President's Corner
By Steve Bible, N7HPR

  TAPR will be at the HamSCI Workshop <https://tinyurl.com/y8errhsu > on February 23 and 24 at the New Jersey Institute of Technology in Newark. I, along with a handful of other TAPR officers and board members will attend the workshop, which will focus on the results of the 2017 Great American Eclipse ham radio ionospheric experiment and the development of a Personal Space Weather station.

  As in the past, TAPR will be at Hamvention <http://www.hamvention.org> in May with a suite of booths, our highly regarded TAPR Forum and the annual TAPR-AMSAT Banquet,

  In the fall, the 37th annual ARRL/TAPR Digital Communications Conference (DCC) will take place September 14-16 in Albuquerque, New Mexico. The conference invites technical papers for presentation at the conference and for publication in the Conference Proceedings (presentation at the conference is not required for publication). Papers are due by July 31, 2018, to Maty Weinberg, ARRL, 225 Main St., Newington, CT 06111 or via e-mail to maty@arrl.org. The Conference website <http://www.tapr.org/dcc> has full details.

  Hope to see you in Newark, Xenia and Albuquerque!

  73,

  Steve Bible, N7HPR, President TAPR

###

TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.

PulsePuppy

By John Ackermann, N8UR

The TAPR PulsePuppy is a carrier board for small user-provided oven controlled ("OCXO") and temperature controlled ("TCXO") oscillators. It supports "Eurocase" style OCXOs as well as a Crystek TCXO design and provides output signals not only at the oscillator frequency, but also at 1PPS, 10PPS, and 100PPS rates that can be synchronized with an external clock. The base kit does not include an oscillator.

Why would you want a PulsePuppy?

Time-nuts will probably be interested in using the board with an OCXO such as the IsoTemp model 131-100, which (in December 2017) seems to be available as surplus on eBay for less than $30, to provide a stable RF source as well as a PPS source that has the same synchronization capabilities as the TAPR T2-Mini, on a compact circuit board not much larger than the T2-Mini.

HPSDR and other ham radio users will be interested in using the PulsePuppy with a TCXO as a reference oscillator for their stations, because TCXOs have much lower current drain than oven oscillators, while still having adequate performance for virtually all amateur radio uses. See below for the Pulse Puppy plus Crystek TCXO bundle.

Other PulsePuppy Details

The default PulsePuppy configuration is for 5 volt oscillators with square wave (usually HCMOS) outputs. The PulsePuppy output is a TTL-level square wave. An external low pass filter can be used if a sine wave output is needed.

In addition to a square-wave output at the nominal oscillator frequency, the PulsePuppy includes a PIC-based frequency divider using Tom Van Baak's picDIV firmware that provides outputs at 1 pulse per second ("PPS"), 10 PPS, or 100 PPS The divider can be synchronized to an external source in the same way as the TAPR TADD-2 and T2-Mini products. Other pulse outputs can be provided by loading different firmware into the PIC.

The PulsePuppy accepts from 8 to 15 VDC power input. Note that small OCXOs can have a surprisingly high power draw on start-up of 800 ma or more. This reduces quickly to a steady-state current of about 200 ma. If the power supply provides more than about 12 volts, the 7805-type voltage regulator provided with the kit will require substantial heat sinking and possibly replacement with another device. Lower supply voltages will keep things cool(er).

We've designed the PulsePuppy with flexibility in mind. Options on the board allow use with many oscillator types; these options are documented in the assembly and operations manual available at http://www.tapr.org/~n8ur/PulsePuppy_Manual.pdf.

The PulsePuppy kit includes a PCB with all surface mount components already installed as well as a programmed PIC and other through hole parts which you must install. Note that the PulsePuppy kit does not include an oscillator, unless you buy the Pulse Puppy plus Crystek TCXO bundle.

Visit http://www.tapr.org/kits_pp.html for ordering information.

###

Greg Jones Memorial Endowment
By Steve Bible, N7HPR

In the spring of 2017, the TAPR Community was greatly saddened to learn of the passing of Greg Jones, WD5IVD.

In the early 1990s, Greg took the reins at TAPR at a time when the organization had come off of major successes, but lacked a clear vision of what was next. With tremendous energy and enthusiasm, he pushed TAPR into emerging areas such as spread-spectrum radio, and established the idea that still infuses the organization: that the projects TAPR is working on today will be the ham radio's mainstream technology five years from now.

Greg was much more than a technocrat and visionary. He organized TAPR's operation to be financially sound and he had a tremendous ability to bring talented people into the organization and get the most from them. We all joked about Greg's ability to pull people into the organization he thought would add value. That person often found themselves with a significant TAPR role before they knew what hit them.

Without Greg's involvement, it's doubtful that TAPR would still be around today. Though he was less involved with our organization as he continued his successful academic career, he remained a great friend whose loss is still deeply felt.

Upon his passing, many of Greg's family, friends and colleagues wanted to do something that preserves his memory, honors his life's work and continues his legacy. To that end, the University of North Texas (UNT) has established the Dr. Greg Jones Memorial Endowment in the Department of Learning Technologies. The award will support graduate students' scholarly and research activities to improve distributed teaching and learning; Greg created the distributed doctoral program in the UNT College of Information, the first program of its kind in Texas.

To maximize impact on the program and the number of students who will benefit, the department's goal is to build the Jones endowment to $100,000 by August 2018. To help the department reach its goal, I invite you to help pay it forward by making a charitable donation to the Dr. Greg Jones Endowment.

So far UNT has processed 17 donations from TAPR members or former members for a total of $4,835. Let's endeavor to raise $10,000 collectively.

This is a unique opportunity to honor Greg, and to demonstrate our respect for his innovation, creativity, and many years of impacting service to TAPR. I will provide monthly updates via e-mail on our total donations raised. Every gift counts, no matter its size, and will directly benefit Learning Technologies students – Greg's living legacy.

Thank you for your consideration to contribute to this worthy cause. Make your gift online at https://one.unt.edu/dr-greg-jones-endowed-scholarship or mail your donation to the TAPR Office. In either case, **when making your gift, please indicate you are a TAPR member.** Also, please consider working with your employer's human resources department to see if your contribution can be matched to double the impact of your gift. If you have any questions, please contact Alan Thornton in the UNT Development office at 940-891-6903 or alan.thornton@unt.edu.

###

Phase 4 Space Kickoff

By Michelle Thompson, W5NYV

Digital wireless communications have revolutionized our world. The advantages to digital signal transmission are substantial, ranging from being able to secure an information signal, much better spectral efficiency, lower cost equipment, increased immunity to noise and interference, the ability to easily store information, and error correction and detection. Digital satellites in the microwave bands provide millions of people broadcast television signals every day with extremely low error rates. Global Positioning Satellites (GPS) provide a digital signal enabling location service that has become almost ubiquitous. Mobile phones are digital devices with tremendous capability. Computing in virtually all forms is digital.

AMSAT does not operate a digital satellite nor does it have a dedicated digital payload team.

AMSAT does have a successful digital design team working on broadband microwave radios to support digital payloads that use DVB-S2 and DVB-S2X. This team is Phase 4 Ground. It's open source and the landing page can be found at https://phase4ground.github.io/

It's time to match that effort with an open source team dedicated to broadband digital microwave satellite engineering and development. The AMSAT mission is to keep amateur radio in space. We are also expected to advance the radio art and promote international goodwill.

We are not advancing the radio art by remaining on the sidelines of the digital revolution in wireless communications.

The solution to this problem is to recruit and support a team dedicated to open source digital broadband microwave-band amateur radio satellites.

An organized open source project using and producing designs in the public domain falls under an important ITAR exception. By using and creating work in the public domain, AMSAT provides powerful technical leadership and takes full advantage of the enormous benefits of open source while avoiding the vast majority of the onerous and collaboration-killing requirements of ITAR.

While documents having to do specifically with the launch would have to be controlled, the engineering design can and should be done entirely as an open source project.

The proposed goals of Phase 4 Space are outlined below.

1. Perform a Careful COTS (re)design of an Ettus Research 300 series USRP.

Read about careful COTS here: https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2934&context=smallsat

Careful COTS is a circuit design approach that uses commercial parts to achieve space-worthy designs.

Blog post about the series:

https://www.ettus.com/blog/2014/01/ettus-research-releases-revolutionary-software-defined-radio-with-kintex-7

Schematic for the x300.

https://files.ettus.com/schematics/x300/

The USRP is a world-class SDR that is completely compatible with GNU Radio. Implementing a version of this USRP for space perfectly complements the work done to support DVB-S2/X for amateur radio payloads that is ongoing in Phase 4 Ground.

2. Three-axis stabilization must be implemented to support directional

microwave antennas at 5GHz, 10GHz, and beyond.

3. Develop a payload that supports the Rincon AstroSDR donated from Mike Parker of Rincon. This device is hosted by Virginia Tech and uses the same FPGA as the Ettus series 7 USRPs.

Read about the Rincon AstroSDR here: http://www.rincon.com/wp-content/uploads/2016/11/ASTROSDR_Brief_v1-3-1.pdf

The support framework for this project includes the following parts.

1. Volunteers! The most important ingredient.

2. An open-access repository for engineering. A GitHub organization has been established to achieve this goal <https://github.com/phase4space>. An organization can hold numerous repositories, each devoted to some particular aspect of the project.

3. An ITAR-compliant repository for anything inescapably ITAR. This is not for engineering. This is intended for launch and operations control documents. An AWS GovCloud account that fully complies with ITAR has been established to achieve this goal.

4. Team communications resources such as mailing lists.

5. Intellectual property team familiar with public domain and open source in the context of ITAR. Is this you?

6. A hardware design lead and advisors experienced with space hardware requirements. Is this you?

7. Funding to cover build and test.

8. Licenses to allow FPGA development. Xilinx Vivado licenses have been obtained.

While there are many milestones along the way, substantially complete progress and a final report describing that progress is scheduled for January 2020.

Volunteers can apply either to AMSAT or the address listed on the main page at the GitHub phase4space repository.

ITAR projects obviously remain a part of the AMSAT engineering landscape. Supporting projects that take advantage of the public domain and open source ITAR exceptions improves AMSAT's position and potential productivity.

Open source and ITAR-compliant repositories have been established. Both are funded through January 2020.

Technical goals have been defined and are achievable.

A schedule has been proposed.

Open source and public domain resources exist.

Volunteers and leads with specific qualifications are needed.

Most pressing are a public domain compliance lead, a hardware design lead with spacecraft experience, and volunteers that either have or are willing to learn components engineering skills.

Board design and radiation testing will be unavoidable expenses.

I commit to enabling this project to the best of my ability through January 2020.

If you want to volunteer for the roster, either fill out the engineering volunteer form at AMSAT or contact repository support staff at phase4space@optimizedtomfoolery.com. The roster will include your name and area of interest.

###

XC-3006
By John Hayes, K7VE

Popular Digital Voice systems for radio, such as D-STAR, DMR, and Fusion Digital all use AMBE vocoding to create extremely low baud rate transmissions resulting in narrow bandwidth transmissions. While all of these protocols use AMBE, they can use different FEC ratios and slightly different encoding within the vocoder.

The XLX team in Luxembourg created the XLX reflector system to allow the various DV networks and Protocols to be bridged together. As part of the bridging, it is necessary to transcode one AMBE version to another, eg. AMBE+ to AMBE+2. This can be done with XLX's ambed server software that can manage 2 or more AMBE streams for vocoding. The manufacturer of the AMBE processing chips offer USB devices which cost $1500 for 12 streams, the XLX team designed and built a 6 stream device using the AMBE processing chips but were not prepared to build them in quantity. NW Digital Radio offered to use its production capability to make this design available to the amateur community and the XLX team was amenable to the project.

A Kickstarter was started in December, but fell short of the goal, however there was enough interest that NW Digital Radio came up with an alternate plan to produce the XC-3006.

Ordering the XC-3006 can be completed at the NW Digital Radio website <http://nwdigitalradio.com/product/xc-3006/>. This is an advance order item and will only be produced if NW Digital Radio receives 25 orders by 2/15/2018, otherwise your order will be refunded. If you want to get one or more of these, this may be your opportunity to make it happen."

###

2018 ARRL / TAPR
Digital Communications Conference

September 14-16
Albuquerque, New Mexico

Make your reservations now for three days of learning and enjoyment at the Sheraton Albuquerque Airport Hotel. The Digital Communications Conference schedule includes technical and introductory forums, demonstrations, a Saturday evening banquet and an in-depth Sunday seminar. This conference is for everyone with an interest in digital communications from beginner to expert.

Call Tucson Amateur Packet Radio at: 972-671-8277, or go online to www.tapr.org/dcc

Sheraton Albuquerque Airport Hotel
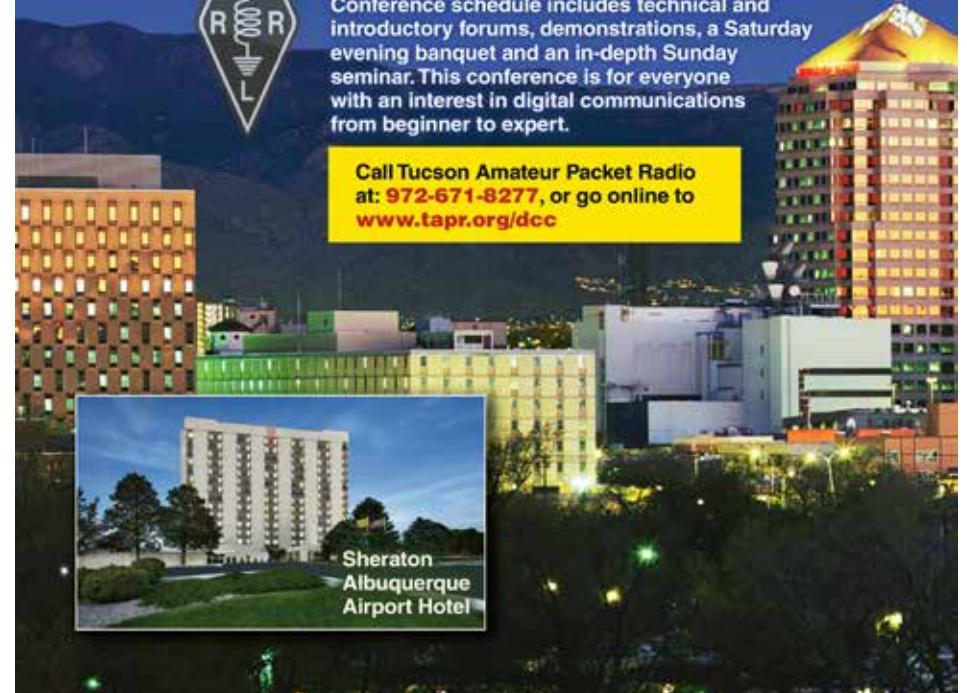
Evangelizing Ham Radio Data Modes

By Miroslav Skoric, YT7MPB

To contribute to the popularization of amateur radio data modes in 2017, I decided to organize and participate in several events in Poland and Uzbekistan.

The first activity was a tutorial session with the 24th international conference on computer networks (CN2017), held in "Zamek na Skale" ("The Stone Castle") in the south-west of Poland. I provided a half-day lecture on the amateur radio communications and displayed various portable electronic devices to the audience.

I continued to Rzeszow to give a seminar for students and teachers at Politechnika Rzeszówska (Rzeszów University of Technology). The tour finished in Krakow with an informal discussion with local technology enthusiasts. The whole program confirmed expectations that the amateur radio in Poland was alive and well.

The second set of activities occurred in Tashkent, the capital of Uzbekistan in central Asia. I started with a half-day tutorial session with IEEE/IFIP International Conference on Information Science and Communications Technologies (ICISCT 2017), which followed by a keynote during the conference opening, and finished with a 4-day radio 'training' for students and teachers of TUIT (Tashkent University of Information Technologies).

The ten-day travel and work was pretty tiring, but fully successful. I received a special permission from the Ministry for development of information technologies and communications to temporary import radio transmitting equipment and accessories to Uzbekistan to show it to students of TUIT. That was an opportunity for young participants to get familiar with modern radio technologies. Unfortunately, there was no time for obtaining ham radio licence for transmitting signals.

However, it was a nice experience. In times to come there will be more tutorials and workshop sessions at TUIT. Prospective amateur radio instructors are invited to contact me for coordinating new joint activities.

###

TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.

Set Up an IPv6 Gateway on Packet

By Brian Rogers, N1URO

Introduction.

As we know, the future of IP (internet protocol) is pushing towards exclusive usage from IP version 4 to IP version 6. This is a much different and newer technology than the previous version 4 was especially in regards to packet radio. In trying to keep up with the forward motion of newer technologies it's essential that we also keep up. To date, the only way we're able to route IP version 6 (IPv6) is with the usage of HamLan/Wan systems that natively support IPv6. Classic packet natively is NOT designed to handle IPv6.

What's the Secret?

It took me a while to figure out a method in engineering just how to do this but once a good solid theory was in place it was a matter of testing it out. As we know, to route IP version 4, we must create an ARP statement that links the remote host's IPv4 IP to their callsign-ssid. An example of this on a Linux system would be:

```
arp -i ax0 -H ax25 -s 44.68.88.1 K2PUT-13 which looks
like: Address                      HWtype  HWaddress
Flags Mask             Iface k2put.ampr.org
ax25    K2PUT-13             CM                      ax0
```

when viewing the local arp table. Then you can set your route table to push the IP and it's full block accordingly:

```
44.68.88.0/27 via 44.68.88.1 dev ax0 src 44.88.4.1
onlink 44.68.88.1 dev ax0 scope link src 44.88.4.1
```

So now we have a path to 44.68.88/27 via the host's main IP of 44.68.88.1 which will use device ax0 (an ax.25 interface) to encapsulate (or tunnel) IP under ax.25 via the ARP statement to K2PUT-13 so when K2PUT receives a frame it will know how to handle the IPv4 properly. Our issue with IP version 6 is that it does NOT use ARP! So how do we do this? The secret is already in this paragraph!

Establish Your IPv6 Block.

You will obviously need an IPv6 block or a single IPv6 address from someone so you can get proper routing. I suggest finding or creating a gateway with a block brokered from someone such as Hurricane Electric <https://www.he.net>. They will be happy to grant you a /64 IPv6 block for your gateway and they also provide instructions as to how to set up your system. If you need a larger block (why I don't know!) you can get a /48 IPv6 block from them. This will give you more IPs than you'll know what on earth to do with! Once you set up your IPv6 gateway you can then pass off IPv6 IPs to remote sites using RF by configuring SIT tunnels under your existing amprnet paths.

Setting Up a Router.

I suggest when you configure your routing to a broker such as HE.net that you make it a separate script called either with your main ax.25 loader script or called via rc.local. From there you may add to your script for those you intend to broker IPv6 via packet for. In my case for K2PUT I create a SIT tunnel I call "put6" and put the proper tunneling to it's amprnet IP in there. Example:

K2PUT ip tunnel add put6 mode sit remote 44.68.88.1 ttl 64 # create the tunnel and map it to K2PUT's amprnet IP ip link set put6 up # this is like ifconfig up ip -6 address add 2001:470:8a1e::1 dev put6 # assign my main gateway IPv6 IP to the SIT interface ip -6 route add 2001:470:8a1e::20 dev put6 # push the /128 IP out the interface the gateway side is now complete and acts as a router for K2PUT's IPv6 IP.

Configure the Remote End.

I have a script on https://uronode.n1uro.com under "broker an ip from n1uro" that you can modify for your usage. The working sample that gets loaded at K2PUT is below:

modprobe ipv6 # Load the kernel module ip tunnel add ampr6 mode sit remote 44.88.0.1 local any ttl 64 # Configure the tunnel to use the existing amprnet path to my gateway ip link set ampr6 up # Bring the interface up ip -6 address add 2001:470:8a1e::20 dev ampr6 # Assign the IP to the interface ip -6 route add 2001:470:8a1e::1 dev ampr6 # Set a route to the gateway ip -6 route add default via 2001:470:8a1e::1 dev ampr6 # Set an IPv6 default route to our gateway host

Once saved, then you need to insure you have allowed your system to handle the IPv6 routing.

Setting Your System for IPv6.

There's not much left for you to do before you start your script load, you just need to allow your system to handle the IPv6 routing. This will require a minimum of 2 things:

1. Allow for IPv6 forwarding

2. Allow in your firewall IP -protocol- 41 (IPv6)

In /etc/sysctl.conf you may achieve #1 by uncommenting (if it is commented out) net.ipv6.conf.all.forwarding=1 and then run as root sysctl -p. This will reset your interfaces to allow for forwarding of your IPv6. As for the second thing you need to do, you'll need to consult your firewall config instructions on how to do this. Keep in mind, this is a second network to your system so any firewall rules you may have for IPv4 you'll most likely want to duplicate them for IPv6 as well.

Test the Routing.

Insure you have ping (I prefer fping) and try to "fping6 ipv6-ip". If you're using (ax)listen you should see something like this:

```
ax0: fm K1YON-13 to K2PUT-13 via K1YON-2* K2PUT*
ctl I47^ pid=CC(IP) len 124 IP: len 124 44.88.0.1-
>44.68.88.1 ihl 20 ttl 63 DF prot 41 0000  `....@:?
..p............ ..p........... ..â-'â-'Fâ-'......{â-'.
ZNZ...... 0040  ...................................
.... ax0: fm K2PUT-13 to K1YON-13 via K2PUT K1YON-2
ctl I04^ pid=CC(IP) len 124 IP: len 124 44.68.88.1-
>44.88.0.1 ihl 20 ttl 64 prot 41 0000  `....@:@
..p........... ..p..............â-'â-'Fâ-'......{â-'.
ZNZ...... 0040  ...................................
```

You'll notice on the IP line at the end it says "prot 41" for IPv6. The final results show properly:

```
n1uro@n1uro:~$ fping6 k2put k2put is alive
n1uro@n1uro:~$ telnet6 k2put node Trying
2001:470:8a1e::20... Connected to k2put.ampr.org.
Escape character is '^]'. (k2put.ampr.org:uronode)
login: n1uro [URONode v2.8] Welcome n1uro to the
k2put.ampr.org packet shell. This is copy of URONode
is located at Mount Ninham, Putnam, Putnam County,
New York [FN31dl] Type "?" for commands or H for
more detailed help on a command.  n1uro@k2put.ampr.
org-IPv6: u Current users: Telnet6 (n1uro @ IPv6)
-> Idle (0:00:00:00) n1uro@k2put.ampr.org-IPv6: b
Thank you n1uro, for connecting to the k2put.ampr.
org URONode IPv6 packet shell. Connection closed by
foreign host.
```

As you see, IPv6 is working just fine!

Final notes.

A few final notes in regards to IPv6 on classic packet:

- Since this is encapsulating/tunneling another protocol within the protocol layers, I suggest that you don't use it on links slower than 9600 baud as you see in the trace there's additional protocol overhead thus taking up data space within the limitations of the 256 byte MTU of ax25 specifications. Of course you're welcome to try it if you wish on slower speeds. I'm not at all suggesting it wouldn't work, it just may be slower than expected or desired.

- As of this writing, the only node software known that can handle incoming IPv6 telnets natively is URONode. This is verified within the sample of a telnet6 session to K2PUT.

- You don't *need* amprnet/44-net IPs to accomplish this either, you may use any RFC-1918 (private) space such as 10/8 or 192.168/16 to accomplish point to point tunneling for IPv6.

That's all I can think of for now... 73!

###

TAPR Wear Available

Personalized Land's End clothing with the TAPR logo and your name and call sign are now available from the TAPR Store at http://business.landsend.com/store/tapr/

Select from the Men's or Women's catalog. (To make shopping easier, there are "TAPR Recommended Shirts" in the Men's catalog including two styles of polo shirts, each available with or without pockets.)

The logo is available in three colors -- red, blue, and white. The name/call sign monogram thread will match the logo color. (We recommend that you use the white logo with dark colored shirts.)

Prices are very reasonable, for example, after adding the logo and monogram, a mesh pocket shirt is $36.95. Processing time is 5-7 days, plus shipping.

###

Aruba on a Sloper

By Maiko Langelaar, VE4KLM

You know you're stir-crazy when out of the blue you decide to go up your tower in a -30C windchill (yeah, yeah) to reconfigure a flat top dipole into a sloper. My tower is only 42 feet; the apex of the dipole is at 35 feet. Some might say I have no right to even call that a tower. I am lucky to have some trees in my small city lot, a 50 foot blue spruce in my front yard, and a scraggly looking out of control 45 foot Chinese (American) elm in the back yard. Also the same one my neighbours constantly harass me about to cut down, since they can't seem to handle the three weeks of the year it decides to 'rain' seeds.

Thanks to the trees, it's very easy to physically run a full size 30m dipole in the north/south direction with a tower standoff supporting the feed point. The dipole doesn't droop, it's flat, and decently high, so six months ago Sweden and Estonia were possible, but it has gotten very quiet. The weird thing is I have all of Canada in my main lobe, so you would think all the HF folks in Canada have disappeared or maybe they just don't care for 30m (sense of humour required).

I discovered RBN (Reverse Beacon Network) some time ago. With the propagation being what it is lately, RBN has kept my interest in the bands, in the sense that when I'm not hearing much, RBN is still showing stuff, lots of it to the south of me, so when you start seeing Peruvian, Chilean, and several different DXpedition callsigns, it's actually depressing. We're still on 30m by the way, it gets better later in the article, but now you see why I decided to climb.

Another climb on New Years Eve to tie one end of my dipole (using heavy dacron fishing line as a support) to the 35-foot mark on my tower, and the other end to my neighbour's fence (the end of the full size 30m dipole is roughly 8 feet above ground, the whole thing is sloping due
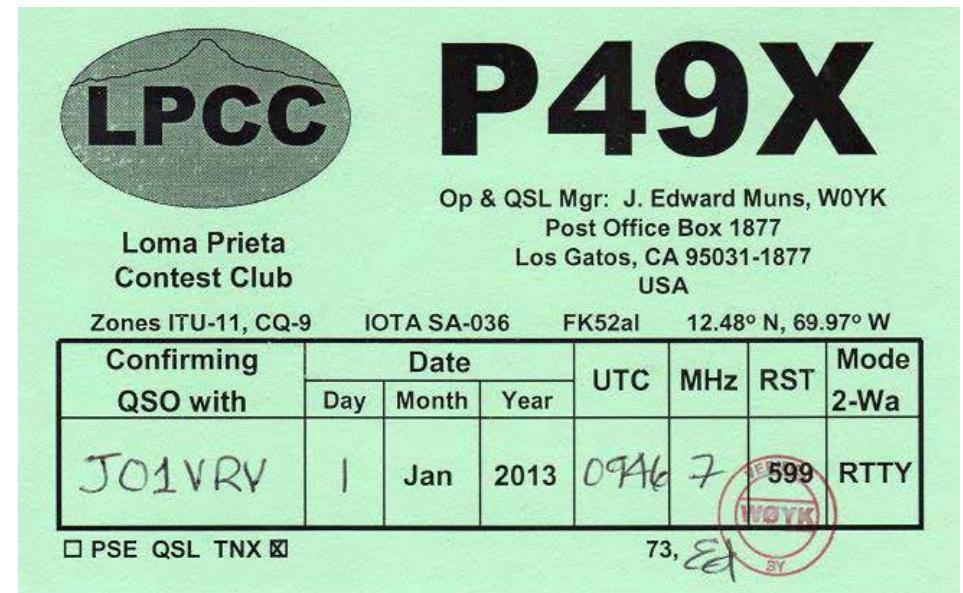
south). Usually run about 10 watts max. Did a quick check of SWR (1:1.5), good enough. Snagged a few CW contacts with three stations down south: N6XJP, W1VDE, and N9N - thank you all for the contact.

So where does Aruba come in ?

For whatever reason, maybe it was because I was thinking I could use a tuner on the dipole to get to the higher bands, RBN was showing Uruguay and Peru on 30m, so I decided to check 17m and 15m as well, and so on the afternoon of New Years Day. Made my first ever contact on 15m, Aruba of all places, and using RTTY to boot, only 10 watts into my sloper matched to the radio with my home built ATU using one capacitor only, no coil needed. Thank you to P49X for coming back to me that afternoon. You actually made my day, it was awesome.

My setup is not fancy. The 30m dipole has a coaxial current choke on 4-inch PVC at the feedpoint (no RF in the shack at all). For 30m obviously, it goes direct in to the radio; for other bands, it goes through my ATU, variable caps and coil unelegantly mounted on a plastic sheet.

I have an old brass key given to me long ago by VE3JHW (Ken) who passed away not long after that, minister of a church I went to as a kid, simply astounded me with his ability to send/receive 45 wpm and have a full blown conversation with you at the same time, not missing a beat. Just blew me away at the time and still would actually. I'm lucky enough if I can do 10 wpm consistently.

MultiPSK is my sound card modem software of choice and is what I used to get my contact with P49X. The soundcard is interfaced to the radio's data port in the back using a couple of isolation transformers ripped out of a circuit board from one of those old industrial telecom modem nests. The PTT control is via a serial port, using an optocoupler also ripped out of an old modem. All of these parts and the wires - connecting them are simply strung out in the open, none of it is inside of any enclosures. Very jury-rigged (cheap), but it works fine.

This exercise has reinvigorated my HF interests, it can for you as well

:)

###

N7DRB SK

Former TAPR member Jim O'Leary, N7DRB, passed away on October 3, 2017.

###

Write Here!

Your *PSR* editor is focusing on the next issue of PSR and hopes to find a few good writers, particularly ham radio operators working on the digital side of our hobby, who would like to write about their activities and have them published here in *PSR*.

You don't have to be Hiram Percy Maxim to contribute to *PSR* and you don't have to use *Microsoft Word* to compose your thoughts.

Your *PSR* editor can handle just about any text and graphic format, so don't be afraid to submit whatever you have to wa1lou@tapr.org, she can handle it!

The deadline for the next issue of *PSR* is March 15, so write early and write often.

If *PSR* publishes your contribution, you will receive an extension to your TAPR membership or if you are not a member, you will receive a TAPR membership.

###

On the Net
By Mark Thompson, WB9QZB

Facebook

As you may know, TAPR has a Facebook page, www.facebook.com/TAPRDigitalHam.

However, I also created a TAPR Facebook Group, www.facebook.com/groups/TAPRDigital/.

If you have a Facebook account, "Like" the TAPR Facebook page and join the TAPR Facebook Group.

If you join the group click on the Events link and indicate you're Going to the events.

On Twitter, Too

Access the TAPR Twitter account at

www.twitter.com/taprdigital.

Also on YouTube

TAPR now has its own channel on YouTube: the TAPR Digital Videos Channel: www.youtube.com/user/TAPRDigitalVideo.

At this time, there are a slew of videos on our channel including many from the TAPR-ARRL Digital Communications Conference (DCC) that you may view at no cost, so have at it!

###

Submission Guidelines

TAPR is always interested in receiving information and articles for publication. If you have an idea for an article you would like to see, or you or someone you know is doing something that would interest TAPR, please contact the editor (wa1lou@tapr.org) so that your work can be shared with the Amateur Radio community. If you feel uncomfortable or otherwise unable to write an article yourself, please contact the editor for assistance. Preferred format for articles is plain ASCII text (OpenOffice or *Microsoft Word* is acceptable). Preferred graphic formats are PS/EPS/TIFF (diagrams, black and white photographs), or TIFF/JPEG/GIF (color photographs). Please submit graphics at a minimum of 300 DPI.

Production / Distribution

PSR is exported as Adobe Acrobat and distributed electronically at www.tapr.org

PSR Editor:

Stana Horzepa, WA1LOU

E-mail wa1lou@tapr.org

TAPR is a not–for–profit scientific research and development corporation [Section 501(c)(3) of the US tax code]. Contributions are deductible to the extent allowed by US tax laws. TAPR is chartered in the State of Arizona for the purpose of designing and developing new systems for digital radio communication in the Amateur Radio Service, and for disseminating information required, during, and obtained from such research.

TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.

Membership Application

TAPR

P. O. Box 852754, Richardson, TX 75085–2754

Phone 972–671–TAPR (8277), Monday–Friday, 9AM–5PM Central Time

E-mail taproffice@tapr.org   URL http://www.tapr.org

Join or renew online at https://secure.tapr.org/np/clients/tapr/login.jsp

Benefits of a TAPR Membership:
- *Subscription to the quarterly PSR*
- *10% off most TAPR kits and publications*
- *Access to the TAPR digital library*
- *Latest information on TAPR R&D projects*
- *Co-sponsor of the annual TAPR-ARRL Digital Communications Conference (DCC)*

Name_____Call Sign_____

Address_____

City_____State/Province_____Postal Code_____

Country_____ Daytime Phone No._____

E-mail Address_____

New ☐   Renewal ☐ $25 X _____ number of years = $_____ total

Payment Method: Check ☐   Money Order ☐   Credit Card ☐

STOP! Provide the following information only if paying **by mail** with a credit card:

VISA ☐   Mastercard ☐   Discover ☐

Credit Card No. _____ Expiration Date_____Security Code_____

Card Holder's Name_____

TAPR is a community that provides leadership and resources to radio amateurs for the purpose of advancing the radio art.