation is restricted to narrowband modes, else we’d use up the entire band with just a few signals.

We just want to make the contact (and maybe talk a bit). For the

most part, radio hams are just trying to make the contact. This is most pronounced during a DX pileup or during a contest when you’ll hear short exchanges that provide just the minimal amount of information. Some of us like to talk...rag chew...but that can be accomplished with narrowband (SSB) modulation with no problem. It seems that narrowband signals suit our needs. I suppose it would be handy from time to time to be able to send a 3 MB jpg file to someone I am working on 20m but that’s not the main focus of a radio contact.

Of course, not all amateur radio operation is below 1 GHz. There’s always someone messing around at microwave and millimeter wave frequencies. I’ve done some mountaintop operating at 10 GHz and achieved VUCC on that band. Recently, the ARRL announced a [new distance record](#) of 215 km on the 47 GHz band.

ICOM produced a D-STAR system at 1.2 GHz with a data rate of 128kbps, quite the improvement over AX.25 packet. However, adoption of this technology has been very limited and it remains a single-vendor solution. In fact, it may be a dead technology, hard to say.

There is significant work going on with [High-Speed Multimedia](#) (HSMM) Radio which repurposes commercially-available 802.11 (“WiFi”) access equipment. Broadband-Hamnet is focused primarily on using 2.4 GHz band to create mesh wireless mesh networks. [Amateur Radio Emergency Data Network](#) (AREDN) is doing some interesting work, mostly on the 2.4 GHz and 5.8 GHz bands. The [HamWAN site](#) has lots of information about a 5.8 GHz network in the Puget Sound area. I just became aware of the [Colorado Amateur Radio Broadband Network](#), in my neighborhood. The basic theme here is use commercial gear on adjacent ham bands...a common strategy for many VHF and higher ham radio systems.

Also worth mentioning is the [FaradayRF work](#), currently aimed at creating a basic digital radio for the 33cm (902 MHz) amateur band. The raw data transfer rate is around 500 kbaud.

There are probably some other high-speed digital systems out there that I’ve missed but these are representative.

Infrastructure Rules

A critical factor in making LTE (and 5G) work is the huge investment in infrastructure by Verizon, AT&T and others. With cellular networks, the range of the radio transmission is limited to a few miles. One of the trends in the industry is toward smaller cells, so that more users can be supported at the highest bandwidths. With 5G moving up in frequency, small cells will become that much more important.

On the other hand, most amateur radio activity is “my radio talking to your radio” without any infrastructure in between. Most of us like the purity and simplicity of my station putting out electromagnetic waves to talk directly to fellow hams. In many cases, this simplicity and robustness has played well under emergency and disaster conditions.

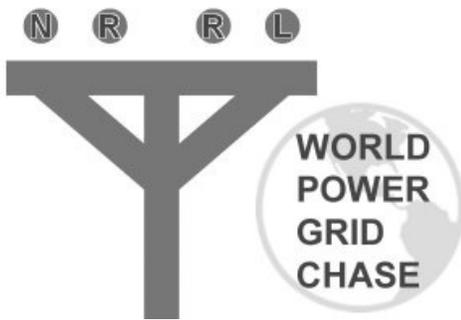
FM (and digital voice) repeaters are a notable exception with the Big Box on the Hill retransmitting our radio signal. For de-

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ELECTRIFYING NEW ON-AIR EVENT PLANNED

By WBØRUR, on the scene

Not to be outdone by the ARRL, the NRRL has a similar operating event for 2018 - ed



NEWING - STEAD, VT — The National Radio Retransmission Legion today unveiled plans for next year's much anticipated amateur radio operating event.

The "World Power Grid Chase 2018" will encourage ham radio operators to get on the air from utility poles and electrical substations around the world. Each location is identified by a unique 6 character code which every operator will be forced to look up multiple times during an activation because, honestly, they're pretty hard to remember.

NRRL CEO Bob Gilligan – adjusting his ascot and repositioning his captain's hat – says the "World Power Grid Chase 2018" idea has been in the works for some time.

"Admittedly, we struggled a bit to come up with something with the same strong sex appeal as 2016's NPOOTA (National Pizza Ovens On The Air). As I sailed around the cape aboard my 37 foot yacht watching the seagulls snap up the mackerel, I realized it's hard to surpass the combined excitement of a stuffed crust pepperoni pizza and RF. But we really think we're onto something electrifying now!"

Here's How You Can Get In On The World Power Grid Chase 2018.

The goal of the NRRL World Power Grid Chase is simple – work as many portable stations set up at utility poles and electrical substations as possible.

Then, upload your contact to the NRRL's Logbook of the Globe (LOG). And if you're not registered with LOG, now's a good time to start! It's absolutely free and will only take 2.75 hours to register. Soon, you'll get a postcard in the mail with a password – but that's not the password you use to login. So watch for an email blast from NRRL with connection information on how to retrieve your access

code and get into the double-blind Linux server. Then you're ready to start your Power Grid chase!

Every new power pole or electrical substation you contact counts towards your monthly total. And if you set up a portable station and activate a power pole or electrical substation (note: ground rods strongly encouraged) you get double the points!

Each month, you can check out the leaderboard and see how your QSO totals rank among your fellow hams. We'll do all the hard math work for you because after getting set up with Logbook of the Globe – you'll be bushed!

Frequently Asked Questions

Q: Can I set up at any power pole or electrical substation? Does it have to be one on my property?

A: Any available power pole or electrical substation is available for activation.

Q: Can I set up at a power pole or electrical substation on my in-laws property?

A: Any available power pole or electrical substation is available for activation.

Q: How close do I need to be to the power pole or the electrical substation?

A: You should be within 20 feet, unless you are feeling the tiny hairs on the back of your neck stand up – then it is advised to move.

Q: I have an electrical power generating dam near my QTH. Can I set up there?

A: We have not yet implemented The DAM WORLD POWER-GRID CHASE at this time.

Q: Can I activate the power meter on the side of my house?

A: Not sure we understand the question.

Q: How many power poles and electrical substations are available to be activated?

A: So, so, so many. And you'll find that some are literally in the middle of nowhere! We suspect some hams will drive around the United States trying to activate all of them. But surprise! You can't drive to the South Pole.

Q: Will you have operating awards at the end of the year for the most International Power Grid contacts?

A: There will be terrific prizes available! (Fees apply and do not include shipping or handling.)

DX WORLD.NET REPORT

Kosovo's IARU Society SHARK, and its president Vjollca Caka, Z61VB are hosting a tenth anniversary activation celebrating Kosovo's independence, February, 2008. The activation has already started, with Z60A being found on several bands. Adding to their HQ location is a semi-permanent low-band site. Both sites have beam antennas plus four K3s and SPE 1.3KW amps.

Olli, OH0XX has been testing the propagation over the past two days with good - but narrow - U.S openings.

An international team has been invited to Kosovo and is partially on the ground at this time. The team consists of DL3DXX OH0XX, OH1MA, OH2BH, OH3JR, OZ1IKY, S50A and S51E,

along with locals Z61DX, Z61FE, Z61VB, Z62FB and Z63DBB. Additional locals are behind this activity as well, and a new 2nd week team will be announced soon.

Jim, K9JE, ARRL Hon. Vice-President and Hans, PB2T, IARU R1 secretary will add to the party.

The ARRL Rocky Mountain Division director, Dwayne Allen, WY7FD has informed the team that the LoTW and the other ARRL structures are being put into place to receive this new DXCC country contacts. Already, "Republic of Kosovo" is listed in the DXCC Challenge pages. Club Log will be used for this activation, while QSLs will go via OH2BH.

Continued from page 4

cedes now, FM repeaters have represented an infrastructure that individual hams and (more often) radio clubs put in place for use by the local ham community. There is a trend towards more infrastructure dependency in ham radio as repeaters are linked via the internet via IRLP, EchoLink and other systems. (Some hams completely reject any kind of radio activity that relies on established infrastructure, often claiming that it is irrational, unethical or just plain wrong.)

One interesting area that is growing in popularity is the **use of hotspots** (low power access points) for the digital voice modes (D-STAR, DMR, Fusion, etc.) In this use model, the ham connects a hotspot to their internet connection and talks to anyone on the relevant ham network while walking around the house with a handheld transceiver. See the Brandmeister web site to see the extend of this activity. It strikes me that this is the same “small cell” trend that the mobile wireless providers are following. You want good handheld coverage? Stick a hotspot in your house.

Looking at ham radio and broadband communications, I summarize it like this:

The vast majority of ham radio activity is narrowband, for reasons described above.

There is some interesting ham radio work being done with broadband systems, mostly on 2.4 GHz and 5.8 GHz.

Commercially available broadband technology (LTE, 5G, and beyond) will continue to increase total network bandwidth and performance increasing the difference between commercial broadband and narrowband ham radio.

Implications

The reason for writing this article is that the amateur radio community needs to recognize and understand this increasing bandwidth gap. We like to talk about the cool and exciting stuff we do with wireless communications but we need to also appreciate how

this is perceived by someone with an LTE phone in their pocket. Just communicating with someone at a distance is no longer novel. After all, **Amateur Radio is Not for Talking**.

What do I conclude about this? Here's a few options:

1. Don't worry. We are all about narrowband and that's good enough. This attitude might be sufficient as there are tons of fun stuff to do in this narrowband world. In terms of ham radio's future, this implies that we need to expose newcomers to narrowband radio fun. We'll need to get better at talking about how amateur radio makes sense in this broadband world.
2. Embrace commercially available broadband. Use it where it makes sense. This approach means that Part 97 remains mostly narrowband but we can make use of the ever-improving wired and wireless network infrastructure that is available to us.
3. Develop Part 97 ham radio broadband. I am initially a bit skeptical of this idea. How the heck does ham radio compete with the billions of dollars Verizon, AT&T and others pour into broadband wireless? But that may not be the right question. Once again, I fall back to the universal purpose of amateur radio: To Have Fun Messing Around with Radios. Can we have fun building out a broadband network? Heck yeah, that sounds like an interesting challenge. Would it be useful? Maybe. Emergency communications might be an appropriate focus and some hams are already working on that. Create a network that operates independent from the commercial internet and make it as resilient as possible. It doesn't have to be at 5G speeds but it better be way faster than AX.25.

I think Option #3 is definitely worth considering. What do you think? 73, Bob K0NR

LINKS *(click on the underlined link to view)*

You've just purchased your first 2m FM transceiver and have been chatting with both old and new friends around town on the 2m band. You and your buddies decide to find an out of the way frequency to hang out on. After tuning around, you find a nice, quiet frequency that no one seems to be using and start operating there. Nothing to worry about, right?

Not so fast, there are a few more things to consider when selecting a frequency on the 2m band. Let's take a look at the key issues. **[Click on this link for entire article](#)**.

Take a look at a new Chinese HF radio with FREEDV built in. Is digital going to be the next SSB on HF?? Check out **[marxy's musing on technology](#)**

Remember Archie comic books? How about one about ham radio? Click on this link and read a classic.

https://kk4dsd.files.wordpress.com/2013/09/archies_ham_radio_adventure.pdf

Do we have hams in our club (or yours) who we hardly ever see? Check out this article and perhaps there are things we as a club (or you as an individual) can do to bring them back.

http://www.kb6nu.com/keep-touch-hams-life-help-prevent-isolation/?utm_source=amateur-radio-weekly&utm_medium=email&utm_campaign=newsletter

We explored **[Hara Arena in Trotwood Ohio](#)**, just outside Dayton. Hara Arena is 165,000 SQFT and has over 20 acres of parking. Also on the property is an abandoned golf course. The facilities include a bar/pub, ballroom, conference center, ice rink, and 4 exhibition halls. This place is huge! The arena started with a dance hall, the Wallarena Ballarena, in 1956 by Harold and Ralph Wampler.

The arena has hosted many events, teams, and entertainers including The Longhorn Rodeo, Sesame Street Live, Silver Sticks Hockey Tournament, The Dayton Hamvention, Lanfest, Monster Truck Winter Nationals, the Midwest Ceramics Show, The Miami Valley Home Improvement Show, The National Holiday Gift Show, the Dayton Gems, the Dayton Bombers, the Rolling Stones, Elton John, and the Who, and many many more.

Hara Arena closed in 2016 and it was sad to see this amazing 7,000 seat venue shut down but it was a great urban exploration.

https://www.youtube.com/watch?v=wBPVBxnJnU&sns=em%3Futm_source%3Damateur-radio-weekly&utm_medium=email&utm_campaign=newsletter

[Just a short video on the method on how to seal coaxial connectors](#) for Amateur Radio. This method can be applied to many other applications and works great to keep moisture out of your connectors & antennas!

[Indoor attic dipole antenna](#)

Trying out an antenna for Ham Radio in the attic.

<https://youtu.be/GpovJsdLSiU>

FT-8 I'm Not Really Feeling the Magic

By Dan Romanchik, KB6NU

Partly out of curiosity and partly because my friend Jeff, KE9V, shamed me into it, I setup my Signalink interface, downloaded WSJT-X from <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>, and started operating FT-8, the latest “shiny object” (as the ARRL dubbed it) from the K1JT team. As you probably know, this mode has really caught on with the digital crowd, and the waterfall is chock full of FT-8 signals. Part of the reason for this is that it has some of the characteristics of JT-65, but is not as excruciatingly slow.

Over the past couple of days, I've made 32 QSOs, including a couple of DX contacts. It's been fun to try something new, but to be honest, I'm not really feeling the magic.

Part of it is that I don't feel like I'm really doing anything. I downloaded the software, plugged in my digital interface, fooled around with the settings a bit, and then, the computer started making contacts. I have to click a few on-screen controls to make contacts, but even that's a step that could be easily programmed in by the WSJT-X developers. (In fact, I wonder why they haven't done that already!)

When a CQ appears in the “Band Activity” window, you double click on it. When you do this, the software begins listening for signals on that frequency. In this case, I double-clicked on the CQ by WA9THI. When I double-clicked on the CQ, the program began decoding signals on that frequency and display the transmissions in the “Rx Frequency” window.

Then, I clicked on “Enable TX” and the program began the contact sequence, sending “WA9THI KB6NU EN82.” EN82 is my grid designator. This is shown as the first yellow line in the Rx Frequency window. The transmissions that I sent are highlighted in yellow. The transmissions sent by WA9THI are highlighted in red.

The sequence of transmissions shown there comprise a complete contact, and that whole process takes less than two minutes. And, once WA9THI received my first transmission, the sequence is all automatic. You just sit there and watch the two computers talk to one another.

While I can certainly appreciate the thought and the work that went into the design of the protocol and programming to implement it, sitting and watching the computers talk to one another just doesn't excite me. On the other hand, if you're one of those guys who wants to make contacts, but doesn't really want to talk to anyone, than this is the mode for you!

Here are a few more notes about FT-8 operation:

- Not surprisingly, synchronizing your computer with the other stations computer is very important. To do that, you need to get your computer to use the network time protocol (NTP). I failed to do this when I first installed WSJT-X, and while my waterfall was full of FT-8 signals, WSJT-X just wouldn't decode them.
- I got my PC laptop to talk ntp by installing Meinberg NTP software (<http://www.ntp.org/ntpfaq/NTP-s-def.htm>). Once I did that, WSJT-X magically started decoding transmissions.
- Most of the cool guys seem to be using Meinberg NTP, but

there are other options. One of the guys in our club is using a program called Dimension 4, for example.

- Apparently, you don't have to limit your power output as you would with PSK-31. At first, I set my output power to 10 W. I had a bit of success at 10 W, but I expected more. When I asked on Twitter how much power other guys were using, most of them said that they were using more than that.
- For the last couple of sessions, I've been setting my output power to 25 W, and I've been having more success. I've now worked several Europeans on 30m.
- Even at 25 W, my signal reports are more often than not not as good as the signal reports I'm handing out. I haven't figured this one out yet. This doesn't happen to me when I'm operating CW, so I don't think it's my antenna.
- When I'm operating, I write down the calls of stations I've contacted. The reason for this is that while WSJT-X does have a logging function, it doesn't have a log window, so unless you have a great memory, you could end up working guys two or three times a session. That's probably not a big deal since contacts are so quick, but I'd rather avoid doing that if I can.
- WSJT-X works “split.” While most contacts take place on the same frequency, a station can call you anywhere in the passband of your receiver and WSJT-X will decoded the signal and begin a contact. This threw me the first time or two that this happened, and I tried to change my transmit frequency to match the other station's. In doing so, I messed up the sequence. I now just let the contact proceed normally, and it works out great.
- When I work the other digital modes, I set my IC-746PRO to the USB-D mode. In this mode, the receive passband is narrower than for working phone. When operating FT-8, however, you don't want to limit that passband. Signals will appear across the entire 2.6 kHz of the USB signal, and if you narrow the passband, you won't be able to work those stations.
- WSJT-X checks the validity of call signs. This afternoon, there was a guy who had typed in his call as “WAMAD” and was calling CQ. WSJT-X wouldn't let me answer that CQ.
- Operating this mode opens up the possibility of working more stations whose callsigns spell words and adding those QSL cards to my collection. I have, for example, already worked K1GUY, N4HER, and N5SLY. I'm guessing that these guys don't operate CW.

All told, I've found this to be an interesting foray into a new digital mode. While I'm not feeling the magic that some others seem to be feeling when operating FT-8, it certainly will be a change of pace to operate this mode from time to time. Give it a shot and tell me what you think.

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Do Shortwave ‘Numbers Stations’ Really Instruct Spies?

By James Careless, Radio World Jan 12, 2018

OTTAWA, Ontario — “6-7-9-2-6. 5-6-9-9-0.” Tune across the shortwave bands (above AM/MW), and chances are you will come across a “numbers station.” There’s no programming to speak of; just a mechanical-sounding voice (male or female) methodically announcing seemingly random groups of single digit numbers for minutes on end.



The site of British intelligence’s numbers station transmitter site, “The Lincolnshire Poacher,” at the RAF base in Akrotiri, Cyprus.
Credit: Lewis Bush, “Shadows of the State.”

Congratulations! You are now officially a spy-catcher, to the extent that you may have tuned into a spy agency’s “numbers station” transmitting one-way instructions to their minions worldwide.

Numbers stations are unidentified radio broadcasts that consist usually of a mechanical voice “reading out strings of seemingly random numbers,” explained Lewis Bush, author of “Shadows of the State” a new history of numbers stations and the spies who run them. “These are sometimes accompanied by music, tones or other sound effects.” He said. “There are also related stations broadcasting in Morse Code and digital modes.”

NO PARANOID DELUSION

Program formats aside, the common purpose of numbers stations is “to broadcast coded messages to spies in distant countries,” said Ryan Schaum. He is co-founder of Numbers Station Research and Information Center (NSRIC), a hobbyist group that reports on these signals at www.numbers-stations.com. According to Schaum, the “use of shortwave allows complete secrecy and makes it impossible to determine who the recipient is.”

In order to decode the message hidden within the numbers broadcast, “the recipient uses ‘one-time pad’ encryption, which cannot be decoded by anyone without the time pad key,” said Schaum. Printed on paper pads, the one-time pad key allows the recipient to decode the message just once, it is then discarded for a fresh key after every use, thus making the cipher literally unbreakable. “For these reasons, numbers stations are still used today.”

A waveform file of “The Lincolnshire Poacher” numbers station broadcast.

Credit: Lewis Bush, “Shadows of the State.”

The notion that spy agencies are contacting spies using code broadcasts over shortwave may seem like a paranoid delusion. But as the saying goes, “just because you’re paranoid doesn’t mean they’re not out to get you.”

In the case of numbers stations and the evidence associated with them, “the most widely agreed upon theory is that they are operated by intelligence agencies,” said Bush. “This theory has been backed up by a number of cases where spies have been uncovered or arrested in the act of listening to or decoding these stations, and in a few rarer cases by declassified documents and government admissions of ownership.”

“Voice (numbers) stations are known to be spy messages,” said Paul Beaumont. He is an associate editor of Eye Spy Intelligence Magazine, an independent publication dedicated to espionage and intelligence. “For instance, V02 in Spanish was used to instruct Ana Belen Montes,” Beaumont said.

Montes was a United States Defense Intelligence Agency employee who spied for Cuba from 1985 until caught by the FBI in 2001. A 2016 report by CNN’s Thom Patterson described Monte as “The most dangerous U.S. spy you’ve never heard of.”

A CENTURY OF SPY RADIO

Motivated by what she saw as the U.S.’ unfair policy toward Cuba, Montes avoided detection by never removing top-secret documents from the DIA. Instead, this spy memorized what documents she could at work, and then transcribed these memories on her laptop at home.

Next, she would receive coded instructions from Cuban numbers station V02 (via shortwave radio) “about where to hand over the discs to her Cuban contacts,” Patterson wrote. “Some of the most damaging information Montes admitted giving to Cuba, the FBI said, were the identities of four American undercover intelligence officers working there.”

Today’s shortwave numbers stations are very much a legacy of the Cold War. The fierce espionage battles between the West and the Soviet Bloc — and their mutual vigilance in ferreting out each other’s concealed agents — required a form of communications that covered long distances, provided ironclad security, and yet could be received using locally available radios if need be. Numbers broadcasts via shortwave fit the bill perfectly.

Yet the legacy of using radio to transmit secret information goes back to the First World War. According to Māris Goldmanis, a numbers station listener and NSRIC member based in Riga, Latvia, Allied numbers stations broadcasting in Morse Code were detected by Austrian Archduke Anton Habsburg.

“He was a radio enthusiast, and as a member of the royal family received permission to construct his own radio receiver,” said Goldmanis. “His first activities involving listening to numbers stations such as FL ‘Tour Eiffel’ from Paris, ICI from Cortona [Italy], and FSK from Moscow.”

“The reason coded broadcasts started in World War I was not on a whim,” said Beaumont. “The British had dredged up the underwater telegraphic cables used by Germany and its allies and cut them, forcing the use of radio to send messages.”

FAMOUS STATIONS

Radio as an espionage tool exploded during World War II, and, after that, the Cold War. This is when numbers stations came into their own, as spy agencies such as the CIA, Britain's MI6, and the Soviet Union's KGB spent millions building and operating high-powered yet clandestine shortwave transmitter sites.

One of the "best known" numbers stations was "The Lincolnshire Poacher," due to its use of "The Lincolnshire Poacher" folk song played on a pipe organ as an identifying signal. Amateur radio enthusiasts used direction-finding equipment to locate this station's transmission location to the RAF base in Akrotiri, Cyprus. This station is believed to have been operated by MI6 from the mid-1970s to 2008, using several curtain-array shortwave antennas.

"Among the historic ones which no longer broadcast, there are many stations which could be considered weird," noted Bush. "One known as the Swedish Rhapsody could be a strong contender, as it used music played on a child's music box and the voice that read its numbers sounded somewhat like a child; characteristics which made the station particularly eerie." This numbers station is believed to have broadcast from a transmission site in Falenty, Poland.

Even after the Cold War, numbers stations have stayed in business. One of these is "HM01, which is thought to be Cuban operated," said Bush. "It transmits voice read numbers in combination with digital transmissions using the Redundant Digital File Transfer mode. Another example is a station known as XPA, which is believed to be run by one of the Russian intelligence agencies and transmits numbers solely using multiple-frequency key shifting."

Even North Korea has apparently gone into the spy station business, with one key difference. The dictatorship's domestic radio service KCBS Pyongyang Pangsong has been noted to sometimes transmit 'maths lessons,' which it has been suggested are in fact numbers messages," Bush said. Whether they are intended for real agents or are simply intended to unnerve South Korea and its allies is unclear. According to Beaumont, this numbers station is known as V15, and "decoded sheets [associated with tuning to its signals] have been recovered."



The speculated transmission site of "The Swedish Rhapsody" numbers station in Falenty, Poland.

Credit: Lewis Bush, "Shadows of the State."

TODAY

Today, numbers stations remain a reality on shortwave radio, even in the Internet Age. The reason for these stations' longevity isn't hard to understand. Unlike communications over the internet that leave digital evidence (even in supposedly secure systems) for investigators to find, receiving instructions via shortwave numbers broadcasts leave no traces behind.

"It's a rather safe way to send coded messages, unless you are observed listening to them," said Goldman. "You don't need a large clunky radio. It's even possible to listen these stations on the internet using remote software defined radio, and that is what we hobbyists do."

This doesn't mean that receiving instructions via numbers stations is a perfect form of communications for spies, because it isn't. Spies can get caught if the authorities see them listening to numbers broadcasts, as has occasionally happened.

"A Cuban Morse numbers station — M08a — was also cited in an FBI affidavit as being the channel for a husband and wife team, the Myers, who were arrested following shoddy operator discipline," said Beaumont. "I think they used the internet and made reference to a received Morse transmission."

Nevertheless, the numbers station's ability to send secret information securely over large areas means that this form of shortwave communication likely has a secure future; even while other forms of analog broadcast are being supplanted by digital means.

For readers who are now wishing to tune into numbers stations, making your first direct contact with spycraft is easy. Just get a shortwave radio and scan around the dial. You can even tune in using a remote-controlled shortwave radio over the web, at the free site www.globaltuners.com.

To save time, check out a website like www.hfunderground.com to find numbers stations to tune into. Another good bet for frequencies and general information is the United Kingdom's ENIGMA 2000 [European Numbers Information Gathering & Monitoring Association] at www.apul64.dsl.pipex.com/enigma2000.

A third option is to go to NSRIC's at www.numbers-stations.com or <http://priyom.org>, and tap into its archived and live numbers stations feeds.

Be warned: After hearing your first numbers station, your personal experience of espionage will move from fiction to nonfiction. The spies are out there, they are broadcasting, and you will have heard them!

James Careless reports on the industry for Radio World from Ottawa, Ontario.