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This Newsletter is published by the Port Elizabeth Amateur
Radio Society

P.O. Box 10402, LINTON GRANGE, 6015

Editing by Ashley Goosen ZS2AG

**QsX-PE - Newsletter for the discerning
Radio Ham**

Next PEARS Monthly Meeting

Will be at the Italian Club on the 16th January at the Italian Club or tba.



From the Chair

Welcome back! Hard to believe but the New Year is already a week old. I do certainly hope you all have a fantastic 2024. December certainly allowed for a bit of radio time and there were plenty of interesting call signs to choose from on the HF bands. 2m as every December was relatively quiet. For those who don't know as yet, Lady Slipper

Repeater site was once again the victim of thieves and as a result the whole site now has to be rewired and thus the repeater will remain down until this work can be done. We apologise for the inconvenience but it is a situation beyond our control.

A special mention I would like to make is Mitch ZS2DK has been in the white house for major surgery and on behalf of the Club and myself I wish him a speedy recovery.

I would also like to congratulate Andre ZS2BK on becoming the 3rd ZS station of all time to complete his DXCC on Orbiting satellites. This is a tremendous achievement. Well Done Andre!

Ham Classes will start again in February and I am taking names so if you know of anyone interested please ask them to email me their details and I will correspond with them with regards to the course.

I look forward to seeing as many of you as possible on Tuesday 16 January at our first meeting of the year. Please make an effort to attend.

So once again enjoy the hobby, get involved with the Club activities.

Most importantly remember to “Say Hello”!

PEARS, WE LIKE BEING YOUR CLUB

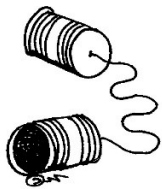
73,

FROM THE EDITOR

Here's wishing you all a belated Happy New Year for 2024 and a happy reading of this edition of QSX. If you have an article or two that you would like published in future copies of QSX, please let me have your contribution by email to qsx.zs2ag@gmail.com. Please do not send me QSX material on WhatsApp as I am inundated with WhatsApp messages and I will miss your material.

Thank you for your continued support of QSX and the articles you have submitted for this issue.

73,



From the JAMTIN.....

It's the start of a new year and already great things are happening at the Jamtin.

ZS2G, ZS2OD have been busy giving the inside and outside a lick of paint which has transformed the rusty Tin into a place of beauty. There has also been a lot of work done to to repair holes in the sides and roof and also fix the roof covering.

The next big steps are a serious cleanup/chuck out inside (again). And then rearranging the furniture to make the pace more useable. We are also looking at suitable branding on the container.

Amongst all this work there was also time to play radio and we managed to make a number of QSO's

The ZS2JIM QRZ log book is now 34 countries with 39 confirmed QSOs. The only continent we have not been able to reach is South America. Closest we got was St Kitts Island in the Caribbean.

Jamtin will be operating for the PEARS uhf/vhf contest 12-14 January, we will cover the results of this in the next edition of From the Jamtin.

We are in the process of formulating a MOU with the 1st Walmer Scouts to cement the relationship we have with the Scouts.

2024 looks like a good year ahead for Jamtin, hopefully there will be an improvement in propagation and we will be able to broaden our ability to speak to the world.

Remember, Jamtin is available for all hams. I am there most Fridays from about 16h00/19h00+. I also try and post my DX contacts on the Technical WhatsApp group so if you are in your shack, you can try make contact as well.

Remember

Jamtin is there for you..... Just say HELLO

73

ZS2JIM

RADIO STATION WWV: ALL TIME, ALL THE TIME

BY DAN MALONEY

SUBMITTED FOR PUBLICATION BY RORY ZS2BL

Of all the rabbit holes we technical types tend to fall down, perhaps the one with the most twists and turns is: *time*. Some of this is due to the curiously mysterious nature of time itself, but more has to do with the various ways we've decided to slice and dice time to suit our needs. Most of those methods are (wisely) based upon the rhythms of nature, but maddeningly, the divisions we decided upon when the most precise instrument we had was our eyes are just a little bit off. And for a true time junkie, "a little bit off" can be a big, big problem.

Luckily, even the most dedicated timekeepers — those of us who feel physically ill when the clock on the stove and the clock on the microwave don't match — have a place to go that's a haven of temporal correctness: radio station WWV. Along with sister stations WWVB and WWVH, these stations are the voice of the US National Institutes for Standards and Technology's Time and Frequency Division, broadcasting the official time for the country over shortwave radio.

Some might say the programming coming from these stations is a bit on the dry side, and it's true that you can only listen to the seconds slip by for so long before realizing that there are probably better things to do with your day. But the WWV signals pack a surprising amount of information into their signals, some of it only tangentially related to our reckoning of time. This makes these stations and the services they provide essential infrastructure for our technological society, which in turn makes it worth your time to look into just how they do it.

FIRST ON THE AIR

Callsign WWV has been around and active longer than US commercial radio itself. WWV was assigned as an experimental license to the National Bureau of Standards, the predecessor of the NIST, back in 1919. By September of 1920, WWV was broadcasting weekly concerts on 600 kHz, beating Pittsburgh station KDKA to the airwaves by a couple of weeks.

In those early days, WWV was very much a solution looking for a problem, alternating between music and farm market reports, and focusing on the Washington, DC area, where the NBS offices were located. In 1922, someone must have noticed that the "S" in NBS stood for "standards," and WWV's signal became a reference frequency standard for other broadcasters in the burgeoning industry. A succession of technological advances gradually increased the accuracy of WWV's signals from a few tenths of a percent to the parts-per-million level, which was vital for allocating spectrum in the gold-rush years of the 20s and 30s.

WWV's signature time programming didn't start until nearly the end of WWII. Shortly thereafter, In 1948, station WWVH went on the air from the Hawaii Territory, in a nod to the country's growing interest in events in the Pacific Basin. It wasn't until 1950 that Morse time announcements gave way to the now-familiar voice time announcements; by the late 50s, frequency control on the station's 5 MHz, 10 MHz, and 15 MHz frequencies was better than 200 parts per billion.

In 1966, the station moved to its current location in Fort Collins, Colorado, only about 80 km away from the NIST laboratories in Boulder, Colorado that house the US standards for time and frequency. The relocation put WWV on the same site as WWVB, a low-frequency (60 kHz) station that transmits nothing but encoded time signals at a scorching 70,000 watts effective radiated power (ERP). WWVB is designed to reach the entire United States for at least part of every day, and if you've got a "radio-controlled" clock or watch, chances are it's listening to WWVB.

ATOMICALLY ACCURATE

The heart of WWV and WWVB operation in Fort Collins centers around the "Screen Room," a Faraday cage-shielded room housing the station's cesium frequency standards and time code generators. The three redundant oscillators derive their time and frequency information from the NIST Time Scale, called "UTC(NIST)," maintained at the Boulder NIST lab using a suite of hydrogen maser and cesium oscillators, which in turn are calibrated against a cesium fountain oscillator. The station oscillators are compared to UTC(NIST) every day and corrected as needed. Only one oscillator serves as the station master at a time; a supervisory system monitors the output of each oscillator and automatically promotes one of the backups to master status if anything goes wrong with the time signal.

The station master cesium oscillator is the heartbeat of the entire system. Its 5 MHz signal — actually, at 1 part in 10^{14} , that's 5.000000000000000 MHz — gets divided down to multiple reference frequency signals that control both time code

generators and transmitter carrier frequencies. WWV currently broadcasts on 2.5 MHz, 5.0 MHz, 10.0 MHz, 15.0 MHz, and 20.0 MHz, with an experimental signal at 25.0 MHz; WWVB still operates at 60 kHz.

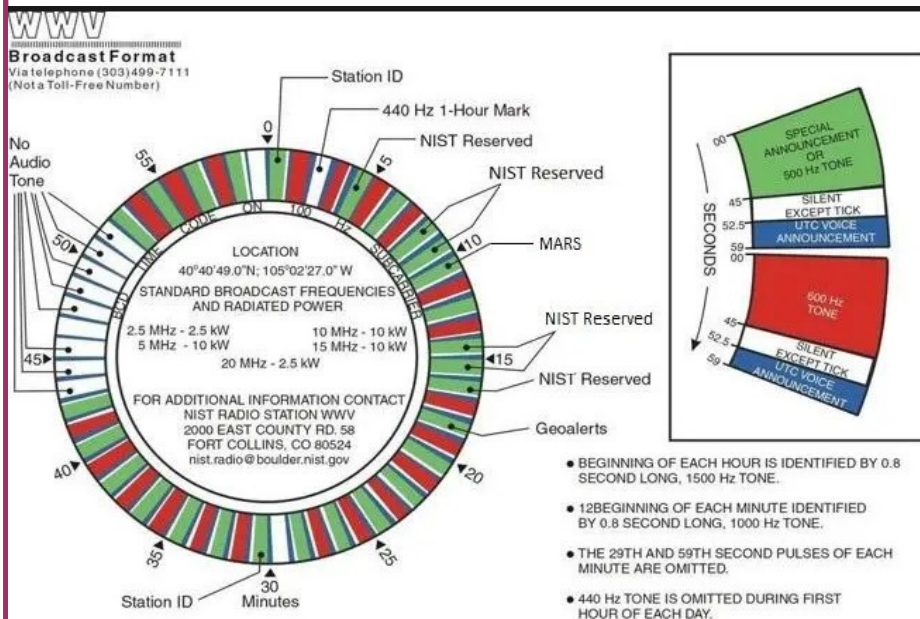
Audio time signals and voice announcements are generated by the time code generators in the Screen Room. WWV uses a male voice for time announcements while WWVH, which transmits on some of the same frequencies, uses a female voice to avoid confusion. The announcements are concatenated from digitally recorded phrases spoken by professional announcers; WWV currently uses the golden voice of Atlanta's John Doyle.

SOUNDS AROUND THE CLOCK

While the voice announcements on WWV are certainly its biggest draw, there's so much more going on in these signals. The audio signals are carefully engineered to relay the maximum amount of information in the most flexible way possible, giving users access to all sorts of valuable information. The most obvious component of the audio signal is the constant tick of seconds. Each tick is really a 1,000 Hz sine wave that lasts for five milliseconds — a mere five cycles — which sounds like a tick. The seconds signal sounds every second of each minute, except for the 29th and 59th seconds, and for whenever a leap second is called for. At the top of each minute, the seconds pulse is changed to a 1,5000 Hz tone and extended to 800 ms. For the first sixteen seconds of every minute, you might hear double clicks for certain seconds, which serve as correction indicators between Coordinated Universal Time (UTC) and UT1, a time standard based on the rotation of the Earth. The number of doubled clicks tell you how many tenths of a second UTC and UT1 differ by; if the clicks are doubled from seconds 1 through 8, that means UT1 is ahead of

UTC, while seconds 9 through 16 indicate that UT1 is lagging.

In addition to the ticks, the audio signal contains an audio tone that changes depending on the minute of the hour. Tones alternate between 500 Hz for the even-numbered minutes and 600 Hz for odd, with a 440 Hz “A440” tone used for the second minute of each hour. Certain other minutes are blocked out as reserved as well, but generally contain the tone normally designated for that minute. The audio tones, which can be used to calibrate audio equipment, are suppressed for one minute during the station identification announcements at the top of the hour and 30 minutes, and are suppressed entirely from 43 to 51 minutes and again for minute 59. The idea behind these blocks of silence is to prevent interference with WWVH’s signal, while the switch to A440 once each hour is meant to be used as a



WWV by the hour. Every minute is jammed with all sorts of useful stuff. Source: **NIST**

WWV also devotes several minutes of each hour to special announcements by official government agencies. Each announcement gets a 45-second block. Storm warnings from the National Weather Service are broadcast during minutes 8-11 when needed, with updates on GPS constellation status and geophysical alerts going out on minutes 14, 15, and 18. There's also an interesting project called [the WWV/WWVH Scientific Modulation Working Group](#), which aims to broadcast special signals once per hour (8 past the hour for WWV, 48 past for WWVH) to study the ionosphere and propagation. The signal is a series of chirps, tone sweeps, and broadband noise developed with the help of [Ham Radio Citizen Science Investigation](#). Watch out — the audio is quite loud.

In addition to the audible content, WWV sends out a separate coded time signal. The signal is continuously transmitted as a 100 Hz tone that uses binary-coded decimal (BCD) format. Each bit is squeezed into the space after the seconds tick finishes and consists of the 100 Hz tone at two different amplitudes. The length of time the tone stays at the high amplitude indicates whether the bit is a binary one or zero, or a “marker” bit. A full frame of time code data takes 59 seconds to send, with each frame containing fields for hours, minutes, and seconds, plus the day of the year, last two digits of the current year, flags for Day Saving Time and leap years, and the UT1 correction factor and sign. WWVB, whose only business is sending these time signals, has a slightly different frame arrangement, but uses the same encoding scheme.

All things considered, the amount of information jammed into WWV's audio signal is pretty amazing. It's also kind of fun to realize that WWV's signal can be consumed on so many different levels, from the casual listener just wanting to know the time to control of automatic systems and calibration of systems ranging from audio frequencies all the way into the lower reaches of the VHF band.

Birthdays and Anniversaries

Birthdays

January

17 Albie Gipson ZS2AZ

20 Barry Murrell ZS2EZ

23 Paul Schoeman ZS2PS

27 Ulrich Ann ZR2A

February

02 Paul Swart ZS2JD

02 Paul Galpin ZS2PG

04 Shaun Gilbert ZS2SG

04 Ivan Newman ZS2ILN

10 Regardt van Heerden ZS2RH

14 Arno Du Preez ZS2ABT

17 Jeffrey Ferreira ZR2JEF

18 Peter Flynn ZS2PF

19 Gary Laaks ZS2GRL

Spouse Birthdays

January

24 Suzette Greyling Bennie ZR2BC

February

02 Ginny Pullinger ZS2GIN Pat ZS2PJP

06 Neels Kruger Patricia (Patsy) ZS2PTY

07 Joan Bowles ZR2ABA Allan ZS2BO

08 Tracey Hartwig ZS2TAH Trevor ZS2 TJ

12 Jackie Norton Rory ZS2BL

Anniversaries

January

17 Jimmy Barbara De Scande ZS2JIM

19 Tejas Dixeeta Gajjar ZS2TG

22 Andre Renett van Deventer ZS2BK

February

01 Nico Lizette Oelofse ZS4N

08 Jan Sonya Swart ZS2JS

15 Christopher Vanessa Scarr ZS2AAW

DISCLAIMER

Please note:

The Editor, nor any PEARS club member shall be held liable for errors and/or omissions in any article and/or drawing contained in this newsletter. Furthermore, any view expressed is not necessarily that of the Editor, any committee member or other members of the Club. The material contained in this newsletter is not meant to defame, purge, humiliate and/or hurt someone's person or feelings.

If copy is unintentionally infringed, we apologise. The newsletter is published as a free service to Amateur Radio Operators and friends.

SUNDAY SARL AND MONDAY
EVENING PEARs
BULLETINS

PEARs provides a local reading of the SARL bulletin every Sunday morning at 8:15 in Afrikaans read by Kevern ZR2BK and 8:30 in English read by Rory ZS2BL, transmitted through the Town 2M Repeater on 145.650MHz.

PEARs bulletins are transmitted on Monday evenings at 20h00 on the Lady's Slipper repeater, 145.700 MHz, 88.5Hz, Narrow and 438.700 MHz, no CTCSS Wide. (Standby option is 145.650MHz Town repeater 88.5Hz, Narrow)

Bulletin Roster

22-Jan	Ashley	ZS2AG
29-Jan	Jimmy	ZS2JIM
05-Feb	Paul	ZS2PS
12-Feb	Rory	ZS2BL
19-Feb	Donovan	ZS2DL
26-Feb	Kevern	ZR2BK
04-Mar	Chris	ZS2AAW
11-Mar	Mike	ZS2MIC
18-Mar	Dave	ZS2DH

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Our 2023/2024 PEARS Committee

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PEARS' VHF/UHF, Packet & Other Services

Local Repeaters: These repeaters form a separate sub-net in the PE - Uitenhage - Despatch area.

Town VHF 145.050/650 88.5Hz, Narrow 12.5k	Longmore 145.025/625 88.5Hz, Narrow 12.5k	Uitenhage 145.075/675 Wide 25k	Town UHF 431.050/438.650 Wide 25k	<---- IRLP available on this subnet
Cockscomb 431.000/438.600 Add 88.5Hz for squ tail	Viewlands 431.075/438.675 Add 88.5Hz for squ tail	<---- These form linking hubs for events, hence no tail	DMR 430.675/438.275 QTH: ZS2VA	D-Star 145.175/775 QTH: ZS2N

Cape Linked System Repeaters:

These form the PEARS long-range 2-metre repeater system, in conjunction with the Border, Southern Cape and WCRWG systems. See www.zs2pe.co.za/Repeaters/repeaters.htm for more details.

Lady's Slipper 145,100/700 88.5Hz, Narrow 12.5k	Grahamstown 145,150/750 Wide 25k	Cradock 145,050/650 Wide 25k	Noupoort (link only) 438,750 / 438,675 Wide 25k
Colesberg 431,075/438,675 Wide 25k	Kareedouw 145,125/725	Plett 145,175/775	Brenton 145,075/675

APRS/Packet network:

ZS0NTP Node Lady's Slipper 434,800 1200bd 439.850 9600 bd	ZS0KDK APRS Digi Mount Road 434,800 1200bd	ZS0KDB APRS Digi Longmore 434,800 1200bd	
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VHF Beacon: 50,007 MHz FSK – ZS2X, 25 Watts into 2 element Yagi beaming north.

Banking details (for subs & donations): NEDBANK SAVINGS ACCOUNT No. 221 252 7594, Bank code 121217, A/C name: Port Elizabeth Amateur Radio Society. **Please use call signs as a reference.**