



# President's Corner

By Steve Bible, N7HPR



Greetings!

We are making preparations for the 37th Annual ARRL and TAPR Digital Communications Conference (DCC) in Albuquerque, New Mexico, September 14-16, 2018.

If you have not made your hotel reservation, please do so as soon as possible so that you can take advantage of the conference room rate. Also, please register for the DCC at <http://www.tapr.org/dcc> and you will have a badge ready for you when you check in Friday morning.

Please find the preliminary DCC schedule on the next two pages. You will note that we have a 45-minute slot available. We are inviting speakers to fill that slot, so if you or someone you know would like to speak at the DCC, please contact Steven Bible, N7HPR at [steven.bible@gmail.com](mailto:steven.bible@gmail.com) as soon as possible.

This year Jason Johnston, KC5HWB, will video-record, then edit each talk and place them on YouTube. Jason is running a Kickstarter campaign to help pay for his trip and work. Please consider pledging to his campaign at <https://www.kickstarter.com/projects/1380808921/2018-tapr-conference>

If you have any questions or concerns about the DCC or TAPR, in general, please don't hesitate to email myself and I'll get you an answer right away.

We look forward to seeing everyone at the DCC and another exciting year sharing ideas and promoting Amateur Radio's state of the art.

73, Steve, N7HPR

###

President's Corner	01
DCC Schedule	02
TAPR Directors Election	04
Mail List Changes	05
TAPR TICC Impresses at Atomic Clock Research Lab	06
TAPR Impresses at the "Big Show"	07
WSPR Testing My Autotuned Small Magnetic Loop Antenna	10
TAPR Wear Available	14
If You Don't "Schmooze," You Will Lose	15
Donate to TAPR	16
The End of Daytime HF	17
Write Here!	18
Misko On the Road	18
On the Net	18
The Fine Print	19
Our Membership App	20

# Digital Communications Conference

September 14-16, 2018 • Albuquerque, NM

Last Revision: August 22, 2018



<http://www.tapr.org/dcc>

## Schedule at a Glance

### Thursday, 13 Sep

9:00 AM TAPR Board Meeting  
5:00 PM (everyone is welcome to attend)

### Friday, 14 Sep

8:00 AM Conference Registration and Demonstration Room Open  
8:45 AM Welcome  
9:00 AM Technical Presentations  
Noon Lunch  
1:00 PM Technical Presentations  
5:30 PM Friday Night Social  
10:00 PM Demonstration Room Closed

### Saturday, 15 Sep

8:00 AM Conference Registration and Demonstration Room Open  
8:45 AM Welcome  
9:00 AM Technical Presentations  
Noon Lunch  
1:00 PM Technical Presentations  
4:00 PM TAPR Membership Meeting  
6:00 PM No Host Cash Bar  
7:00 PM Dinner Banquet  
10:00 PM Demonstration Room Closed

### Sunday, 16 Sep

8:00 AM Sunday Seminar  
Noon

## Rooms at a Glance

Registration – Precon Hallway  
Demonstration Room – Tijeras

### Thursday

TAPR Board Meeting – Vista Norte

### Friday

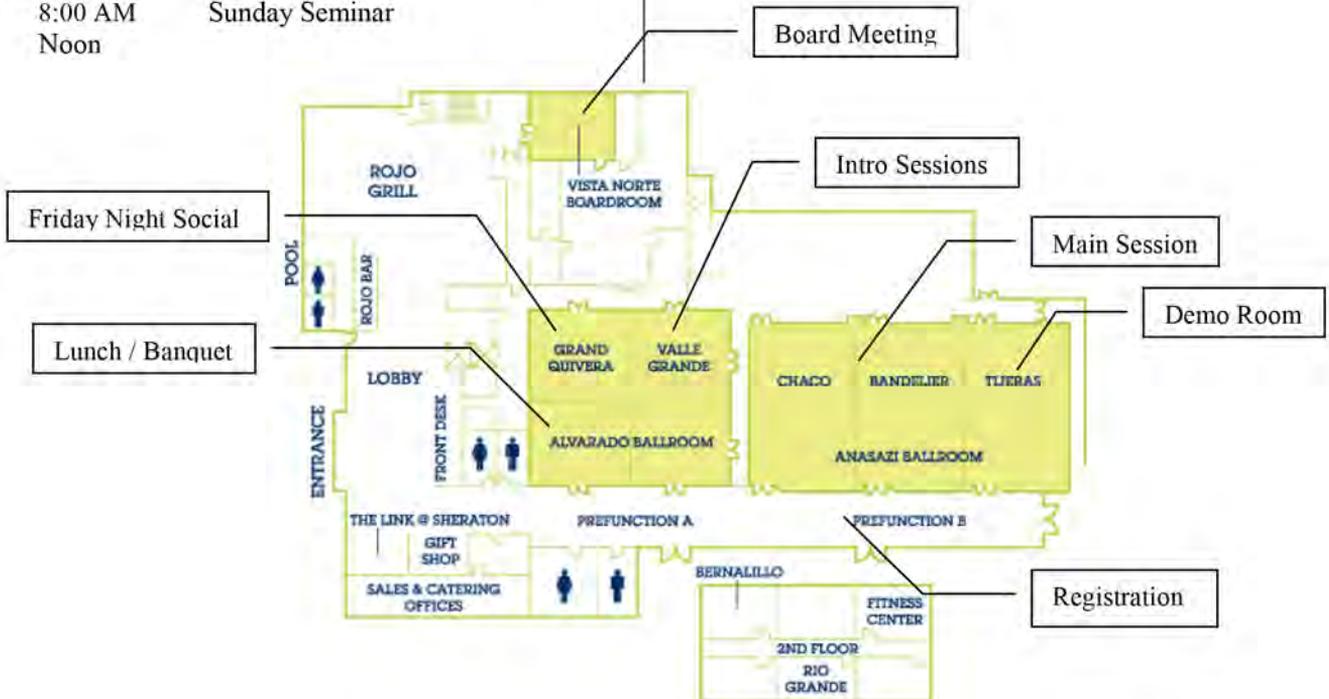
Main Session Technical Presentations – Chaco/Bandelier  
Lunch – Alvarado Ballroom  
DCC Social – Grand Quivera

### Saturday

Main Session Technical Presentations – Chaco/Bandelier  
Introductory Sessions Presentations – Valle Grande  
Lunch – Grand Quivera  
Dinner Banquet – Alvarado Ballroom

### Sunday

Sunday Seminar – Chaco/Bandelier



# Preliminary 2018 DCC Conference Schedule

	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	
8:00 AM	Conference Registration Demonstration Room Open	Conference Registration Demonstration Room Open	<b>Sunday Seminar</b> 8:00 AM – 12:00 AM	
8:45 AM	<b>Main Session</b> Welcome and Introductions	<b>Main Session</b> Welcome and Introductions	HamSCI Personal Space Weather Station  Nathaniel Frissell, W2NAF	
9:00 AM	<b>How Do I Choose? Evaluating 9 Best Single Board Computers for Modern SDR Systems</b> Scotty Cowling, WA2DFI	TBA		
9:45 AM	<b>The Real FT8, JT65, and JT9 Signal-to-Noise Ratio Revealed</b> Jim Frazier, KC5RUO	<b>Bringing Net-44 and IPv6 to your Station via VPN</b> John Hays, K7VE		
10:30 AM	<b>Understanding DMR Networks</b> Jason Johnson, KC5HWH	<b>DRAWS; Digital Radio Amateur Workstation</b> Bryan Hoyer, K7UDR		<b>Hi-Def Digital Television for ham stations and repeaters</b> Mel Whitten, KØPFX
11:15 AM	<b>Deploying a multi-site DMR system for the Total Eclipse of the Sun</b> Mike Pappas, W9CN, and John Spainhower, NØJPS	<b>Study on Actual Usage of FT8 in the US and Japan</b> Masaaki Maeda, W2/JR1AQN		
Noon	<b>Lunch</b>	<b>Lunch</b>		
1:00 PM	<b>Lightning Talks</b> (Impromptu 5-minute talks)	<b>Lightning Talks</b> (Impromptu 5-minute talks)	<b>System Fusion Overview</b>	
1:45 PM	<b>A Flexible, Affordable, Powerful Digital Transceiver for the Raspberry Pi</b> Jonathan Brandenburg,	<b>Beyond Line-of-Sight Digital Communications with the LoRa Spread-Spectrum Waveform</b> Dan Fay, KG5VBY		
2:30 PM	<b>LDPC (Low Density Parity Codes) for Normal People</b> Michelle Thompson, W5NYV	<b>Implementing MACA and Other Useful Improvements to Amateur Packet Radio for Throughput and Capacity</b> Steven Gunderson, and John Bonnett, KK6JRA		
3:15 PM	<b>Ionospheric Measurements of the 2017 Great American Eclipse</b> Nathaniel Frissell, W2NAF Phil Erickson, W1PJE	<b>Realtime Multicast for SDR Module Interconnection</b> Phil Karn, KA9Q		
4:00 PM	<b>Play Time</b> in the Demonstration Room	<b>TAPR Annual Meeting</b>		
5:30 PM	<b>Friday Night Social</b>	<b>Play Time</b> in the Demonstration Room		
6:00 PM	<b>No-Host Cash Bar</b>	<b>Dinner</b> No-Host Cash Bar (6:00 PM) Dinner (7:00 PM) Towards A 21st Century Understanding of Earth's Upper Atmosphere: The Value of Radio Based Amateur-Scientist Partnerships by Dr. Philip J. Erickson, W1PJE Awards Presentation Prize Drawings		
10:00 PM	<b>Demonstration Room Closed</b>			

## TAPR Directors Election

Three Director positions on the TAPR Board of Directors are now open for nomination and nominations may be submitted now.

TAPR Board members serve three-year terms and their responsibilities include:

- 1) Attendance at both in-person board meetings each year. [One is held at the Dayton Hamvention in May, the other at the Digital Communications Conference (DCC) in September.]
- 2) Regular participation in the continuous board session, which is conducted over the Internet.
- 3) Active engagement in TAPR's management.

To place a person in nomination, please remember that he or she must be a member of TAPR. Also, confirm that the individual is willing to have his or her name placed in nomination. Send that person's name (or your own if you wish to nominate yourself), call sign, mailing address, e-mail address, phone number(s), and a biographical sketch (100 words maximum) via <http://www.tapr.org/inforequest.php> or via snail mail postmarked by September 6, 2017, to P. O. Box 852754, Richardson, TX 75085-2754. If you submit a nomination via e-mail, we strongly encourage you to follow up by regular mail.

Nominations close after the call for nominations from the floor at the TAPR Membership Meeting at the DCC on September 15, 2018, and an online election will be held at [http://www.tapr.org/tapr\\_elections.html](http://www.tapr.org/tapr_elections.html) from September 22, 2018 to October 7, 2018.

The three Director positions that are up for election are currently held by George Byrkit, K9TRV, Scotty Cowling, WA2DFI, and John Koster, W9DDD

###



**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](http://www.tapr.org/dcc)

Sheraton Albuquerque Airport Hotel

# Mail List Changes

By John Ackermann, N8UR

Some of you may know that [tapr.org](http://tapr.org) lived on leased hardware at a data center. That hardware was at its end of service life, which means it won't be supported if it breaks. After pondering the options for a replacement, we've decided that it's time to move away from dedicated hardware toward cloud-based services and to offload some of the sysadmin responsibilities to people who know what they are doing.

As part of that, the [tapr.org](http://tapr.org) mailing lists moved to a new list hosting provider. The transition has been as seamless as possible. You do not need to resubscribe to the mailing lists or change any list settings. The lists continue to use the Mailman software and web interface and work just as they have been.

But, as of Friday, June 15, postings to the [tapr.org](http://tapr.org) mailing lists will need to use new addresses -- `<list>@lists.tapr.org` instead of `@tapr.org`. For example, `aprssig@lists.tapr.org` instead of `aprssig@tapr.org`

The web interface is accessible at <https://lists.tapr.org/mailman/listinfo/<listname>>

The list archives are accessible at <https://lists.tapr.org/pipermail/<listname>>

You may see a security warning when accessing the web interface. It's safe to ignore the warning and we will get the certificate updated as soon as possible.

Note that we have deleted lists that were no longer active. The archives for those lists will be available at the [tapr.org](http://tapr.org) website shortly.

Except for the new addressing scheme, the lists will operate just as they did before with the same administrators and moderators.

###



## MICROWAVE UPDATE 2018

Fairborn, Ohio (near Dayton)  
October 11-14, 2018

An international conference dedicated to microwave  
equipment design, construction, and operation.

The focus is on, but not limited to, amateur radio on the microwave bands. The Midwest VHF/UHF Society is pleased to host this October 2018 event. Registration & Conference Updates: [www.MicrowaveUpdate.org](http://www.MicrowaveUpdate.org)  
(Check the website periodically for updates.)

Location: Holiday Inn Dayton/Fairborn I-675

Seminar Presentations	Antenna Gain Measurements	Door Prizes
Test & Measurement Lab	Flea Market	Banquet
Vendor Demo/Sales Area	Tour: Carillon Historical Park	
Tour: Voice of America Museum	Tour: US Air Force Museum	

**Microwave Update is an ARRL technical conference. ARRL publishes the conference proceedings.**

Save the Date, make plans to attend, and help spread the word to others who might be interested.

Joe Burke, WA8OGS  
Publicity

On behalf of General Chair: Tom Holmes, N8ZM  
and the Midwest VHF/UHF Society committee members.

# TAPR TICC Impresses at Atomic Clock Research Lab

By Stana Horzepa, WA1LOU

A user at an atomic clock research lab, who wishes to remain anonymous, wrote the following:

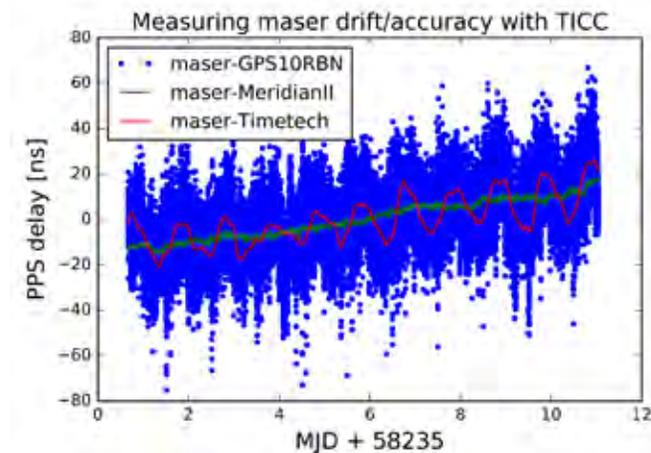
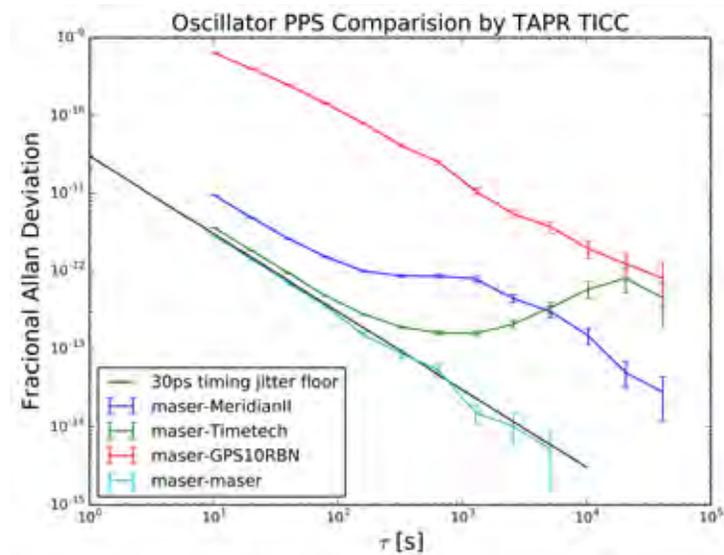
I recently bought three TAPR TICC modules ([https://www.tapr.org/kits\\_ticc.html](https://www.tapr.org/kits_ticc.html)) and just wanted to say thank you for making such an awesome and low cost device!

I benchmarked the modules in a comparison of my hydrogen Maser against other high-end commercial GPS-disciplined oscillators in our building (see first figure) and it seems the TICC has timing jitter of only 30ps in interval measurement.

That's even lower jitter than I observe on a Keysight 53230A (there I measure 50 ps jitter in the same test configuration, despite the fact they spec a timing jitter of 20 ps).

The second figure is another plot you may find interesting showing the PPS measured over the last two weeks which shows the residual inaccuracy of the Maser against the three GPS referenced clocks. This Maser is only recently installed and so I am still characterizing the drift and dialing in the synthesizer settings to compensate. My actual application for the TICC is long term monitoring of the Maser to correct its drift and maintain accuracy.

###



# TAPR Impresses at the “Big Show” in Ohio

By Stana Horzepa, WA1LOU

TAPR was very present at the 2018 installment of Hamvention at the Greene County Fairgrounds in Xenia, Ohio, May 18 to 20.

The Hamvention opened with the TAPR Forum on Friday morning followed by the annual TAPR/AMSAT Dinner on Friday evening. Speaking at the Forum, which was conducted by Scotty Cowling, WA2DFI, were Steve Bible, N7HPR (“Introduction”), Stana Horzepa, WA1LOU (“The World According to PSR”), Steve Ford, WB8IMY (“Write for QST/QEX”), Adam Farson, VA7OJ/AB4OJ (“SDR vs Legacy Radio”), John Ackerman, N8UR (“Collecting Solar Eclipse Data Using SDR, plus a Low Noise VHF/UHF Synthesizer”) and Nathaniel Frissell, W2NAF (“What is HamSCI”).

Meanwhile, Jeri Ellsworth, AI6TK, was the after-dinner speaker at the TAPR/AMSAT evening affair.

And throughout the three-day event, TAPR staffed its popular booth in the Building 5 at the Fairgrounds.

By the way, George Byrkit, K9TRV, video-recorded the TAPR Forum and AI6TK’s after-dinner talk, which you can now view on YouTube at <https://www.youtube.com/watch?v=ejfdhEhEDvU> and <https://www.youtube.com/watch?v=8kSmYQGtxTA> (George’s TAPR Forum video has been very popular with over 2,300 viewings.) George also recorded the SDR Forum (<https://www.youtube.com/watch?v=wIRcpTjcPcI>) and the HamSCI Forum (<https://www.youtube.com/watch?v=S6YHnmxlIn0&t=2536s>)

The accompanying photographs illustrate some of the highlights of TAPR’s Hamvention weekend.

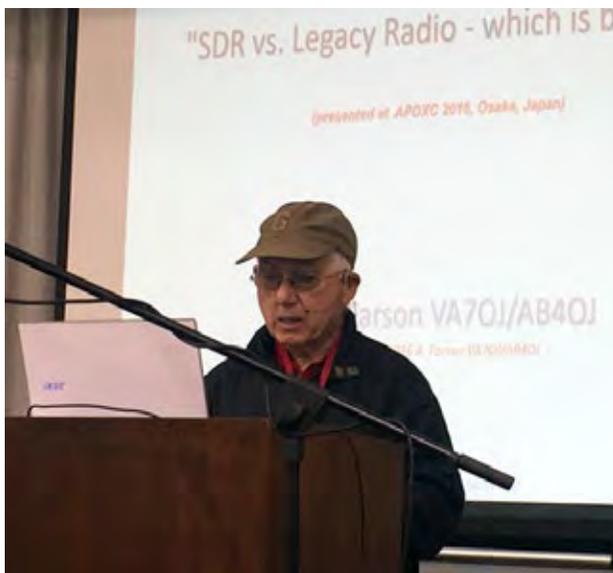


*As the Hamvention kicked-off, moderator, Scotty, WA2DFI, opened the TAPR Forum.*

###



TAPR President, Steve, N7HPR, made his introductory remarks at the TAPR Forum.



Adam, VA7OJ/AB4OJ, presented "SDR vs Legacy Radio" at the TAPR Forum.



Closing the TAPR Forum, John, N8UR, presented "Collecting Solar Eclipse Data Using SDR, plus a Low Noise VHF/UHF Synthesizer."



Stana, W1LOU, encouraged the audience to write for PSR, "iPSR and you can, too!"



At the TAPR Forum, Nathaniel, W2NAF, explained "What is HamSCI."



Mike, AD0NR, Dominic and Taylor, KE0JGN, staffed the Great Scott Gadgets booth next to TAPR's booth in Technology Row.



After the TAPR/AMSAT Dinner, Jeri, AI6TK, spoke about her high tech life.



TAPR's booth was busy throughout Hamvention weekend.

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

# WSPR Testing My Autotuned Small Magnetic Loop Antenna

By Andrew Cornwall, VE1COR

My interest in WSPR, Weak Signal Propagation Reporter, is to gain an understanding of the capability of my autotuned small magnetic loop HF antenna. If you are a member of the Radio Amateurs of Canada, you may refer to Bill Karle's (VE1YY) column "Making Waves ... Taking Measure" in the September/October 2017 issue of *The Canadian Amateur*, where Bill described WSPRNet as one way to measure the transmitting effectiveness and propagation environment of an amateur radio signal. A primary source for information about WSPR on the Internet is [WSPRNet.org](http://WSPRNet.org). The small magnetic loop antenna and its autotuner (the latter my design) is described on my website: [acornwall.ca](http://acornwall.ca).

A special low power radio transmission with the WSPR format is received by WSPR monitoring stations all over the globe and on most amateur bands through UHF. Signal content consists of call sign, maidenhead location, and transmitter power. The transmission is precisely timed and at a precise frequency; it takes about 1 minute and 50 seconds to be sent. WSPRNet aggregates, catalogues and displays reception reports in real time. As an indication of signal success, the more receptions, especially from far away, the better.

For \$29 US I obtained from TAPR a 'QRP TX Shield for WSPR on 20 Meters' module ([https://www.tapr.org/kits\\_20M-wspr-pi.html](https://www.tapr.org/kits_20M-wspr-pi.html)) (commonly referred to as QRPI Shield), comprising an integrated 100 mW 20 metre band transmitter and low pass filter on a small circuit board. The QRPI Shield plugs into the port pins of a Raspberry Pi computer running WSPR software (with the Debian Raspbian OS). In my installation, the Pi is a model 2. The picture below shows the QRPI Shield installed on the left in the Pi.



Figure 1. Raspberry Pi 2 with QRPI Shield installed on left.

I live in a dense forest of trees with a hill to the East. With summer foliage in bloom, the direction of propagation is selective. I normally use a Hustler 6-BTV (7.3 metres tall) trapped vertical antenna, in the yard about 30 metres away from the house, that can kind of push through or over these obstacles. Under these conditions, however, a small magnetic loop antenna elevated only 2 metres off the ground would be even more handicapped. To give this antenna a clearer view of the world I wanted to conduct a trial from an open field at the back of my property. There is no mains electricity nor Internet available in the field.

To satisfy WSPR's requirement of starting a transmission within about 1 second of the beginning of each even numbered minute and to be within a few cycles of the given frequency, the Raspberry Pi routinely receives over the Internet highly accurate NTP (Network Time Protocol server) time data to correct its on-board clock and to measure and correct transmitter frequency deviation. My conundrum was how to use the QRPi Shield where there is no Internet to access NTP. Indeed, NTP is not needed if, once started on time, the on-board clock remains accurate, and the Pi oscillator controlled frequency is stable. This is a lot to ask of an ostensibly hobbieist-educational computer, but it might be possible.

At home, in my cool, constant temperature radio-electronics-computer workshop, I connected the Pi to a regulated 5 V power supply and started the WSPR program allowing it continuous access to NTP via WiFi. I periodically connected the QRPi Shield to the transmission line supplying the Hustler vertical for about 10 minute periods. Throughout there was a satisfactory number of WSPR reception reports to tell me that as set up, the QRPi Shield was working properly.

Over a period of 2 hours and 40 minutes, the Pi automatically adjusted the 20 metre band WSPR transmitting frequency, initially at the rate of -5.61679 PPM (parts per million), then -4.181103 PPM and at the end -3.82719 PPM. The adjustment was settling down the longer the Pi operated. In the absence of an Internet NTP connection to automatically adjust the transmitting frequency, a PPM frequency offset can be entered as a constant parameter into the WSPR computer program.

Next, I checked the continued accuracy of my Pi's on-board clock when NTP was not available to make corrections. Running the WSPR program I let the Pi synchronize its clock with the NTP then I disabled

WiFi on the Pi for the next 49 hours and 12 minutes. During this time I periodically connected the QRPi Shield to the Hustler vertical for 10 to 20 minutes then checked WSPRNet for the 'last 10 minute' reception reports. There were numerous monitoring station reports throughout the trial period and no degradation in the number of reports was evident. This indicated satisfactorily consistent time-keeping accuracy. I stopped the trial after two days because the process was becoming tedious. Two days of workability was longer than I needed.

There was one other condition that required investigation: would the QRPi Shield's 100 mW output be sufficient to be detected by the small magnetic loop antenna autotuner. During tuning, the autotuner senses the power being radiated from the small magnetic loop antenna with the objective of achieving the maximum output (at the transmission frequency). Usual tuning wattage is in the range of one to five watts (once tuned higher wattage can be transmitted) with a signal-detecting 'sampling antenna' about 15 cm long (times two - it's a dipole). The sensitivity of the autotuner can be changed by reducing or lengthening the sampling antenna. To detect the 100 mW power of the QRPi Shield I arbitrarily increased the sampling antenna length to about 70 cm (times two). With this modification, the autotuner worked normally. (An autotuner generated computer report during automatic tuning with the QRPi Shield transmitting 100 mW indicated that a sampling antenna somewhat shorter than 70 cm would suffice.)

The initial field trial occurred on June 30, 2018 from 17:54 to 21:04 UTC. The antenna was pointed approximately East-West; it is directional. The trial stopped when the Pi ceased to function. It was an unusually hot, sunny day in Nova Scotia. The Pi and the 12 V gel cell powering it (through a 12V to 5V down-converted) were not

adequately shaded from the sun and became very warm. I suspect that heat caused the Pi to quit prematurely. There were 285 WSPR reception reports from 20 monitoring stations during the 3 hours 8 minutes trial. Until overcome, the Pi with QRPi Shield was functioning well. All of the

spots were from the West or Southwest as can be seen in the map below, copied from [WSPRNet.org](http://WSPRNet.org). The closest monitoring station was N4SRN 703 km away, and the farthest ACOG, 2477 km.

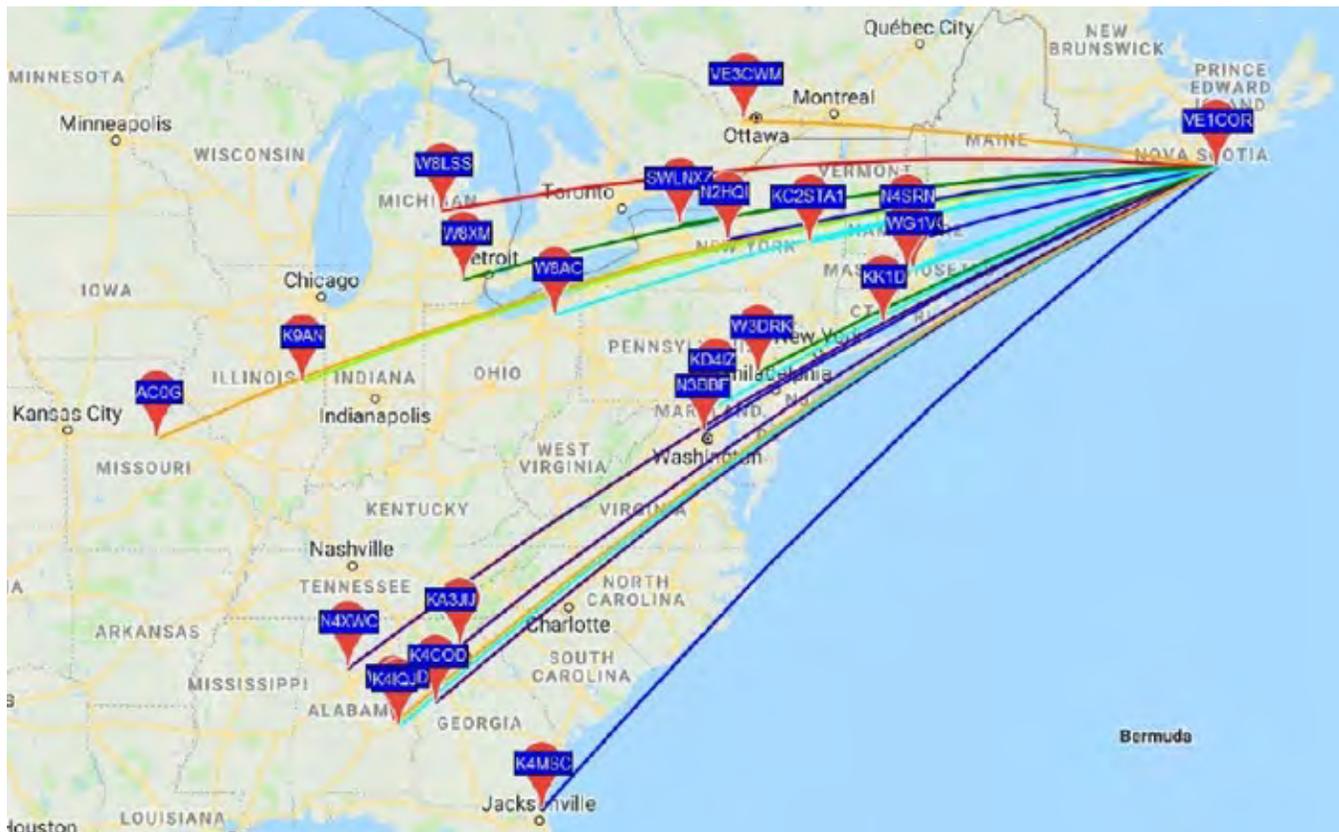


Figure 2. WSPRNet map of monitoring stations hearing QRPi Shield 100 mW signal, 3 hours, 8 minutes, June 30, 2018

I repeated the field trial on July 2 and July 3, starting at 17:28 July 2, and ending at 3:03 UTC July 3; a total of 9 hours and 35 minutes. The Pi with QRPi Shield (and gel cell battery) would have continued transmitting for many more hours, but I turned it off. The time was getting late (midnight local time) and I wanted to take the antenna and WSPR transmitter in from the field before going to bed. As previously, the orientation of the antenna was approximately East-West. There

were 672 reception reports from 47 monitoring stations, many from far away, demonstrating that the autotuned small magnetic loop antenna was doing a good job. The WSPRNet map below shows the location of the monitoring stations hearing the antenna's signal. The closest station was FN41ro 688 km away, and the farthest BP51ip, 5593 km. It was heartening that many European monitoring stations, to the East, reported hearing the signal

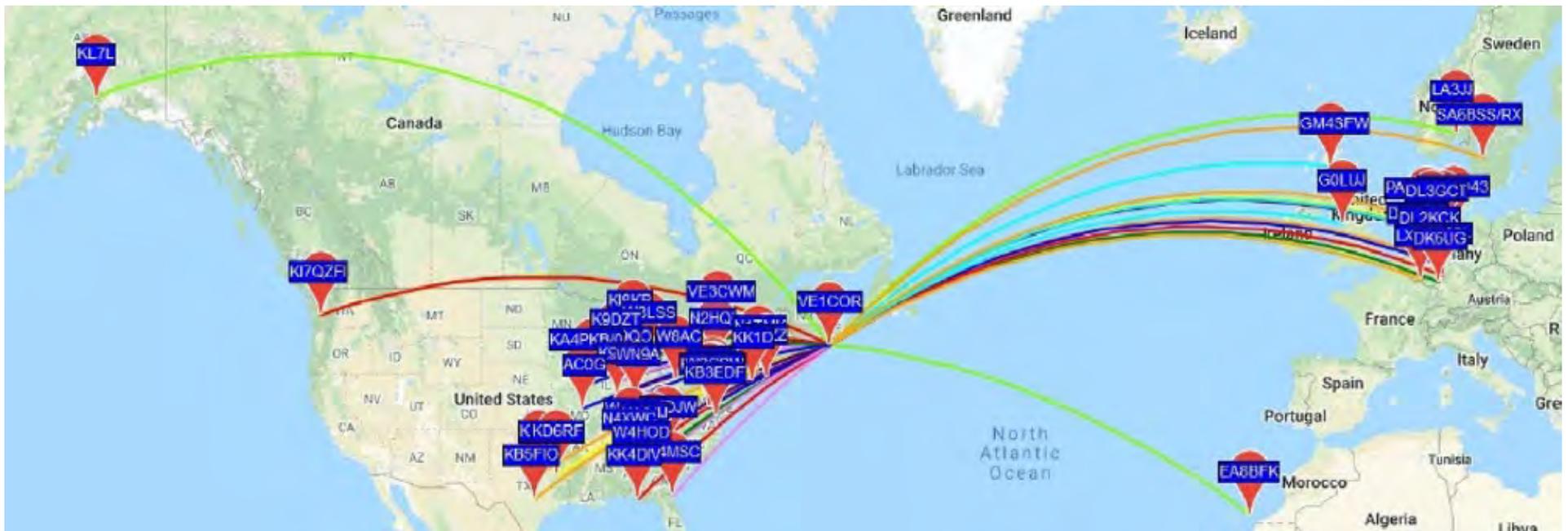


Figure 3. WSPRNet map of monitoring stations hearing QRPi Shield 100 mW signal , 9 hours, 35 minutes, July 2 and 3, 2018

Two amazing things were occurring during these trials. First is that a 1/10 watt signal from my autotuned small magnetic loop antenna could be heard and decoded as far away as 5593 kms, and be consistently heard and decoded at distances more than 3000 kms distant (20% of the total spots in the July 2-3 trial). Second is that there is a myriad of hams and short wave listeners around the world who voluntarily provide reception reports to WSPRnet. Thank You all and Thank You WSPRNet!

*(Andrew Cornwall, VEICOR, owns the copyright to this article.)*

###



## 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.

###

# If You Don't "Schmooze," You Will Lose

By Brian Rogers, N1URO

One of the things we agree to when we accept our license to broadcast from the FCC is to provide emergency communications for the general public whether it's via FEMA, DHS, or other more localized organizations. As hams we also have developed different technologies and modes in which to accomplish this, such as CW, voice and even our various digital modes, such as RTTY and packet.

Lately, however, it's becoming more of a norm that we're unable to continue to do this. Not because the licensed ham refuses to or desires not to, but the agencies we've served for years simply have gone off on their own and believe they know how to use technologies that we've developed better than we do. In doing so, they have shut the amateur community out and in the process, unknowingly harm the communities they themselves are supposed to serve and help protect.

As an example, last summer when Hurricane Irma hit Florida, one county EOC wanted nothing to do with the local RF network provided by EastNet (<https://eastnetpacket.org>) for emergency communications and decided to put all its eggs in one basket using the wired commercial Internet services of Winlink. As

such, the local EastNet folks were basically shut out while the county EOC focused their efforts on the system they chose to use.

As a result of doing so, the backup county fallout shelter also told the hams who had nodes there for years that now they had to pack up and move out leaving them without a site that was shared for years.

Irma hit and with her wrath, she devoured commercial communications cables and antennas for lunch, while using HF Yagis and G5RVs as toothpicks and dental floss for after her big meal, which left the EOC and its new system completely useless and the county basically with no communications.

Had the county continued to work with the local hams who've maintained a working RF network for decades, they would have known that the entire time their EOC system failed, the UHF/VHF network provided by EastNet continued to operate along with its services, which included SMTP-based mail via axMail-FAX. Had the EOC not kicked out the hams, they would have had a nice link into this system where the use of proprietary softwares is not needed. After all, the last thing one can't afford to do in an emergency is to muck with some

software configuration especially on a platform that is not 100% open source. Also, as one who's been in IT, and with a very heavy ISP background, one – especially an EOC – should never put all its eggs in one basket like that. Always, and I mean always, have backup!

What we need to do as digital operators is to continue to build useful services so that we can present them to EOCs and schmooze with these agencies so we can come to agreements to work together and use our RF networks to provide these services for them, while at the same time we ourselves can make use of their facilities to grow our own networks whether they be HF/VHF/UHF/802.11. Their real estate is of value to us and we need to insure they understand that our services are of equal or greater value to them in a time of need. We also need to understand that not just making the initial contact with the proper people is important, but maintaining the positive relationship is even more important.

All too often lately, I'm seeing EOCs and the like not only pushing back on the use of Amateur Radio services and staff. We need to remind them that when push comes to shove as it did in Puerto Rico, who actually saved the

day? I can easily think of three to four key sites that hams have been forced out of or have been asked to leave because those in charge desire to remain ignorant as to what we can provide for them in a time of crisis and that's just in the NorthEast USA.

Come up with a presentation highlighting your network's services and connectivity. Offer them a chance to give you their ideas for services that they may not have been able to find but want and try to work with someone to make it happen. This will bring huge value to your offering and will be a major step in gaining not only confidence, but possible access to the site and facilities that agency may have to offer in exchange to gaining your services.

Years ago, I mentioned to our then ARRL Section Manager that the services we can offer on packet is unlimited if we find a single common denominator. I found the IP protocol suite – and this was prior to smartphones being developed and marketed. What PC, or laptop, or mobile device doesn't have the IP protocol stack in their operating system now-a-days? What services do you use daily on this protocol stack? Chances are, you're already using web browsing services if you're reading this online. The exact same web services work fine on RF

as well. File transfers are also possible using FTP., and if you're running 802.11 VoIP on RF, it works fine using something such as Asterisk PBX server. How beneficial would it be for county A to be able to use a telephone on Amateur Radio to contact county B for help and/or supplies?

Come up with your plan, build your services, make your presentation and then "schmooze". When done right it's a win win win for you, them, and the general public.

## Donate to TAPR

TAPR is now participating in the AmazonSmile program!

When you shop using the AmazonSmile program, Amazon makes a donation to TAPR equal to 0.5% of the price of your eligible AmazonSmile purchases.

AmazonSmile is the same Amazon you know. Same products, same prices, same service.

Bookmark the TAPR AmazonSmile Program link:

<https://smile.amazon.com/ch/86-0455870>

That link takes you to a special login portal where you enter your normal Amazon credentials and get redirected at the same Amazon home page except there will now be a notice that you are supporting TAPR.

Other ways to donate to TAPR:

[http://www.tapr.org/tapr\\_donate.html](http://www.tapr.org/tapr_donate.html)

###

###

# The End of Daytime HF

By Bob Bruninga, WB4APR

I don't want to be an alarmist, but we need hams with the proper knowledge to get involved regarding this disturbing news.

The National Electric Code now requires electronics on every module of a solar array communicating via signalling on the DC power lines to assure each pair of panels can shut down independently. This is to make sure all possible faults never allow more than 80 volts anywhere in the system. This is effective 1 Jan 2019

This is the nail in the coffin of simple DC series string arrays which are the quietest systems and almost demands microinverters or optimizers on every panel. Refer to the *QST* article a few years ago about how disastrous optimizers are to RFI and HF operations with modules all over the roof..

Here is the Solar news:

<https://solarbuildermag.com/bos/nec-2017-module-level-solar-system-shutdown/>

Also, what is going to happen to an array that has signaling all over it in the near field of HF?

Although you can avoid it by going solar before then, you may have problems when your neighbors go later.

I hate to be an alarmist, but we all know what happens when ham radio and commercial systems are incompatible. Even though ham radio might be in the right, we are only 1 in 600 and no one is going to side with us.

We took on broadband-over-power and squelched that dumb idea, but now this has the potential for equal demise of ham radio. It should be fixable, but we also know that there is high competition in the solar market and the modules that are made the cheapest will be popular and

will likely not be adequately filtered.

If nothing else, we need to find out what systems are terrible emitters and nip them in the bud. Maybe all it takes is driving by solar systems you see and turning on your AM radio on a weak signal channel and seeing if the background noise peaks near that home. But also it has individual peaks, so it might also be nice to tune around to find the max and then check the range. I find the noise can go hundreds of feet along the power lines. You cant miss em... just sounds like a 60-Hz buzz on all the harmonics of the inverter switching frequency.

*(This article originally appeared on the AMSAT-BB mail list.)*

###



## 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 [wallow@tapr.org](mailto:wallow@tapr.org), she can handle it!

The deadline for the next issue of *PSR* is October 31, 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.

###

## Misko On the Road

Miroslav Skoric ([skoric@uns.ac.rs](mailto:skoric@uns.ac.rs)) will be participating at International Conference in Tajikistan on Wireless and Optical Communications Networks (<http://www.wocn2018tj.org/>) and International Conference in Kyrgyzstan on Wireless and Optical Communications Networks (<http://www.wocn2018kg.org/>). Misko welcomes TAPR member(s) to join him at the conference(s) to perform ham tutorial sessions.

###

## On the Net

By Mark Thompson, WB9QZB

### Facebook

As you may know, TAPR has a Facebook page, [www.facebook.com/TAPRDigitalHam](http://www.facebook.com/TAPRDigitalHam).

However, I also created a TAPR Facebook Group, [www.facebook.com/groups/TAPRDigital/](http://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](http://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](http://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!



###

**PSR**

#139 Summer 2018, ISSN: 1052–3626

Published by

TAPR

Phone 972–671–TAPR (8277)

E-mail [taproffice@tapr.org](mailto:taproffice@tapr.org)

URL [www.tapr.org](http://www.tapr.org)

Facebook [www.facebook.com/TAPRDigitalHam](http://www.facebook.com/TAPRDigitalHam)

Twitter [www.twitter.com/taprdigital](http://www.twitter.com/taprdigital)

TAPR Office Hours: Monday to Friday, 9 AM to 5 PM Central Time

**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 ([wallou@tapr.org](mailto:wallou@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](http://www.tapr.org)

PSR Editor:

Stana Horzepa, WA1LOU

E-mail [wallou@tapr.org](mailto:wallou@tapr.org)

**TAPR Officers**

President: Steve Bible, N7HPR, [n7hpr@tapr.org](mailto:n7hpr@tapr.org)

Vice President: Scotty Cowling, WA2DFI, 2018, [wa2dfi@tapr.org](mailto:wa2dfi@tapr.org)

Secretary: Stana Horzepa, WA1LOU, [wallou@tapr.org](mailto:wallou@tapr.org)

Treasurer: Tom Holmes, N8ZM, [n8zm@tapr.org](mailto:n8zm@tapr.org)

**TAPR Board of Directors**

Board Member, Call Sign, Term Expires, e-mail address

John Ackermann, N8UR, 2019, [n8ur@tapr.org](mailto:n8ur@tapr.org)

Steve Bible, N7HPR, 2020, [n7hpr@tapr.org](mailto:n7hpr@tapr.org)

George Byrkit, K9TRV, 2018, [k9trv@tapr.org](mailto:k9trv@tapr.org)

Scotty Cowling, WA2DFI, 2018, [wa2dfi@tapr.org](mailto:wa2dfi@tapr.org)

Stana Horzepa, WA1LOU, 2020, [wallou@tapr.org](mailto:wallou@tapr.org)

John Koster, W9DDD, 2018, [w9ddd@tapr.org](mailto:w9ddd@tapr.org)

Bruce Raymond, ND8I, 2019, [bruce@raymondtech.net](mailto:bruce@raymondtech.net)

Darryl Smith, VK2TDS, 2020, [vk2tds@tapr.org](mailto:vk2tds@tapr.org)

Mark Thompson, WB9QZB, 2019, [wb9qzb@tapr.org](mailto:wb9qzb@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.

**PSR Advertising Rates**

Full Page Ad for 1 issue: \$100, 4 issues: \$350

Half Page Ad for 1 issue: \$75, 4 issues: \$250

Quarter Page Ad for 1 issue: \$50, 4 issues: \$175



# 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](mailto: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.**