Official Publication of the
West Allis Radio Amateur Club

Hamtrix

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Volume 69, Issue 10 October, 2020

OCTOBER CLUB HAPPENINGS

NUT NET
3.985mhz
Monday-Saturday
8:15am CT
NUT NET
Breakfast
8:30am fourth
Tuesday
of the month

Milwaukee-Florida Net
Every Day on 14.290 Mhz
7:00AM - 9:15AM ET
6:00AM - 8:00AM CT

Sunshine Committee

If you know of a member who could use a bit of cheer or support,
Barb Garnier (KD9HPS) is now the Sunshine Committee Chair.
Contact her: 414-529-3536 or barbsewsblue@gmail.com.

Virtual Meeting will be held October 13, 2020 at 7:00pm
presentation "Roof Tower - UPDATE"
by Steve Dryja NO9B
pre-meeting eye-ball QSO Greenfield Park North of Pool 4:00pm to 6:00pm

Join Zoom Meeting
https://zoom.us/j/98047043586?pwd=NWZXam44cU1yaGx4alNTUGcyNG1kUT09
Meeting ID: 980 4704 3586
Passcode: warac

Dial by your location
+1 301 715 8592 US (Germantown) +1 312 626 6799 US (Chicago)
+1 646 558 8656 US (New York) +1 253 215 8782 US (Tacoma)
+1 346 248 7799 US (Houston) +1 669 900 9128 US (San Jose)
Meeting ID: 980 4704 3586
Passcode: 766513

Zoom Board Meeting Oct 29, 2020 7:00pm
Zoom Meeting instructions will be sent out prior to meeting.
Non-Board member interesting in joining us let me know.

WARAC 2-meter net

Every Wednesday at 8pm
SEWFARS W9TJK Repeater 146.820
standard (-) offset 127.3 Hz CTCSS
if repeater down try 146.55 simplex

Index

The President's Shack

Another month done. Fall is here. Still the weather is holding. As of this time it looks like we will be able to hold a pre-meeting Eye-ball QSO at Greenfield park just (north of the pool) The same place as our August meeting. I'll be there from 4:00pm to 6:00pm so we can all get home in time for our zoom meeting. Bring a chair and food if you see fit.

I have actually got on the radio using CW. Sunday night at 7:00pm CDT there is a "Slow speed test" SST. It is a contest format practice get together. You exchange your first name and state. They limit the CW speed to around 20wpm. That's it. Really no pressure. Seems to be going good. The bands are packed but everyone is just there to help each other or learn. No one is keeping track of how many contacts you make or if you report them. It's more like the old Novice bands. See more info on page 12, 13.

Other then that I'm keeping busy
73
Frank KA9FZR • —• —••

From the Editor

No editorial due to being occupied by the President's Shack

WARAC Club Meeting Minuets

September 9, 2020

Due to the nature on the COVID-19 crisis and Governor Tony Evers "Emergency Order #12 Safer At Home Order", Chuck W9WLX hosted the Zoom Meeting.

The club meeting was called to order 7:02 pm by Frank KA9FZR.

Approximately 16 virtual club members were identified by the Secretary Dave WB9OWN as being present.

Club Discussion. Purchase of Wisconsin QSO Party computer. Since the purchase price of computer was over the $250 limit, the question was raised "How are we going to vote on this over Zoom?" "Will a quorum be present for this vote?" (Quorum is 10 or more members we had 16 per club secretary.) Frank K9FZR asked the members if there was any objection about the purchase of the computer; dead silence, no objections were heard. The club president Frank K9FZR accepted that silence as a pass... Tom K9BTQ has possession of the computer and reported that major pieces of software has been installed. Also reported he's working on the QSO party documentation before handing it over to the Wisconsin QSO Party Chairperson Chuck W9WLX.

Club Presentation was Dave's WB9OWN 630 Meters Odyessy. This talk described Dave's 2 year interest in 630 meters operation culminating with first contact. A brief history of the FCC granting amateur privileges to operation 472-479 kHz (630 meters) and to 135.7-137.8 kHz (2,200 meters) was presented.
https://docs.fcc.gov/public/attachments/FCC-17-33A1.pdf
The 630 meter band is shared with the electric utilities, 30 day online notification with them is required, "no objection received via email" is considered a pass!
https://utc.org/plc-database-amateur-notification-process/
There is FCC EIRP radiated power limit requirement is a little different but there are online calculators to help with this process.
http://www.472khz.org/pages/tools/antenna-simulator.php
The great 630 & 2200 meter resource: http://njdtechnologies.net/
The following Dayton 630 meter presentation is must read:
http://no3m.net/uploads/no3m-dayton-2018.pdf
Most 630 meter operations are the WSJTX digital modes, tho CW is popular by the hardcore! Take a listen on 474.2 kHz USB, everything begins from this point. http://njdtechnologies.net/wp-content/uploads/2017/09/15.jpg

General meeting was adjourned about 8:00 pm.
Respectfully submitted,
David Garnier WB9OWN
Secretary WARAC, September 9, 2019

SCIENCE and ELECTRICITY

by Dave Barry

TODAY'S SCIENTIFIC QUESTION IS:

What in the world is electricity and where does it go after it leaves the toaster?

Here is a simple experiment that will teach you an important electrical lesson. On a cool day, scuff your feet along a carpet, then reach your hand into a friend's mouth and touch one of his dental fillings. Did you notice how your friend twitched violently and cried out in pain? This teaches one that electricity can be a very powerful force, but we must never use it to hurt others unless we need to learn an important lesson about electricity. It also illustrates how an electrical circuit works. When you scuffed your feet, you picked up batches of "electrons", which are very small objects that carpet manufacturers weave into carpets so they will attract dirt. The electrons travel through your bloodstream and collect in your finger, where they form a spark that leaps to your friends filling, then travel down to his feet and back into the carpet, thus completing the circuit.

AMAZING ELECTRONIC FACT:

If you scuffed your feet long enough without touching anything, you would build up so many electrons that your finger would explode. This is nothing to worry about unless you have carpeting. Although we modern persons tend to take our electric lights, radios, mixers, etc. for granted, hundreds of years ago people did not have any of these things, which is just as well since there was no place to plug them in.

Then along came the first electrical pioneer, Benjamin Franklin, who flew a kite in an electrical storm and received a serious electrical shock. This proved that lightning was powered by the same force as carpets, but it also damaged Franklin's brain so severely that he started speaking only in incomprehensible maxims, such as "A penny saved is a penny earned". Eventually he had to be given a job running the post office.

After Franklin came a herd of electrical pioneers whose names have become part of our electrical terminology: Myron Volt, Mary Louise AMP, James Watt, Bob Transformer, etc. These pioneers conducted many important electrical experiments. Galvani discovered (this is the truth) that when he attached two different kinds of metal to the leg of a frog, an electrical current developed and the frog's leg kicked, even though it was no longer attached to the frog, which was dead anyway. Galvani's discovery led to enormous advances in amphibian medicine. Today skilled veterinary surgeons can take a frog that has been seriously injured or killed, implant pieces of metal in its muscles, and watch it hop back into the pond ... almost.

The greatest electrical pioneer of them all was Thomas Edison. He was a brilliant inventor despite the fact that he had little formal education and lived in New Jersey. Edison's first major invention in 1877 was the phonograph. It could be found in thousands of American homes where it sat until 1923 when the record was invented. Edison's greatest achievement came in 1879 when he invented the electric company. Edison's design was a brilliant adaptation of the simple electrical circuit. The electric company sends the electricity through a wire to the customer, then immediately gets the electricity back through another wire. Then (this is the brilliant part) they send it right back to the customer again. This means that the electric company can sell a customer the same batch of electricity thousands of times a day and never get caught, since very few customers take the time to examine their electricity very closely. In fact, the last year any NEW electricity was generated was 1937.

Today, thanks to men like Edison and Franklin, and frogs like Galvani's, we receive almost unlimited benefits from electricity. In the past decade, scientists have developed the laser, an electronic device so powerful that it can vaporize a bulldozer at 2000 yards, yet so precise that doctors can use it to perform delicate operations on the human eyeball, provided they remember to change the power setting from "bulldozer" to "eyeball". • —• —••

DXing and Contesting - October 2020

DX UPDATE:

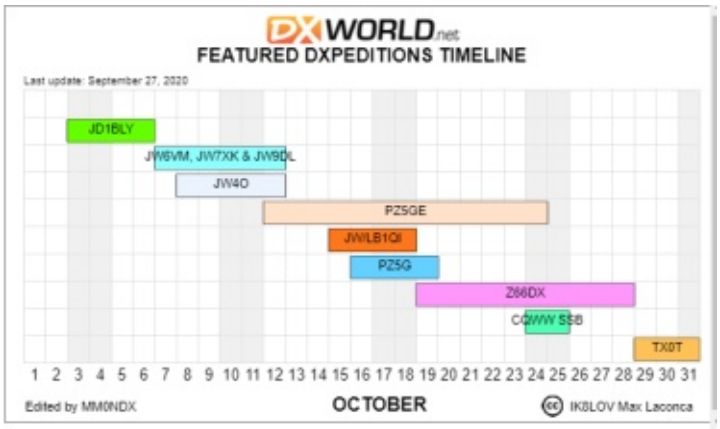
HF: Holy cow, we actually have some ops to report:

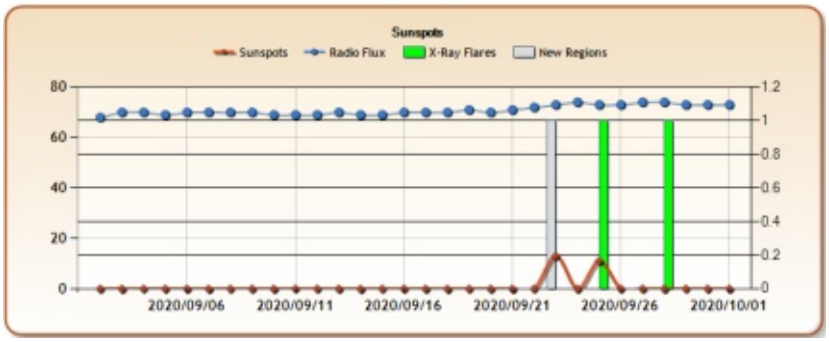
Svalbard: JW.. Ops from Oct 6th thru Oct 18.

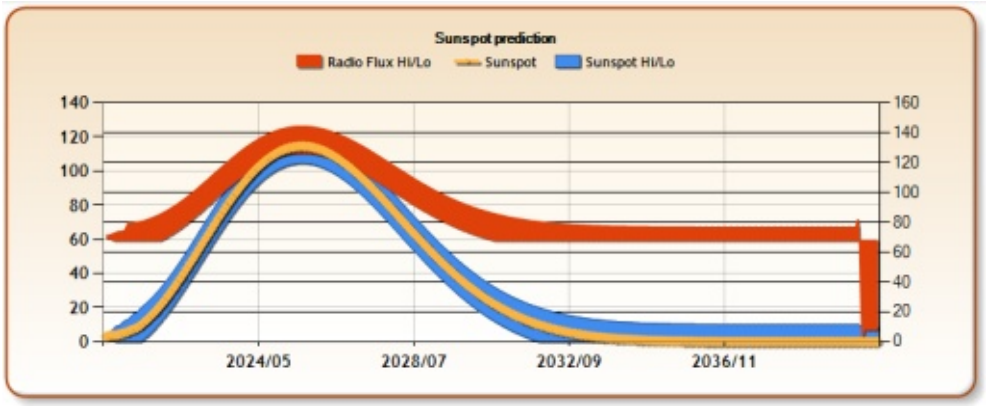
PZ5G: Surinam IOTA SA-092 10/16-10/19

Z66DX: Kosovo, 10/19-10/28

TX0T: Tattatoko Isl, 10/29-11/5







Sunspots: If you like the last month, well hang on, the reports are more of the same. SFI to remain in the low to mid 70's. A-Index will continue to fluctuate but generally remain active. K-Index activity will also be unsettled and fluctuating.

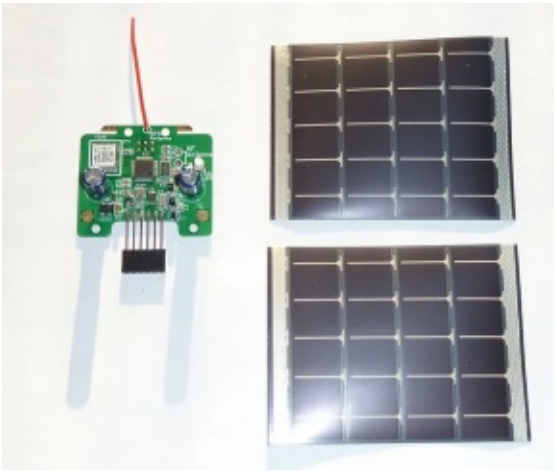
CONTEST UPDATE:

The fall contest season continues this month. We have excellent State QSO Party opportunities virtual every weekend. They are proving to be a lot of fun. In addition, the biggies are firing up this month. CQ WW SSB and ARRL SS CW. With better solar activity, the CQ WW should be improved this year.

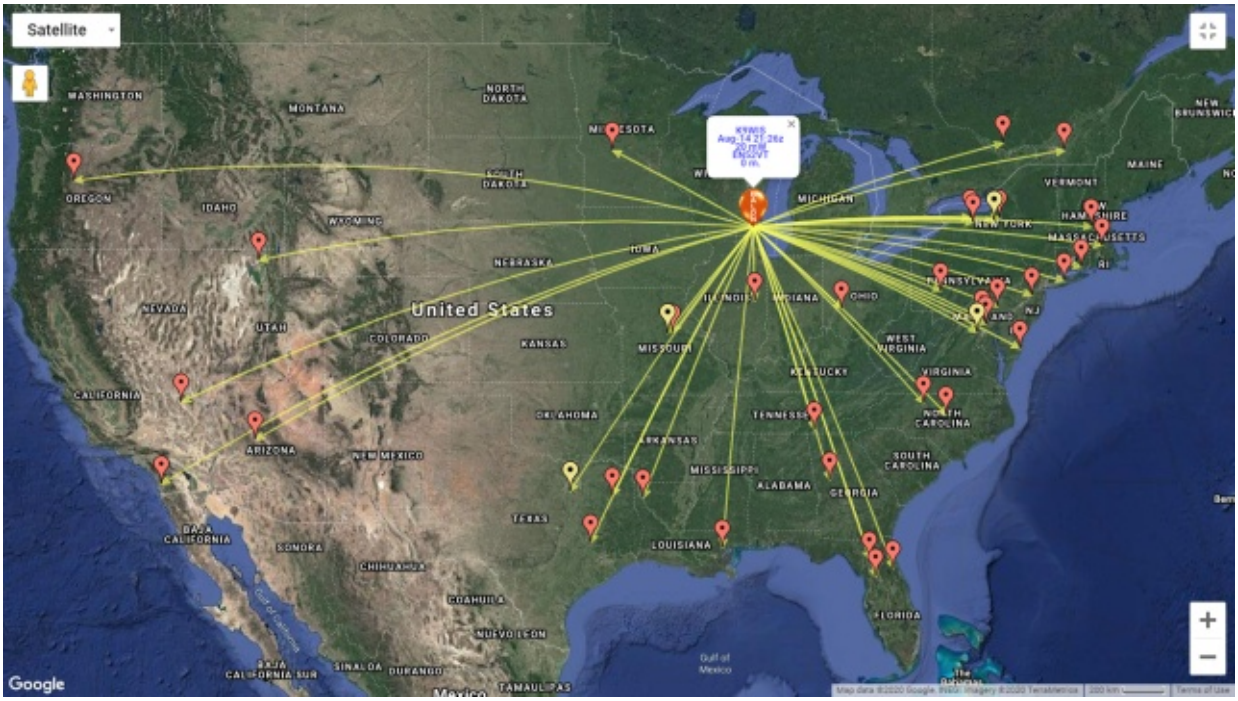
- Nevada QSO Party: Oct 11
- Arizona QSO Party: Oct 11
- Pennsylvania QSO Party: Oct 11
- South Dakota QSO Party: Oct 11
- Stew Perry Top Band Challenge: Oct 17
- New York QSO Party: Oct 17
- Illinois QSO Party: Oct 18
- CQ WW DX Contest-SSB: Oct 24-25
- ARRL Sweepstakes - CW: Nov 7-9 • —• —••

Project Ham-High
Circumnavigating the World in a Balloon
Status Report

Things have really been buzzing here at the HorwitzDeRemer Planetarium in Waukesha. Our plans for a spring 2021 attempt to launch a GPS radio tracker around the world in a balloon are coming together. Two satellites designed to completely circumnavigate the earth at an altitude of 40,000 feet have been procured and assembled.



Initial grounds tests were run with amazing results. These were what we call ‘plugs out’ tests. The satellites were in complete flight configuration minus the balloon.
Signal reports were received from all over the US, the farthest being the coast of Southern California. Not bad considering the satellite and its antenna was only 8 feet off the ground. These satellites are completely solar powered. Because they are solar powered the go to sleep at night. During the day they send position reports every 8 minutes on two different radio frequencies. A world wide network of ham radio operators will monitor the air waves for our weak radio signals and report the position data on the internet. The satellite’s data can be downloaded from the web side and a map showing its position can be viewed.

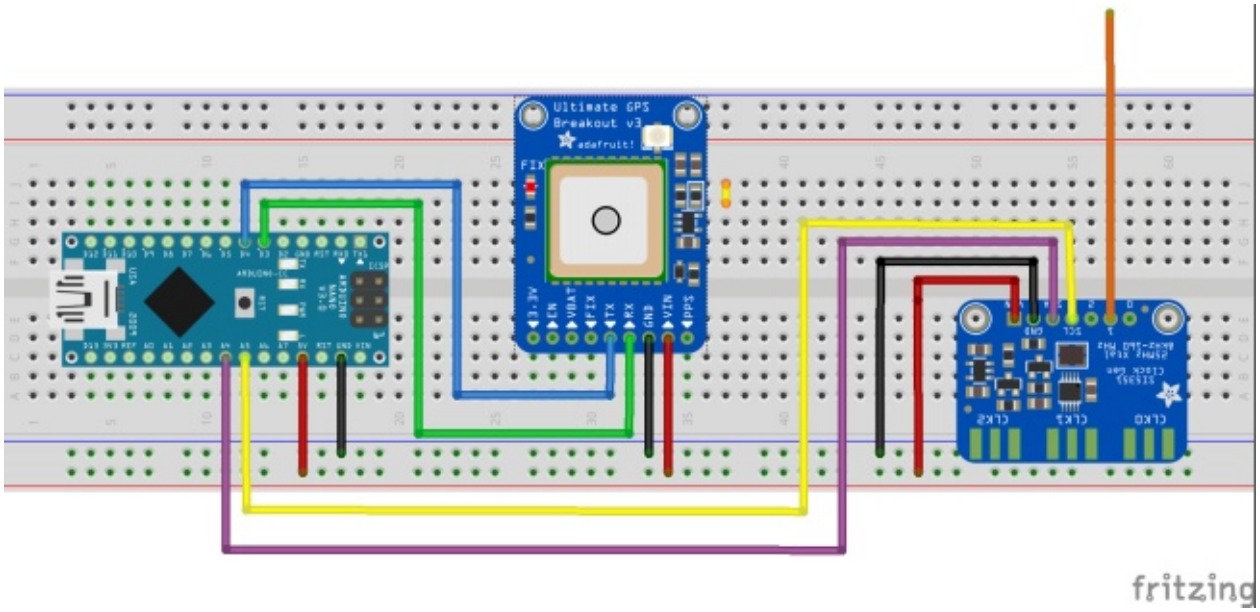


It is our intent to use a specially made balloon used for science research to lift the satellites into the jet stream at an altitude between 30,000 and 40,000 feet. The higher we can get, the less weather affects the flight because we can get above it. Also, the higher we get the farther our signal can be heard. Imagine if we were heard in California being just 8 feet off the ground, how far we'll reach from 40,000 feet.

The balloon will be partially filled with either Helium, or preferably, Hydrogen that will give us more lift. The wind speeds in the jet stream can be in the hundreds of miles per hour. If we catch a ride we can get to the East Coast in a day or two, cross the Atlantic in a few days. Previous launches by other groups have made the trip around the world in about two weeks.

But there are hazards. Ice forming on the balloon and satellite can weigh it down, so can rain. If the balloon gets to heavy it could sink into the ocean or the ground, ending the flight. And let's not forget storms and their crazy up drafts and down draftsor hail that can shred a balloon.

We are not allowed to transmit over some countries. Our satellite must use position data it collects from the on-board GPS determine where it is, and decide if it should transmit. That's a function called 'GeoFencing' and it one of programs running on the flight computer.



We are also in the process of designing and building two satellites for local flights. Below is an image of the prototype WSPR beacon that we will turn into a printed circuit board. By local, we mean within North America. Any chances of these flights making it across the Atlantic are pretty slim, but not impossible. This is because these near-space satellites weigh a bit more than the two we plan to try to circle the world with. (17 grams vs 7 grams). And the balloons are smaller and cheaper. (thing Dollar Store) .This type of balloon mission is called a 'Pico Balloon'. These short range flights are also battery operated. The life span of a battery at the sub-zero temps at 40,000 will be short. But we plan to collect a little more data the just position and altitude, like temperature and pressure.
This is all STEM at its best and we welcome any questions. Watch for K9WIS on your waterfall during testing periods and flights.

Brian Cieslak K9WIS - Project Ham High Director - k9wis@twc.com • —• —••

HAMTRIX Sale Corner

Here is this month's sales items:

Yeasu FT-920 HF transceiver in very good condition. Excellent sounding receiver, even on FM radio. Repaired by Burghardt--full operation on all bands, however it will not transmit on AM—processor chip is no longer available. A new hand microphone and power cable included. Instruction manual available online. Asking price is $450.

Kenwood TS-590S HF/6M transceiver brand new never out of the carton. Includes a microphone, power cable and manual. Selling price is $600.

Rohn 25 tower, 40 feet, includes a rotator mounting plate.
Ready for pick up. Listed at $100.

Contact:
Phil, W9NAW
414.617.7029 (cell)**. __. __..**

Random CW Hints

Mike Johnson, WO9B

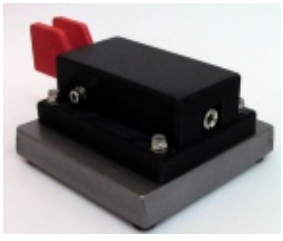
Can't help but notice an uptick in interest for CW in the club. The new K1USN Sunday evening SST (Slow Speed conTest) offers up a venue to hack away at a few dit's and dah's at a friendly pace. What a wonderful idea and if you have any interest in CW, this is a great opportunity. Learn more HERE . So what follows are a few ideas that may be of interest.

Stop Two Handed Keying: If you've got $500 to spend, you can get a super key that weighs 5 lbs and pretty much stays where you put it. I don't have one of those. That means I end up chasing my key around my desktop OR it becomes a two handed operation, one as an anchor and the other for making the dits and dahs. But fear not, there is a cheap and easy solution that does not involve a mouse pad (hate 'em). All you need to do is add a few dabs of reusable adhesive putty to the rubber feet of your key and viola, it ain't going nowhere. Easy!!

Keys: Speaking of keys, you don't have to spend a fortune to get a decent key. There are some economical alternatives available

UNI-730A Keyer ($50) - These are available on Ebay. I've had one for several years. They work surprisingly well and are very durable.

CW Morse Keys: These folks have a number of inexpensive items to pick from. Single lever, double lever, heavy base… ranging from $45 to $60. CW Morse Site



Contest Tuning: The SST popularity means the band is awash in signals. I always have my radio set to run upper sideband or CW-U as it is designated on some radios. I find my productivity improves working from the highest frequency down. I just like the way the CW signals sound as they enter the receiver passband. And the passband is set to no more than 250 Hz. Crowded contests often have 2 or even 3 signals per Khz.

• —• —••

A Cheap and Easy WSPR Beacon By Brian Cieslak – K9WIS@twc.com

"One Small Step for Man….."
While that event occurred in the distant past we still use technology that was developed for the moon mission today. Spin offs from the space program of the 1960's and 1970's include things like Velcro and Ziplock bags.(Don't ask where zip lock bags were spun off from, you'll never pack a lunch in one again..hi hi)

The same holds true for the Project Ham Hi mission that will send a radio transmitter around the world next spring. A small beacon, suspended under a hydrogen filled balloon that will ride the jet stream at 40,000 feet, also makes a nice land based WSPR transmitter. Since we're not concerned with the weight factor for a land based beacon, we can use breakout boards and bread boards as our platform.

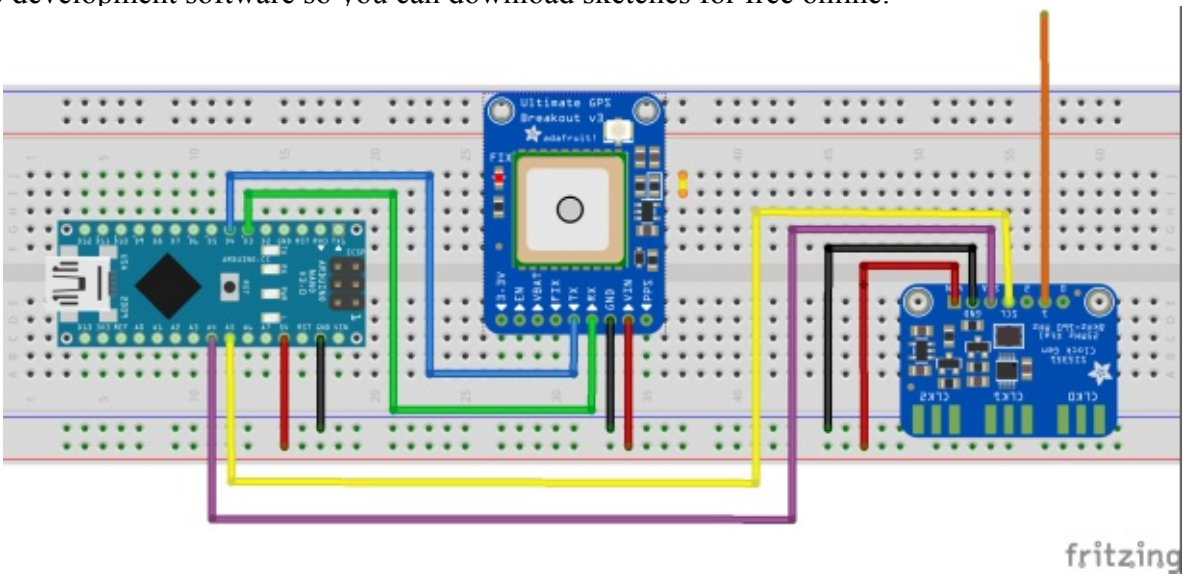
Our beacon is made up of three breakout boards:

An Arduino Nano microprocessor (but if you have any other Arduino you can use it. But this article focuses on the Nano). You can buy these on Ebay.

A uBlox Neo-6 GPS break out board. You can also buy them from AdaFruit or SparkFun. The diagram below shows the Adafruit board. I find these on Ebay too. Just make sure you can identify the RX and TX pins. Look for one that includes an antenna otherwise you will have to solder a wire to antenna connection to hear GPS signals.

A Si5351 programmable clock. This is the 20 mW transmitter that can be programmed to output from 8Khz to 160 Mhz. You can get this from AdaFruit or SparkFun.

I put these all together on a protoboard and some jumpers. You will also need a computer that is running the Arduino development software so you can download sketches for free online.



This is how I wired up the breakout boards into the simple WSPR beacon. Connect your laptop to the Arduino Nano. This not only powers your transmitter but lets you download the program from the Arduino development program.
To make life easy for you I have a working version of code that you can download into your arduino using the Arduino development system. But before it will work for you there are a few libraries that you will have

to add to your development platform:

Ethernet Jtencode
Adafruit si5351 library
TinyGPS

These can be added using the library manager in the Arduino development system
To add a library this way click on the ‘SKETCH’ tab in the tool bar, then click on ‘Include Library’ and then click on ‘Manage Libraries’. You will get a huge menu of available libraries you can add. Use the search function to find the libraries we need listed above and install them.

Next you’ll have to get the actual sketch (that’s what they call Arduino programs). The easiest way is to send me an email and I’ll will send it back in an attachment.

Inside the code is a section that you have to edit for your call and the frequency you want to transmit on. Just change the frequency to any WSPR frequency.

```
unsigned long freq = 14096760UL;          // Change this - This is the frequency in Hz (yes you can
                                          // change it to any ham freq including VHF)
char call[6] = "K9WIS";                   // Change this to your Call sign
char loc[5] = "EN52";                     // You dont have to change this..it will be updated by the
                                          // GPS
uint8_t dbm = 10;                         // Change this to indicate your power output level in dbm
```

Save and compile the program. If all is well you will have no errors. Download and run the program. The program will toggle an LED an the Arduino board like a heart beat. It may take a few minutes for the GPS to lock onto enough satellites to get things going. Most GPS break out boards have a LED that indicates the GPS has enough satellite data to give a reliable position. The GPS can still report accurate time if it finds only one satellite but it needs to hear several before it has accurate position information.
http://www.k1usn.com/sst.htmlYou may have to locate your WSPR transmitter near a window.

Fire up your receiver and computer, startup WJST-x and wait for your signal to show up on the waterfall..When the WSPR beacon starts transmitting a LED on the arduino will light.

If you open up the serial monitor feature on your Arduino development program you can see some debug data being sent back. While the beacon is idle it will output the time, updating each second. This is time from the GPS. When its time to transmit it will output the frequency data as each byte of data is transmitted.

It isn’t my intention to get into theory of operation and a lot of detail in this article. My goal is to get you up and running. The 20mW signal is safe inside your shack without an antenna. If you get everything working grab a couple of alligator clips and hook it up to your shack’s antenna and let it run.
You can check WSPRnet.com to see if anyone heard you..

Have fun. • —• —••

On Sunday, September 27, 2020, 3:56 PM, Joe Taylor <joe@princeton.edu> wrote:

The first public candidate release of WSJT-X 2.3.0 is now available for download and use by beta testers. This release is your first chance to try two new modes designed especially for use on the LF and MF bands, and to provide feedback to the WSJT Development Team.

The new modes are:

- FST4, for 2-way QSOs. Options for sequence lengths from 15 seconds to 30 minutes, with threshold sensitivities from -20.7 to -43.2 dB in a 2500 Hz reference bandwidth.

- FST4W, for WSPR-like transmissions. Sequence lengths from 2 minutes to 30 minutes, threshold sensitivities from -32.8 to -44.8 dB.

FST4-60 is about 1.7 dB more sensitive than JT9, largely because it uses multi-symbol block detection where appropriate. With AP decoding in FST4 the advantage can be as much as 4.7 dB. Additional sensitivity details with respect to path Doppler spread are illustrated in the following graph comparing JT9 and FST4-60:
https://physics.princeton.edu/pulsar/k1jt/jt9_vs_fst4.pdf

FST4W-
http://physics.princeton.edu/pulsar/k1jt/wsjtx.html120 is about 1.4 dB more sensitive than WSPR, and FST4W submodes with longer transmissions have proportionally better sensitivity. Decoding probabilities are plotted as a function of SNR on the additive white Gaussian noise (AWGN) channel for WSPR and all FST4W submodes here:
https://physics.princeton.edu/pulsar/k1jt/wspr_vs_fst4w.pdf

Tests over the past several months have shown FST4 and FST4W frequently spanning intercontinental distances on the 2200 m and 630 m bands. Further details and operating hints can be found in the "Quick-Start Guide to FST4 and FST4W":
https://physics.princeton.edu/pulsar/k1jt/FST4_Quick_Start.pdf

We strongly recommend that users of JT9 and WSPR on the LF and MF bands should migrate to the more sensitive modes FST4 and FST4W.

Links to installation packages for Windows, Linux, and Macintosh are
available here:
http://physics.princeton.edu/pulsar/k1jt/wsjtx.html
Scroll down to find "Candidate release: WSJT-X 2.3.0-rc1".

You can also download the packages from our SourceForge site:
https://sourceforge.net/projects/wsjt/files/
It may take a short time for the SourceForge site to be updated.

WSJT-X is licensed under the terms of Version 3 of the GNU General
Public License (GPL). Development of this software is a cooperative project to which many amateur radio operators have contributed. If you use our code, please have the courtesy to let us know about it. If you find bugs or make improvements to the code, please report them to us in a timely fashion.

We hope you will enjoy using this beta release of WSJT-X 2.3.0. Please report bugs by following instructions found here in the User Guide:

http://www.physics.princeton.edu/pulsar/K1JT/wsjtx-doc/wsjtx-main-2.3.0-rc1.html#_bug_reports

-- 73 from Joe, K1JT, Steve, K9AN, and Bill, G4WJS • —• —••

Announcing the New Slow Way to Go!
Every Sunday @ 8:00-9:00 PM EDT
(Monday @ 00:00-01:00 UTC)

K1USN's New Weekly Slow Speed Test

The CWops Club (**CWops**) promotes the art of CW for those who wish to expand and improve their on-the-air experiences. CWops' CW Academy (**CWA**) program has produced thousands of successful graduates who have gone on to become everyday CW operators. Hundreds of CWA grads have become CWops members after demonstrating their ability to understand and communicate in CW at speeds of 25 WPM and higher!

CWops' three weekly 25 to 40+ WPM CWT sprints are exciting, stimulating and a great way to improve CW copying ability, operating skills, and propagation knowledge. The CWTs create bonds of friendship among CW-loving operators around the world.

Now, for those just getting started in CW contesting and others who prefer a more leisurely pace, several members of both the K1USN radio Club and CWops have started a weekly one-hour slow speed CW contest, the SST. Please join us! Thank you to all who took our recent survey. It's helped us choose the day and time for the SST.

K1USN's new Slow Speed Test is designed to encourage and assist those who signed up for CWA to learn CW or to improve their CW skills but are not yet copying 25 WPM, and all others who feel like "taking it slow and easy" once per week both for their own pleasure and to help others out. CWops currently offers a total of nine "slow speed" CWT's per year just after the three CWA graduations where all are asked to slow down to 20 WPM. Many CWA grads make contacts in those sessions, enjoying a well-earned rush of accomplishment. The SST will expand those opportunities for success to **52 weeks per year!**

All of us old enough to remember our Novice days recall the rush of adrenalin and the sweaty grip on our J-38 (or Radio Shack) keys during our first CW QSOs. This is what it must feel like for the new CW operators we want to encourage.

The weekly slow speed SST is also for operators who participate in regular CWT sessions, but only as S & P (Search and Pounce) entrants. The weekly 20 WPM or slower SSTs can build their confidence to find open frequencies and begin calling CQ, first in the SSTs and then in the more crowded and frenetic full speed CWTs. Successfully crossing that CQing threshold is another real accomplishment!

We hope many SST participants become sufficiently comfortable with CW contesting to enjoy the regular higher speed CWT sessions, other big CW contests, and smaller local and regional QSO parties, using N1MM+ (or other) computer loggers, spotting networks, call history files, live online scoring, etc. **But we welcome everybody to join in the SSTs** whether high speed CW contesting is your goal or not, including new ops making their first attempts at completing a CW QSO. In addition to SST's 20 WPM upper speed limit, we ask all to be patient, supportive, and willing to slow down further as necessary to assist another op in completing an SST QSO.

CWA recommends using electronic keyers and paddles, but if you are more comfortable with some other device, please feel free to join us in the SSTs using a straight key, cootie key, bug or paddles. Unlike high speed contests, where QSO rate is king and a CQing/"running" station expects only the required exchange and confirms a contact with simply "dit" or "R," the SST encourages sending brief friendly greetings to the other Op. Friendliness is part of taking it slow and easy!

So please join us in the SSTs! All you need is an HF radio, an antenna, and the desire to become, and assist others to become, better CW operators!

SST Time and Day: weekly @ 8:00-9:00PM US EDT Sunday
(which is 00:00-01:00 UTC Monday)

Exchange: Name + state/province/country

Sample SST QSO:

K1RV: CQ SST K1RV
N1DC: N1DC
K1RV: N1DC PI MA
N1DC: GE PI RICK MA
K1RV: GL RICK TU K1RV SST

Suggested initial SST frequencies:
(QSY +/- as needed)

80 meters 3.532 - 3.539
40 meters 7.032 - 7.039
20 meters 14.032 - 14.039

For more info or questions about our SST, please email us at: k1usn.radioclub.sst@gmail.com
or visit us at http://www.k1usn.com/sst

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Space Weather News for Oct. 6, 2020
https://spaceweather.com
https://www.spaceweatheralerts.com

RADIO SIGNALS FROM MARS: This week, an amateur radio operator in British Columbia picked up a radio signal ... from Mars. It came from NASA's Mars Reconnaissance Orbiter flying just 274 km above the Red Planet's surface. Such a detection is possible because, right now, Mars is unusually close to Earth. Want to hear what it sounds like? Visit today's edition of Spaceweather.com.

Aurora alerts: Sign up for Space Weather Alerts and receive a text message when auroras appear in your area.
Above: This home-brew radio antenna in Roberts Creek, BC, is picking up signals from Mars Reconnaissance Orbiter. Credit: Scott Tilley.• —• —••

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