



# PCARA Update



Volume 19, Issue 4 Peekskill/Cortlandt Amateur Radio Association Inc. April 2018

## Seeing signs of April

Last month's PCARA membership meeting, with presentation by Stan Levandowski, WB2LQF on 'The Three Lives of the *USS Slater*' was very well attended by members and guests. Stan has suggested a club visit to the *USS Slater* in Albany later this year.



At the March PCARA meeting Stan WB2LQF described the history of the *USS Slater*, now moored in Albany, NY.

The March 17<sup>th</sup> **PCARA Breakfast** at Turco's was attended by eighteen members! These events are growing in popularity. The next PCARA Breakfast is scheduled for Saturday April 14, 9:00 a.m. at Turco's in Yorktown, NY. Thanks to Lou KD2ITZ and Jared KD2HXZ for organizing these events.

Just a reminder that the next **PCARA Foxhunt** is scheduled for Saturday May 12, 2018 at 3:00 p.m. Assembly for the foxhunt will be from 2:30 p.m. at the Beach Shopping Center on Dayton Lane in Peekskill. Full rules to be published in the May newsletter. ALL ARE WELCOME!

PCARA has booked an indoor table at the **Orange County Amateur Radio Club (OCARC) Spring Hamfest** on Sunday April 29 at the Town of Wallkill Community Center, 2 Wes Warren Drive in Middletown, NY. If you have items that you wish to sell, please feel free to bring them along to the club table. Details regarding the OCARC Hamfest can be found at: <http://ocarcny.org/hamfest/>.

PCARA made an appearance in the April issue of "Cortlandt Living", the free magazine distributed by direct mail to residents of Cortlandt. Thanks to Lou KD2ITZ and all members who contributed to this proj-

ect. [See page 14 -Ed.]

A previous PCARA hike to Bull Hill/Mount Taurus on December 8, 2017 had to be canceled due to snow. A new event has now been scheduled for Sunday April 15, 2018. Join in — or listen for strong signals from the 1420 foot summit. [See page 15 -Ed.]



Mt. Taurus/Bull Hill. (Taurus is a sign of April.)

Since Easter Sunday occupies the first Sunday in April, our next regularly scheduled meeting is **Sunday April 8<sup>th</sup>, 2018** at 3:00 p.m. at New York-Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY. The agenda will include some modifications recommended by David K2WPM. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

## Contents

Seeing signs of April - KB2CQE	1
Adventures in DXing - N2KZ	2
Seeing Scouts	4
μBITX transceiver - N2MUZ	5
Upgrade to Raspbian Stretch - N2CKD	7
Seeing it through - NM9J	11
Cortlandt Living	14
Mt. Taurus hike - KD2ITZ	15

## PCARA Officers

President:

Greg Appleyard, KB2CQE; kb2cqe at arrl.net

Vice President:

Joe Calabrese, WA2MCR; wa2mcr at arrl.net

## Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m.

Join net control Karl, N2KZ for news and neighborly information.

# Adventures in DXing

- N2KZ

## This... is... MARS!

Can wireless signals actually reach other planets? During its first twenty or more years of development, radio receiver technology advanced remarkably. Early experimenters strained to hear sounds using coherer detectors or galena 'cat whiskers.' Years later, vacuum tubes amplified signals and now they were easily heard. Sensitivity leaped forward when Edwin Armstrong invented the marvel of a regenerative receiver in 1912 and the superheterodyne receiver by 1922. Radio signals now could be heard from thousands of miles away. Imagine if broadcasts were trying to reach us from outer space! Could we hear them too?

Ultimate DX receptions began even before the turn of the century. Those who were lucky enough to have unbridled resources and the latest equipment believed they could hear truly amazing things. In 1899, Nikola Tesla declared: "I have received faint extra-planetary signals whose measured regularity was such that they could not have been accidental. I signaled back with my powerful radio transmitter and am certain that I produced a disturbance on Mars!"

For the next twenty years, radio enthusiasts exchanged stories and folklore discussing all the noises



Guglielmo Marconi c. 1920.

Marconi revealed he would be "investigating the sounds heard on various wireless apparatus" seeking



Nikola Tesla peers around the door of his Colorado Springs laboratory in 1899.

that could be heard on newfangled radio gear... and their origin! Guglielmo Marconi participated in this fever when he began listening very carefully during a perigee between the Earth and Mars around April 21, 1920. In an interview with London's *Daily Mail*,

verification of the origin of them all. Where did all of these signals come from?

French military wireless operators had a different idea. In their eyes, legendary 'messages from Mars' were actually thunderstorms from the Sun. The *New York Times* reported on February 9, 1920 that the Frenchmen had coordinated a study comparing odd signal receptions from various points over time. Their findings made logical sense. If the Hertzian waves being received were indeed from Mars, they would be received at the same time at all participating wireless stations. Alas, the signals were extremely random in nature.

This may have been the discovery of what today's top band enthusiasts call 'static salad' or simply QRN!

The Frenchmen were quite content with this finding. The alleged 'extraterrestrial' signals were not in synchronicity. According to *The Times'* report, one French authority was quoted as saying "It would be something extraordinary if we could hear the people of Mars or any other planet trying to talk to us, but surely it is wonderful enough that we can hear a thunderstorm going on in the Sun some hundreds of millions of miles away. Considering the force of the Sun eruptions necessary to travel the distance, it is certain that we would never be able, without burning up the Earth, to reply to any messages from Mars."

Another theory surfaced in the fall of 1921. The London manager of Marconi Wireless Telegraph Company Limited, J. C. H. Macbeth, was convinced that he had intercepted signals from Mars confirming Signor Marconi's earlier findings. Macbeth was ready for Martian communication and thought that he could find a method to break the language barrier between Martian and English if required! How would he do it? Send pictures instead and a simple code to get thoughts across!

One other explanation of 'Martian' signals might actually be a fundamental characteristic of radio that was first recognized in 1907. It occurred to Tesla and other experts that radio signals were not perfectly defined when they are created. It is quite possible that the 'Martian' signals were actually harmonics, products or images of a powerful primary signal created by earthbound humans. Early radio experimenters and developers referred to these oddities as 'undertones.'

How could 'undertones' be created? Message delivery had become big business by 1921 and powerful



transmitters were in use to insure reliable service on a daily basis. These transmissions were certainly not as 'clean' as we are used to today and stray products might easily be unpredictably broadcast along with the primary signal. Many experiments were also in progress during this era. For example: General Electric was testing a potent radio system designed to communicate with railroad trains concurrently with Marconi's attempts at 'Martian' receptions.

The general public was not blind to all of these claims and conjecture. Prestigious publications such as *The New York Times* and *Scientific American* heralded the discoveries of some of the greatest wizards of this era on their front pages. On September 2, 1921, *The Times* exclaimed:

**“MARCONI SURE MARS FLASHES MESSAGES**

Regularity of Signals, London Expert Says, Eliminates Atmospheric Disturbance Theory.

**WAVES TEN TIMES OURS**

J. H. C. (sic) Macbeth Declares It Would Be Simple Matter to Arrange a Code.”

Even a Pathé newsreel documented Marconi aboard his yacht *Elettra* searching for signals from above.

A deluge of these stories hit the press for three or four years (1919 to 1922.) Great scientists and inventors all commented on the prospects of this amazing pending discovery. Amateur radio operators and general radio enthusiasts built and experimented with very long wave reception. Some could swear they were hearing messages in Con-

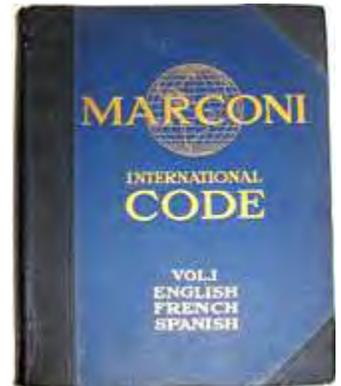


Marconi's 220 ft steam yacht *Elettra* was equipped as a floating wireless laboratory.

tinental Code. Were these just the natural sounds of the Earth that we now know as 'whistlers?' What if these signals really did come from Mars? Sadly, nothing conclusive was ever found and life went on.

Time passed and Marconi turned away from Mars to follow other pursuits. By 1922, he had changed his focus to reducing static using highly directional transmission and receiving antennas. In addition, Marconi and his staff were developing methods of phasing signals received by two or more receivers simultaneously for additional noise cancellation. Clean and reliable reception was essential for success. His ultimate goal was to attain message speeds of up to two hundred words per minute. Marconi Wireless was a business, after all, and increasing profits was their primary goal.

To truncate messages further, London manager J.C.H. Macbeth had indeed devised an amazing system whereby common sayings and phrases could be conveyed with five number-letter combinations instead of being sent in verbatim English. Think of it as a very complex and verbose version of the modern amateur's Q-signal system. Standard issue to Marconi wireless operators was a set of reference books authored by Macbeth to decipher the code. Using the method of encryption that was documented in these books, the code sent from Marconi stations could be sent at record speeds and remain quite



20160	VYFMA	Sugar.
20161	VYGAB	beet sugar.
20162	VYGEK	cane sugar.
20163	VYGID	Suggest(s).
20164	VYGME	suggest that.
20165	VYGOF	can they suggest ?
20166	VYGUG	can you suggest ?
20167	VYGWI	do not suggest.
20168	VYGYK	if they suggest (that).
20169	VYHAL	if you suggest (that).
20170	VYHBA	we cannot suggest.
20171	VYHEB	what do they suggest ?
20172	VYHIC	what do you suggest ?

Sample of Marconi commercial WT Code.

secure. Mars fever eventually calmed down. As published on Saturday, June 17, 1922, *The Times* queried a Marconi employee about any current quest for Martian signals and was rebuffed: "Marconi is not doing that, and has never attempted such 'romantic futilities.' He said that any suggestions of interplanetary communication were 'absurd' and 'ridiculous,' but added that the 150,000 meter wave (about 2 kHz) which he picked up on the *Elettra's* radio apparatus in the Mediterranean several months ago certainly did not originate on the Earth. He is unable to say whether that immense wave — five times the length of any wave

used on Earth — originated on the Sun or some other planet. But he received it.”

Even without authentic Martian communications, 1922 was a breakthrough year in the world of radio. The New York *Times* began a daily listing on April 22<sup>nd</sup> entitled “Today’s Radio Program” to aid followers of the new medium of broadcasting. Several stations were listed: WJZ Newark, New Jersey; WBZ Springfield, Massachusetts; KDKA East Pittsburgh, Pennsylvania; KYW Chicago, Illinois (all on 360-meter wave length at 833 kHz) and WVP from The Army Signal Corps station at Bedloe’s Island, New York, site of The Statue of Liberty on a 1,450-meter wavelength (207 kHz). WVP’s longwave broadcasting entertained wireless operators and early experimenters every night at 9:00 pm.

As Marconi sailed his ship *Elettra* into New York Harbor in June of 1922, he was delighted to hear WJZ as far as 300 miles from shore. The *Times* reported “At one point yesterday, Marconi picked up his listening apparatus when a lively piece of jazz music was being broadcast from Newark and danced around the wireless room to the tunes of the distant instrument.” Shortly after midnight on December 9, 1922, WJZ became the first North American radio station to be heard in Britain. Yes, 1922 was quite a year for radio!

The *Elettra* continued to exist in one piece until 1944. It was submerged by wartime bombing near Zadar, at the time a territory of Italy. The remains were towed to Trieste and sat underwater until 1977 when the hull was cut into parts and distributed to various museums. The restored bow was placed on display in front of a research center outside of Trieste in Padriciano where it stands as a Marconi memorial to this day.

Will we ever talk to Mars? The quest for the ultimate DX is never ending. A major breakthrough came in 2009 when an AMSAT team from Germany bounced

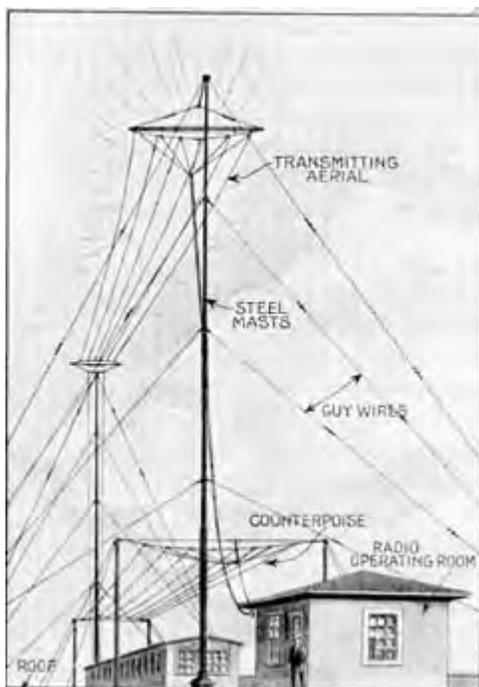
a 2.4 GHz signal off Venus. They heard their signals return 5 minutes later! Certainly, the signals still being heard from Voyager spacecraft traveling beyond the

heliosphere are the most distant man-made signals ever received. The myriad of signals being picked up by radio telescopes and multiple dish arrays from deep space is ours to decipher and understand. How far it will all go is limited only by our imaginations!

Until next month, 73 and dit dit de N2KZ “The Old Goat”



*The bow of Marconi's steam yacht Elettra is preserved at the AREA Science Park in Padriciano, near Trieste, Italy.*



*WJZ radiophone station at Newark, NJ with inverted-L antenna and counterpoise.*

## Seeing Scouts

Jared KD2HXZ recently provided presentations to two Westchester Scout groups. Subject of the talks was the Boy Scouts of America’s “Radio Merit Badge”, which introduces youngsters to several aspects of radio technology including Amateur Radio, Broadcasting, Shortwave Listening and Direction Finding.

The first presentation on March 27<sup>th</sup> was to Sea Scouts Ship #30. This troop is supported by Peekskill Yacht Club, which provides the scouts access to the River Hudson and use of their clubhouse for training.



*Jared KD2HXZ (left) sets up his Go-Box with assistance from Sea Scouts.*

Heights. Fifteen scouts were present.

Thanks to members who assisted Jared at the talks and to those who provided over-the-air contacts.



# μBITX transceiver

## Simply a great little radio - N2MUZ

I wanted to share my impressions of the ‘μBITX’ rig, including the construction experience, in case anyone else may be interested.

Someone at the club breakfast back in December mentioned the “microBITX” radio kit, which piqued my interest and seemed like a fun project for the long winter ahead. Since I’m just getting back into the hobby and knowing nothing about it, I looked up UBITX on the Internet, found the “HF Signals” web-site and was intrigued when I saw what appeared to be a well-designed, full function SSB/CW radio covering 500 kHz – 30 MHz for just **\$109.00!** See the HF Signals URL for more information on the radio:

<http://www.hfsignals.com/index.php/ubitx/>

Really? OK, what’s the catch? Are major expensive components not included? Is radio performance really poor? Is build quality sub-par? Bah humbug.

The more I researched the μBITX, the more I found the answers to my initial concerns were unfounded. For instance, every kit is 100% tested and aligned before it’s shipped. Can’t beat that for a kit.

What I found even more appealing than the radio kit, was the back-story of its design and its creator. The radio is the brainchild of Ashhar Farhan VU2ESE who designed, builds and tests the μBITX largely out of his basement in India, using local labor and providing much needed employment. His goal was to create a



Ashhar Farhan, VU2ESE holds up a μBITX circuit board during the video interview on W5KUB’s Amateur Radio Roundtable.

simple, high performance radio that was fun to operate and was customizable.

<https://www.youtube.com/watch?v=sEQNAekjNk>

I’ve included a link to an interesting interview with VU2ESE, where I found him to be a very skilled radio design engineer, extremely humble, contagiously positive and always enthusiastic. So, being in the holiday spirit (or maybe spirits) I placed an order for a μBITX about a week before Christmas and received it about a month later. On a rainy winter weekend I completed building my μBITX radio kit and quickly made my first contact with it — and while still riding the wave of enthusiasm this created, wanted to share my experience in case others might be interested.

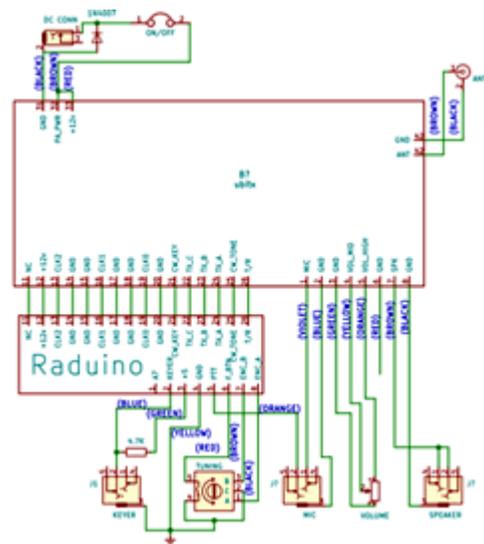
The radio comes with “everything” you need other than control knobs, case and power supply. So I purchased a plastic case on eBay and some knobs on Amazon. I did not like the rudimentary microphone included with the kit, nor did I want to have to wear headphones all the time, so I made some modifications, installing a speaker from a dead boombox and adapting a microphone I had in my junk box. Since I’m primarily an SSB operator and at best a rusty CW op (figuring that QRP is best suited to CW), I also bought and installed a \$10 Morse code reader from eBay in the top cover of the radio to help “improve” my copy. Finally I substituted an SO-239 antenna connector rather than the BNC connector included with the kit.



Components in the μBITX kit include a fully tested transceiver board, Raduino board with display, tuning encoder, I/O sockets, BNC connector, electret mic with PTT push button, volume-on/off control, cables and hardware. [HF Signals pic.]

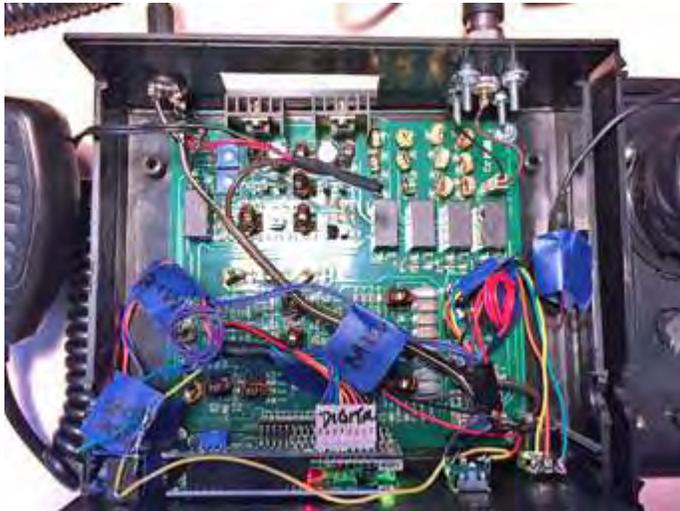
The case I purchased is 2¾" high, 7¾" wide and 7" deep. I found it to be a snug fit for the 6" × 5½" transceiver board. HF Signals recommends a metal case, but I was concerned about ease of construction, so opted for plastic, easily cut using a Dremel® Tool. It took me three or four hours to dry-fit the components, cut out the case, then reinstall the components. Cutting plastic with the Dremel Tool produced an acrid smell of melting plastic that alerted the entire household that the holidays were officially over.

I then had to make sense of the wiring instructions (including my modifications), install the connections and solder everything together. This took another four hours or so. The approach I took was to label the



μBITX wiring diagram shows connection of the chassis-mounted components to the μBITX and Raduino circuit boards. [Credit: HF Signals]

clusters of wires that go to each chassis-mounted component, connect wires to solder tags then solder them into place. I found the on-line instructions were complete and well-illustrated. Now that I've done it once, I could easily shave an hour or more off the construction time — but I double and triple-checked everything. I've found that making errors (which lets the smoke out of components) is a lousy way to end a project.



*μBITX circuit boards mounted inside the plastic case with wiring interconnections completed. [N2MUZ pic.]*

I found myself at 4:45 p.m. on a Sunday afternoon with nothing left to solder and no spare parts lying on the bench. Gulp. Time to hook up an antenna and power supply and turn the knob. *Voilà*, the display lit up with a complete absence of smoke or sparks. That's always a good sign. But I didn't have any audio coming from the speaker. Huh? So I took the \$10 eBay Morse code reader out of line and heard the unmistakable sound of 40 meter CW and SSB chatter as the radio powered up on 7150 kHz.

Since I don't have a 40 meter antenna readily available, I pushed in the tuning knob which lets you quickly jump between bands — or adjust RIT or dual VFO or CW keyer... there are a lot of functions in this basic little rig — and hopped up to 20 meters where I



*Todd's μBITX transceiver powered up ready for use. Front panel display reads: USB A:14.300.050. [N2MUZ pic.]*

have a Cushcraft R-5 vertical antenna. I heard the Maritime Mobile Service Network calling for check-ins. I keyed the microphone, threw out my call, seeing feeble 9-10W peak readings on my watt meter and got an immediate response! I was truly startled as I don't often get an immediate response to any of my calls at 100W, much less QRP. Net Control gave me a 5/6 from Houston, TX, and said my audio sounded good! Wow, not a bad start.

Since then I've made several other SSB contacts and listened around the bands. The μBITX has a very good receiver, which is sensitive and quiet, with punchy receive audio. Even with my plastic case and relatively long runs of wires between components, to my ear I'm not picking up any digital or other noise. I cobbled together a rudimentary straight key and can say it seems to transmit just fine, though I want to get the code reader working before I wobble my way back onto the CW frequencies.

Overall, I found that buying, building and operating this little radio has been a pleasant experience. The performance is very good. The radio is compact and weighs next to nothing, with microphone weighing almost half as much as the entire rig. And I truly like the simplicity. Turn it on, adjust the volume and find a station. The cost and construction challenge is very reasonable for new or old hams. Once they have completed it, they should find that getting back to basics can be a good thing.

– Todd, N2MUZ



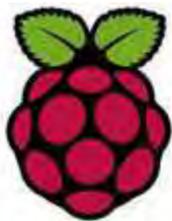
[Note from the editor: A metal case for the μBITX is now available from Sunil VU3SUA of Inkits India. Cost is \$34.99 plus shipping. Further details are available at Inkits' international website: <https://amateurradiokits.in/>.



*Aluminum case for the μBITX HF SSB transceiver from Inkits India. Colors available include maroon, black, gray, and blue.*

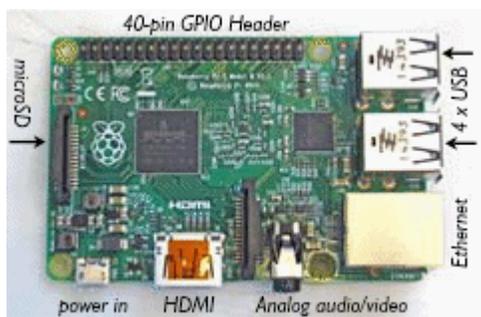
# Upgrade to Raspbian Stretch - N2CKD

[Lovji N2CKD describes recent updates to his **Raspberry Pi 2** microcontroller. For an introduction to the Raspberry Pi and its many applications, see previous articles by Lovji in PCARA Update for March 2016 and April 2016. –Ed.]



**Raspbian** is the recommended operating system for normal use on a Raspberry Pi. Raspbian distributions have been based on recent versions of **Debian** – a free operating system that incorporates the Linux kernel.

About two years ago I purchased a **Raspberry Pi 2, Model B** microcomputer which I reviewed in *PCARA Update* for March 2016. The Pi came with



*Raspberry Pi 2, Model B single board computer, pictured in March 2016 PCUD.*

**NOOBS v 1.4** (New Out Of the Box Software) on an 8 GB class 4 microSD card. I used the NOOBS v 1.4 installer to load Raspbian’s Wheezy distribution, based on Debian 7.0, onto the 8 GB microSD card. That old Wheezy version of Raspbian served me well for almost two years — but I was having performance issues due to some corrupted files. It was time to resolve those issues.

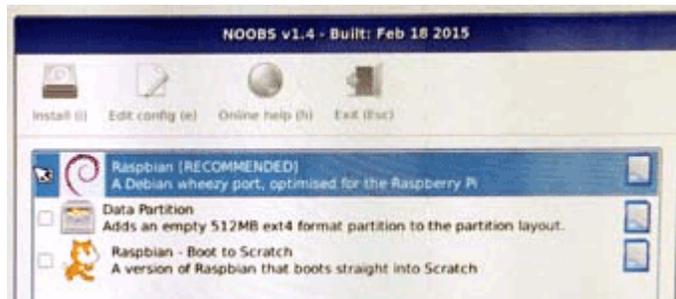
The operating system originally installed on my Pi has been superseded by newer versions. The latest, based on Debian 9.0, is named ‘Raspbian Stretch’. I decided to try to resolve a problem with my previous OS then download and install the new OS. I also wanted to try my hand at writing image files to a microSD card.

## First upgrade attempt

I tried to upgrade my existing Raspbian Wheezy using the Pi’s ‘terminal window’ to enter various Linux commands. I found that several of the upgrade features failed to load and the Pi did not perform properly. I was unable to recover to a working state. The only available option was to *re-install* Raspbian Wheezy using the NOOBS v1.4 installer on the 8 GB microSD card.

## Reinstalling Raspbian ‘Wheezy’ via NOOBS

To *reinstall* Raspbian Wheezy I inserted the 8 GB microSD card into the Raspberry Pi’s card slot then restarted the Pi. During the reboot cycle, I held down the <SHIFT> key which paused the reboot and gave me options to continue with a normal boot or install a fresh image of Raspbian Wheezy. I chose the selection to reinstall Raspbian Wheezy.



*Raspberry Pi NOOBS v1.4 installer screen — with option to install Raspbian selected (cursor arrow).*

It took about 15 minutes to reformat the microSD card and re-install Raspbian Wheezy with Linux Kernel 3.1. On completion a message read “OS installed, press enter to reboot”. I pressed <ENTER> to load the new, fresh copy of Raspbian and the Pi now performed as before. The computer needed to be reconfigured by entering the `sudo raspi-config` command.

Once I had reconfigured the Pi, I issued the command `startx` to enter the Pi Desktop. The Raspberry Pi was now fully restored to its original version. I decided to keep this restored Raspbian image on the 8GB microSD card to serve as a backup and restore option.

## Copying and writing Raspbian Stretch image

The Debian project releases new Linux versions on roughly a 2 year cycle. A new version with Linux kernel 4.9 is now available for the Raspberry Pi named **Raspbian Stretch**. I decided to install this version.

Instead of buying an SD card with pre-installed software, you can *download* images of Raspbian and other operating systems from the Internet. For more storage space you can employ a larger microSD card, for example 16, 32 or 64 GB capacity. All you need is a Windows PC with microSD card reader/writer, the ability to expand a .zip file plus some image-writer software.



*16 GB microSD card (right) with SD Card adapter. [N2CKD pic.]*

Here are the steps that I took to successfully create a 16 GB microSD card with NOOBS v 2.4 and Raspbian Stretch:

### Hardware requirements

1. An 8, 16 or 32 GB microSD card is required, preferably 4, 6 or 10-class card for faster I/O. I paid \$7.00 for a 16 GB card at Staples.
2. You can use your computer's built-in SD card reader if it has one. Otherwise you will need a USB microSD card reader/writer. I paid \$9.60 at Staples for a suitable reader, compatible with SD and microSD cards.



Vivitar SD and microSD card USB reader/writer used by Lovji.

### Software requirements

1. You will need to format your microSD card with FAT32 format. You can download the recommended 'SD Memory Card Formatter' software onto your PC from the SD Association's site: <https://www.sdcard.org>.
2. You will need WinZip-style software to expand the compressed image file. Windows 10 has built-in zip/unzip capabilities. You can also use WinZip itself (<http://www.winzip.com/win/en/>) or the free software 7-Zip (<https://www.7-zip.org/>).
3. Since the "Raspbian with Desktop image" contained in the .zip archive is over 4 GB in size, these archives use features which are not supported by older unzip tools on some platforms. The Raspberry Pi Foundation recommends that if the download appears to be corrupt or if the file is not unzipping correctly, try using 7-Zip.
4. Download the current version of NOOBS v2.x which



contains an image of Raspbian Stretch with Desktop Kernel version 4.9. Download from: <https://www.raspberrypi.org/downloads/noobs/> then unzip to a new folder on the PC hard drive. Note

that large .zip files can take a long time to download and to unzip.

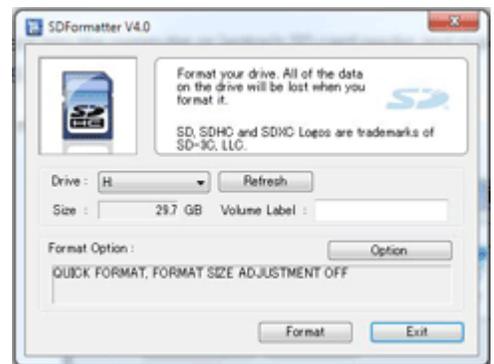
One of the unzipped files is called:

'Instructions-Readme.txt' which gives instructions for NOOBS installation and for fixing HDMI display/audio problems.

[Also see instructions on the Raspberry Pi web site at: <https://www.raspberrypi.org/documentation/installation/noobs.md> -Ed.]

### Practical experience

After gathering the hardware and software, I started by inserting a 16 GB microSD card into the USB 2.0 microSD card reader/writer which was plugged into my Windows 10 notebook's USB port. Next, I ran the 'SD Formatter 4.0' software to format the 16 GB microSD card with FAT32 formatting. The card was now prepared for transfer of the NOOBS software.



SD Formatter 4.0 software.

[Take care to positively identify the drive letter assigned to the microSD card when it is plugged into your Windows computer **before** using "SD Formatter". Otherwise you might destroy data on the wrong device! -Ed.]

I proceeded to download the latest NOOBS v2.4\* installer .zip file from the Raspberry Pi web page <https://www.raspberrypi.org/downloads/noobs/> to my Windows 10 laptop then extracted the image files from the NOOBS .zip file. Next I copied and pasted all the extracted unzipped files to the microSD card's root directory. [\*Current version of NOOBS is v2.7 -Ed.]

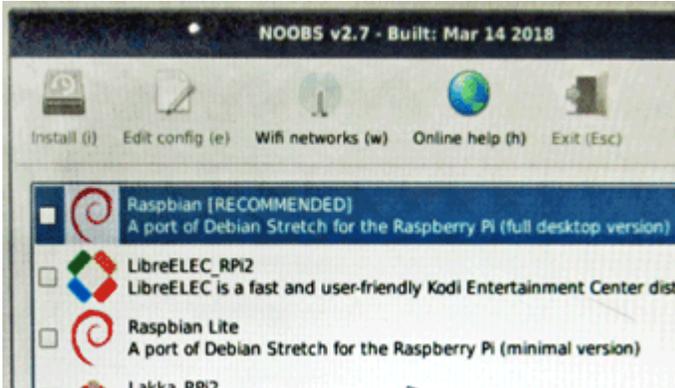
The next step is to remove the microSD card containing NOOBS from the Windows computer or USB reader/writer and insert it into the Raspberry Pi's

microSD card slot **with power off**. Power up the Pi and it will boot up, automatically shrinking the first partition and labeling it 'RECOVERY'. The Pi creates a new empty



Insert microSD card into the Raspberry Pi card slot **with power off**.

extended partition using most of the remaining card space. It then pauses to show a screen of options.



*NOOBS v2.7 presents various options for installing Raspbian Stretch and other operating systems.*

Choose ‘Raspbian’ and press enter. NOOBS will now install the Raspbian Stretch image onto the 16 GB microSD card. Upon completion the Pi will reboot automatically to the Raspbian Desktop.

You will then need to reconfigure the Raspberry Pi to your preferred settings by using the `sudo raspi-config` command in terminal mode. For example, you can configure a Wi-Fi adapter (if installed) from a list of available networks. *[You can also use the desktop GUI menu choice: Preferences -> Raspberry Pi Configuration. -Ed.]*

That’s it — you have successfully installed the Raspbian Stretch operating system.



*Lovji’s updated Raspberry Pi system with monitor, keyboard and mouse. The Raspberry Pi 2 board is in the plastic box with red loudspeaker at right. [N2CKD pic.]*

### What’s new

Raspbian Stretch is much improved over previous versions. Like the previous ‘Jessie’ version, Stretch’s default behavior is to boot straight to the desktop GUI, not to the Linux command line. An option to automatically log in as the “pi” user is available when booting to

desktop or command line interface. The desktop menu lists several new features including the Chrome web browser — instead of Web / Epiphany — plus the LibreOffice suite and other enhancements.

I installed the KODI multi-media application and Fldigi digital modes application using the Raspberry Pi’s

terminal mode with the command: `sudo apt-get ‘name of package’`. By installing the operating system image on a 16 GB card I still have plenty of storage space available for additional applications.

Enjoy your upgraded Raspberry Pi — until the next available upgrade.



*Menu showing programming options on Lovji’s updated Raspberry Pi. [N2CKD pic]*

- 73 de Lovji, N2CKD

*Note from the Editor:* The \$35.00 Raspberry Pi 2 Model B — as described by Lovji in this article — first appeared in 2015. It was superseded in February 2016 by the Raspberry Pi 3 Model B, featuring a faster 64-bit processor, built-in WiFi and Bluetooth as well as the usual wired Ethernet.

The Raspberry Pi 3 Model **B+** was announced on Pi Day, March 14, 2018. This model has an even faster processor, dual-band 802.11ac WiFi, Gigabit Ethernet and Power-over-Ethernet capabilities (with Hat). The price is still \$35.00.

By the way, Lovji’s article also arrived at your editor’s desk on Pi Day, 3/14/2018.



*Latest Raspberry Pi 3 Model B+ released on π-day, March 14 (3/14), 2018.*

# Generator use tips – N2KZ

*[After the wind and snows of March brought down many a tree and wire, Karl explains the care and feeding of gasoline generators. -Ed.]*



*Honda EU2200i inverter generator.*

Aren't generators the greatest invention on Earth? Keep yours running safely! Nothing is worse than a cold house, a cold, cold shower and zero communication with the outside world. Never ever operate a generator indoors. Plenty of ventilation outside is a must. Keep exhaust far, far away from any air intake

into your home. Use of carbon monoxide sensors is always a good investment.

Take care of your friend: When was the last time you changed the oil? Take a look at your owner's manual and give preventative maintenance a try! The last thing you want is a blown engine in the middle of a snowstorm. Consider how many hours you are actually logging on your generator. One week of continuous use is **168 hours**. Suggested oil change periods could be as little as 100 hours. Heed the warning! Don't seize your machine!

## Pouring gas

Don't splash. It is dangerous and stinky. Getting gas odor out of a pants leg or a good coat is difficult at best. Use a wide and tall funnel to catch even small spit splashes. Never fill a five-gallon container with more than about four gallons. The first full gulps of a pour can be wide and uncontrollable. Go as



*2-quart funnel.*

slowly as possible and always use two hands. Be in control! Also, fight the wind. Position your body to block wind gusts to stop gas from taking flight and making a mess.

Consider your refill habits. Always turn off your generator and let it cool off when refilling its gas tank. My generator will run about 15 to 18 hours



*5 gallon gasoline safety can.*

on four gallons of gas (one jug full.) I chose to refill before and after work in a 12-hour cycle. Try to never completely run out of gas. Dirt and other sediment will clog your fuel path, resulting in rough operation or failure.

## Weatherproofing your generator

This is a difficult problem. If you use a tarp or a plywood shelter over your generator, consider how far snow and rain could blow into your hut. Never ever block the air intake or the exhaust pipe. Make sure your roof cannot blow away. Check your installation regularly. Water into the control electronics of your generator means quick and certain generator death. Tie and secure your installation firmly. Make every effort to stay as dry as a bone.

## House connections

The safest method includes a full set of cutover switches isolating your generator from the usual neighborhood grid. Plugging your generator's output straight into a wall outlet without grid isolation — "backfeeding" — is a terrible idea for so many reasons. Even the use of cascaded multi-strips and long extension cords is a bad idea. Stay within electrical code and avoid fires, wiring overloads and other catastrophic trouble. Very important: always ground your generator!

Also, remember most generators do not have very accurate regulation. They produce alternating current at give-or-take 60 cycles per

second. Don't be surprised if your AC-powered analog clocks sway way off time during generator operation.

Finally, lock up your generator and gasoline to protect against theft. I use a tough thick wire rope with a heavy-duty hidden hasp clasp padlock attached to a tree and my deck. Losing your generator or your gas containers can be devastating! When all is said and done, cover your generator with a tarp or a fitted cover. Don't forget to test run your generator at least once a month to ensure good operation when you need it most. Store your gasoline in a safe and dry place with good ventilation. Make sure the gasoline container caps are on tightly. Keep your lights on and protect your investment!

- Karl, N2KZ



*Honda EM6500SX portable generator with electric start.*

# Seeing it through

Here is a further report on the work of **Bert Firs**, G2APL. The author has reported previously on this little-known but much-valued experimenter<sup>1</sup>.

Bert Firs was employed at a Research Center in the United Kingdom concerned with the development of previously unknown technology. His name appears alongside illustrious colleagues on several patents with worldwide application.

The inspiration for Bert's latest development came when a neighbor complained about the "unsightly wires and tower" in Bert's back yard. It is possible that Bert had been watching *Star Trek* re-runs at the time including *Balance of Terror* and *The Enterprise Incident*, featuring Romulan masking technology.

Bert's first experiment made use of techniques pioneered by the UK Ministry of Defence to make military vehicles invisible. Video cameras positioned on the vehicle are connected to video projectors which cast an image of the surroundings onto the surface of the vehicle. As a variation on this technique, the surface of the vehicle could be covered with flat panel video screens displaying a picture of the scene on the far side of the vehicle. This method appears in the movie *Die Another Day*, where James Bond's Aston Martin car is camouflaged (<https://youtu.be/gmrnSp0SUoE>) — and in an



*Ford Transit disguised with video panels.*

episode of *Top Gear*, where Richard Hammond demonstrated a Ford Transit Van with flat panel screens mounted on the outside, fed by video cameras around the vehicle. (See: <https://youtu.be/6SQ3pdgo-Wo>)

Bert extended the idea to camouflage his own tower. Instead of flat panel screens and video cameras, he obtained a number of smart phones with touch screens on one side and camera lens on the other. Bert fastened several phones to one of the tower legs so the lens could still view the scene on the opposite side of the tower. In Bert's own words, the effect was "very eery". The section of tower with phones attached became invisible, showing the yard and fence beyond on their screens. Unfortunately the effect was lost when viewed from a different angle — but looking up through the tower leg toward the sky was more convincing as there is less detail in the sky.

Bert explained why this approach was interesting if flawed. "I could have covered all three legs of a 50 foot tower with around 360 cell phones — but the cost

1. See *Radio Communication*, April 1980, p 395-396.

would have been overwhelming. I also had to figure out a way to feed them all with power. And I could only mask the tower in the direction of one neighbor's house. Anyone looking at the camera-side of the phones would still see the shape of a tower."



*Tower leg disguised with smartphones.*

Bert wondered whether wire antennas could be camouflaged. He remembered the 1965 movie *Those Magnificent Men in their Flying Machines*, where imitation vintage aircraft were filmed "flying"



near the ground using suspension wires painted to match the sky. Bert found that standard paint was not suitable for this application. In rainy Britain the sky can change in a matter of minutes — and a perfect color match for a bright blue sky can be ruined as soon as a cloud passes into shot.

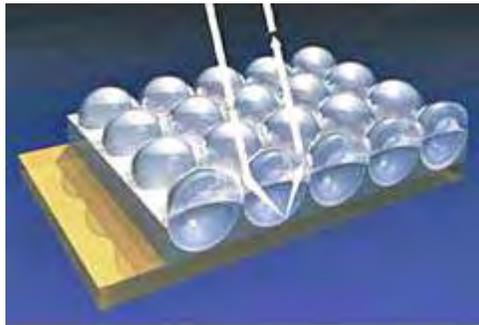
Bert tried several different approaches. One test made use of reflective material, similar to 3M™ Scotchlite™ Reflective tape.



*Reflective safety tape as tested by Bert.*

Scotchlite is used on road signs and high-visibility clothing. These retroreflective materials incorporate tiny glass beads on the front surface which reflect incoming light thanks to a mirrored surface behind each bead. The light beam then exits through the front

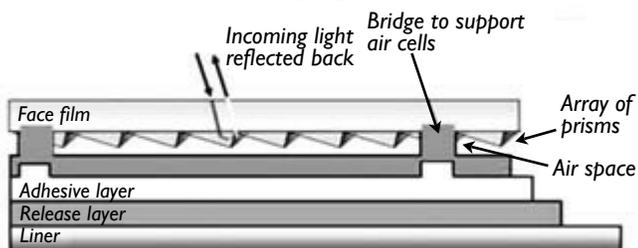
surface of the bead at an angle of  $180^\circ$  compared to the incoming beam and returns directly toward the light source. When a road sign or high-visibility clothing is covered in Scotchlite and illuminated by a car headlamp, much of the light is reflected straight back toward the vehicle.



Reflective glass bead technology as used in road signs and safety clothing.

Bert tried wrapping antenna wire with Scotchlite reflective tape. It lessened visibility to some extent when the wire was suspended high in the air, but the result was far from perfect due to the  $180^\circ$  angle of reflection.

Newer versions of retroreflective tape make use of microprismatic film. An array of tiny prisms is arranged behind a transparent face film. Each prism has the shape of a cube corner and acts like a corner-reflector — as used in marine radar. Incident light is reflected at the cube corners with greater efficiency than from glass beads and emerges directly back towards the source of the light. The prism array can be metallized on its back surface or have an air-space behind it for total-internal-reflection of the incoming light.

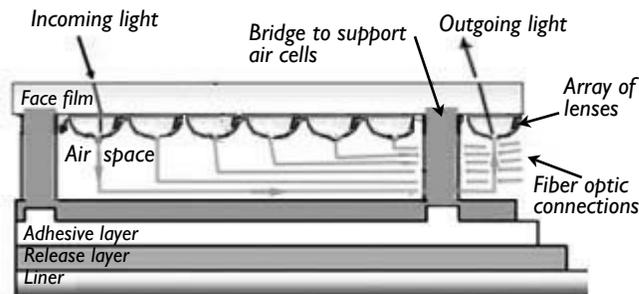


Retroreflective material using an array of microprisms beneath the top surface.

Bert's next development involved the manufacture of microprismatic film by the lab's material sciences division in Scotland. As Bert put it "What I really needed was a reflective tape where the light hitting one side of the covered object could be guided to the opposite side then re-radiated from there. Suppose each microprism at the surface of the tape had a fiber optic strand to guide incident light to a corresponding prism some distance away. If such a tape was wrapped around a wire or a tower leg, light could enter on one side and emerge on the other side."

"In order to send light down the optical fibers, the microprisms had to be replaced by tiny lenses which concentrated the incoming light, then sent the light down an optical fiber to a similar lens some distance away. The whole array required some intricate design,

employing a kagome lattice for the optical fibers. It had to be manufactured using 3-D printing techniques, with acrylic plastic for the lenses and a combination of acrylic and fluoropolymer of different refractive indexes for the fiber optic connections."



Modified retroreflective material with microprisms converted to lenses, connected by kagome lattice of fiber optic strands.

"I was quite excited when the first roll of experimental tape arrived from our Scottish site" Bert recalled. "I opened the box, removed the foam packing beads and found a strange, shimmery cylinder inside. The reel of tape was already doing its job, taking in light on one side of the reel and radiating it out on the opposite side."

"First tests in the Research Lab were positive. We wrapped the tape around objects of different sizes. The best results were obtained when the size of the masked object corresponded to the length of the fiber optic connections."

Bert continued his account of the discovery. "I took a reel of tape home with me that evening and tried wrapping one of the tower legs with a short length. The result was most peculiar... instead of seeing the metal tower, I found myself looking 'around the corner' toward another neighbor's house. This wasn't a simple reflection because the neighbor's house was located at  $270^\circ$  to one side of the tower."

"The problem was caused by the length of fiber optic connections in the sample tape. We had specified 10 centimeters as the length needed, but when wrapped around a tower leg, this distance was too long, and I was seeing incoming light from 'around the corner'. I



Tower leg, spiral-wrapped with tape.

thought about this for a few minutes, then realized that if I wrapped the tape in a spiral fashion, I could make the connected lenses line up so they were spaced opposite each other around the tower leg.”

“Spiral wrapping did the trick. I wrapped a few feet of tower in this fashion and was rewarded with a view directly through the tower legs. It did not matter whether I was looking horizontally at the nearby yard or looking up to the sky, the effect was the same. As night was falling, the available light dwindled and I started to see stars ‘through’ the tower legs — what a wonderful experience.”

“I could not leave the tape in place waiting for daylight as this work was still under wraps — so I covered the tower section with a tarpaulin for the time being. My neighbor was even less happy!”

### Reduction to practice

Bert’s team had to carry out a practical test of the new technology. With their previous experience in neoteric communications, they knew that cell-phone towers could be a lucrative market. Bert took up the story again.

“You are probably aware that cell-phone towers are even less popular with nearby neighbors than amateur radio towers,” said Bert. “If a cell-phone tower could be camouflaged, it would attract far less opposition during the planning process. And I’m not talking about towers disguised as trees — they don’t fool anybody. I’m talking about a tower that nobody would notice. We estimated the annual market for covering cell-phone towers would be in the region of £23 million.”

Bert’s laboratory approached a cell-phone company that had recently received planning permission for a new tower, serving a section of nearby motorway (thruway). Fortunately the site was surrounded by trees on private land, so it was easy to keep the inquisitive public away.

Bert explained the process. “The cell phone company had built a track through the woods and prepared a small clearing for assembly and erection of the tower. The tower was a galvanized steel monopole, with polygonal cross-section, 160 feet high. It arrived in four sections.”

“We had a large batch of our experimental forward-reflective tape manufactured by the materials lab.



Galvanized steel tower arrived in sections.

This tape, 30 centimeters wide, arrived on reels, ready for winding around the tower sections. We had matched the

length of the fiber-optic strands to the circumference of each section so lenses at the beginning and end of each fiber length were exactly on opposite sides of the tower. There was no need to spiral-wrap with this design.”

“We had the contractor raise the tower sections a couple of feet above ground then we wound the tape on by hand. The number of people in attendance was minimized, and those who had to be present had all signed a non-disclosure agreement. Even so, the contractor’s men were somewhat amazed as we wound the tape on and they could see through to the other side of the tower.”

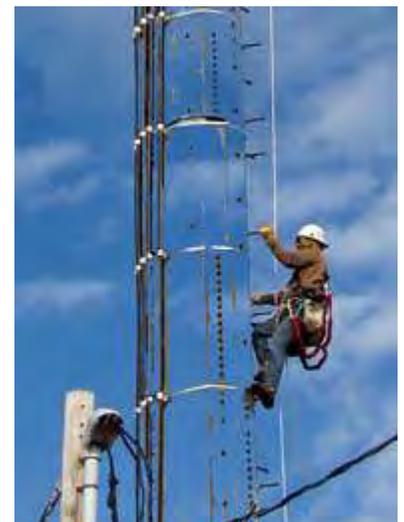


First wrapping with tape.

“The mounting frame was attached, the tower was raised to vertical by the crane then it was bolted to the massive mounting plate which had already been set into concrete. Everything looked perfect. All you could see were the climbing rungs, the antenna supports at the top and the oval holes for the feeder cables. The rest of the tower was practically invisible.”

Bert paused for breath then his expression changed to a frown. “And that’s where it all started to go wrong,” he said. “The cell phone company had a crew of tower workers ready to take the sector antennas and mounts to the top of the pole, fix them at the correct orientation then attach the feeders. This was a well-experienced crew with hard hats, tool belts and ropes to raise heavy equipment. The first member of the team threw a safety rope around the invisible tower and stepped onto the first rung of the protruding ladder steps. He made it up to a height of about 20 feet, then turned a funny color and came down a lot more shakily than he went up.”

“When the crew leader asked him what was wrong, he shook his head and said he couldn’t climb something that wasn’t there. A second member of the crew was sent up



The tower worker reached 20 feet.

in his place. He was a younger worker who could climb more quickly. He managed to reach a little higher than froze in place with the same complaint — you can't climb a structure that your eyes tell you isn't there! We had to bring him down in a sling attached to the crane."

"In order to keep the cell-phone company happy, we then had to peel off all the forward-reflective tape that was wrapped around the tower. The climbing crew helped with this task, working their way up from the bottom. They were happy to ascend, once they could see a solid steel tower beneath their feet."

"So that was the end of our first tower-masking project. Management asked us to work on a refinement to the reflective tape that might allow the effect to be turned off, just for climbing purposes. And I had an idea that would make the tower partly visible when viewed from above by a tower worker."

**Defensive move**

"But then all development came to a grinding halt. The Ministry of Defence had heard about our material and told the Managing Director that no patent could be published at present because the discovery was needed for urgent defense purposes. We had a visit from some shady government types who took away all our samples, as well as the lab notebooks with the development details. Nobody knows exactly what the government plans to do with our material, but if you ever hear the rumble of an invisible tank or the throb of a disappearing helicopter, then it's probably been wrapped with our forward-reflective tape!"



*No patent could be published.*

**Through to the end**

Bert's face broke into a brief smile. "But don't tell anybody about the tower in my back yard. From time to time, I'll wait until a dark evening, then take the tarp off the invisible section. I can still see the stars and my neighbor's yard through the tower legs!"

"Let's look ahead to a time when all the details can be published and our tape becomes commercially available. We're going to call it **"Tower-Gone™"**."

- G3VNQ, NM9J  
PCARA Update, April 1, 2028.

# Cortlandt Living

As mentioned in the March PCUD issue, *Cortlandt*



*Cortlandt Living, April 2018.*

*Living* is a free publication distributed by direct mail to addresses in and around the Town of Cortlandt. The magazine combines articles about organizations and businesses within the town along with local advertising.

Greg KB2CQE and Lou KD2ITZ have been working with Publisher Sonia Lee Garber and Contributing Writer Tobias

Roberts on an article for the monthly feature 'Non Profit Spotlight'. Lou collected information from several PCARA members and submitted his notes to the magazine.

The article "Communicating for a Purpose" now appears on pages 6-7 of the April 2018 issue of *Cortlandt Living*, under the heading "Community News". There is a description of what Amateur Radio is, followed by a short history of Peekskill / Cortlandt Amateur Radio Association. Greg

KB2CQE, Fred KD2GJJ and Karl N2KZ are mentioned and quoted in print. The article ends with contact details for the club's Internet site and Facebook Page.

Thanks to Greg and Lou for coordinating this appearance of PCARA in the local media. If you should meet anyone who expresses an interest in our hobby as a result of the article, be sure to welcome them on-board.

Thanks to Greg and Lou for coordinating this appearance of PCARA in the local media. If you should meet anyone who expresses an interest in our hobby as a result of the article, be sure to welcome them on-board.



*'Communicating for a Purpose' article. The red radio pictured above the title is a QYT KT-8900 dual-band mobile.*

# Mt. Taurus hike - KD2ITZ

On Sunday April 15, Richard N1GIL will be leading members of the Appalachian Mountain Club (AMC) on a hike of Mt. Taurus (Bull Hill) in Cold Spring, NY. He will be joined by Mike W2IGG who plans to set up his portable HF station. All are welcome to attend. This will be a great opportunity to enjoy the outdoors and offer a demonstration of our communications resources.

AMC has a long history of conservation and recreation in our region. According to their website, <http://www.outdoors.org>



Founded in 1876... AMC promotes the protection, enjoyment, and understanding of the mountains, forest, waters, and trails of the Northeast outdoors. We are more than 100,000 members, advocates, and supporters, including 12 local chapters, more than 16,000 volunteers, and over 450 full time and seasonal staff... We offer more than 8,000 trips each year, from local chapter activities to adventure travel worldwide, for every ability level and outdoor interest.

The organization counts Richard as one of their many volunteers and he often leads hikes in our vicinity. Hundreds of scheduled activities are listed on their website, including the Mt. Taurus hike:

<http://activities.outdoors.org/search/index.cfm/action/details/id/104973&act=10>

Those who are unable to attend are encouraged to make contacts to the summit. Conditions permitting, QSO's will be made on 20 and 40 meters. Monitor the W2NYW repeater, 146.670 MHz for information. There will also be a call on the repeater for anyone who wishes to attempt 2 meter FM simplex. Once your station is acknowledged, please listen on 146.565 MHz.

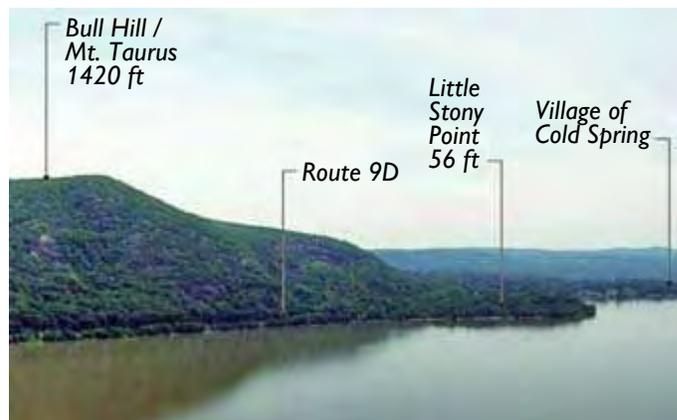
The summit of Mt. Taurus is recognized in the Summits on the Air program (SOTA) and is designated as W2/EH-019. SOTA is a worldwide program that encourages hams to operate from mountainous locations. Additional information about the program is available at: <https://www.sota.org.uk> . SOTA awards points to *activators*



who operate from the summits, *chasers* who contact the activators, and also *shortwave listeners* who copy the summit stations. SOTA maintains a comprehensive listing of real time and planned activations on their SOTAwatch website: <http://www.sotawatch.org> .

Hikers will meet at 10:00 a.m. on Main Street in

Cold Spring, near the Depot Restaurant. The hike will continue approximately six miles and conclude around 3:00 p.m. Participants should expect a steep vertical



*Bull Hill — view showing locations and elevations of Mt. Taurus and Cold Spring. [Picture: NYS Parks]*

ascent, as the summit is 1,420 feet above sea level. Please dress appropriately; pack food and plenty of

water. Hikers are encouraged to bring handheld VHF radios. Many will recall that this trip was planned in December, but cancelled due to snow. In case of inclement weather, contingency plans will be sent to the PCARA Yahoo! Group.



*Topographic map shows location of Bull Hill, Little Stony Point and Cold Spring alongside the River Hudson.*

All are welcome to hike with the group. Bring your family and friends. Please spread the word to hams who may wish to make radio contacts. We also encourage shortwave listeners to send their reports. For more information or to RSVP, please contact Lou Cassetta, [radiocassetta@atgmail.com](mailto:radiocassetta@atgmail.com).

- Lou, KD2ITZ

# Peekskill / Cortlandt Amateur Radio Association

**Mail:** PCARA, PO Box 146, Crompond, NY 10517

**E-Mail:** mail 'at' pcara.org

**Web site:** <http://www.pcara.org>

**PCARA Update Editor:** Malcolm Pritchard, NM9J

E-mail: NM9J 'at' arrl.net

*Newsletter contributions are always very welcome!*

Archive: <http://home.lanline.com/~pcara/newslett.htm>

## PCARA Information

PCARA is a **Non-Profit Community Service**

**Organization.** PCARA meetings take place the first Sunday of each month\* at 3:00 p.m. in Dining Room B of NewYork-Presbyterian/Hudson Valley Hospital, Rt. 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. \*Apart from holidays and July/August break.

## PCARA Repeaters

**W2NYW:** 146.67 MHz -0.6, PL 156.7Hz

**KB2CQE:** 449.925MHz -5.0, PL 179.9Hz

**N2CBH:** 448.725MHz -5.0, PL 107.2Hz

## PCARA Calendar

**Sun Apr 1:** Easter Sunday coordination, Church of the Holy Spirit, 1969 Crompond Rd., Cortlandt Manor. 9:00 a.m.

**Sun Apr 8:** PCARA meeting, NewYork-Presbyterian /Hudson Valley Hospital, 3:00 p.m.

**Sat Apr 14:** PCARA Breakfast, Turco's, Yorktown Hts. 9:00 a.m.

**Sun Apr 15:** PCARA Hike to Taurus Mountain, 10:00 a.m. start.

**Sun Apr 29:** PCARA club table, Orange County ARC Hamfest.

## Hamfests

**Sun Apr 22:** Splitrock ARA North Jersey Hamfest, Roxbury Senior Center, 72 Eyland Avenue. Succasunna, NJ. 8:00 a.m.

**Sun Apr 29:** Orange County ARC Spring Hamfest, Wallkill Community Center, 2 Wes Warren Dr., Middletown, NY. 8:30 a.m.

*PCARA Club table.*

**Sat May 26:** Bergen ARA Spring Hamfest, Westwood Regional HS, 701 Ridgewood Rd, Township of Washington, NJ. 8:00 a.m.

## VE Test Sessions

**Apr 8:** Yonkers ARC, Will Library, 1500 Central Park Ave, Yonkers NY. 1:00 pm. Pre-reg. John WB2AUL, (914) 969-6548.

**Apr 12:** WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.

**Apr 16:** Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.

**Apr 20:** Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY. 6:00 p.m. Contact Joseph J. DeLorenzo (845) 534-3146.

**Apr 28:** PEARL, Mahopac Public Library, 668 Route 6, Meeting Rm 3rd Floor, Mahopac NY. 10:00 a.m.

**Apr 29:** Orange County ARC Hamfest, Middletown NY. 9:00 a.m.



Peekskill / Cortlandt Amateur Radio Association Inc.  
PO Box 146  
Crompond, NY 10517