

Radio ZS

Volume 79, No 9 September 2026



Why a Battery weighs more when it is Charged

RigExpert



RigExpert distributors since 2015 We endeavour to beat any price!

Try us for any hand tools, power tools, soldering equipment and measuring equipment, as well as all related consumables. Dedicated onsite factory making rucksacks and toolbags for technicians.

Agents for Bosch, Ryobi, Makita, DeWalt, Weller, Magnum, etc.



www.hottools.co.za



Radio ZS

The Journal of the South African Radio League
Die Tydskrif van die Suid-Afrikaanse Radioliga

“Advancing the Spirit of Amateur Radio Through Innovation”



Volume 79, No 9 September 2026

Editor: Dennis Green, ZS4BS radiozs@sarl.org.za

In this issue

- | | |
|---|--|
| <p>4. What's happening in September?</p> <p>5. Silent Keys and Amateur Radio News</p> <p>7. Our Volunteers</p> <p>8. SARL News / SARL Nuus</p> <p>9. Veranderinge aan die Radio Amateur Eksamen prosedure</p> <p>10. 'n Uitnodiging aan al die Dames in Amateur Radio in Suid-Afrika</p> <p>10. Why a Battery weighs more when it is Charged</p> <p>12. The Importance of Ham Radio in Modern Times</p> <p>14. The ZS6BVR Field Strength Meter</p> <p>15. Amateur Radio Abroad: Unlimited Radio Operations on Vacation</p> <p>19. Awards from the Namibian Amateur Radio League</p> <p>23. Why Is Ham Radio Critical For STEM Education</p> <p>29. 2026 JOTA/JOTI and CQ Hou Koers</p> <p>30. ZS SOTA Winter and Queen of the Mountain Weekend 2026</p> <p>31. The Spring ZS SOTA Activity Weekend</p> <p>32. Help with project review</p> <p>34. Amateur Radio at the Second Africa Rover Moot</p> | <p>36. ZS6STN in Your Pocket</p> <p>42. The Worked Zone 38 Award</p> <p>43. Effective Communication - The Crux of Field Day</p> <p>45. Amateur Radio has never been more Affordable</p> <p>54. Amateur Radio in STEM Education</p> <p>57. Meet the CubeSatSim</p> <p>61. ClubTalk: Beyond the Weekly Net</p> <p>63. Zero-gravity CW paddles?</p> <p>65. The YL.Beam</p> <p>68. Focus On She Means Business</p> <p>69. Youth and STEM Education Leaders at 2026 HamX</p> <p>71. What is FreeDV?</p> <p>73. ZS1CRG at the Cape Point Lighthouse</p> <p>76. BACAR 14: Mission Skybridge</p> <p>77. HF Update</p> <p>80. 4 pin crystal oscillators</p> <p>82. The Museum Column: The Radio Set B25 SA and Radio Set B26 SA</p> <p>86. Lighthouse: The Lighthouse that moved 880 metres in 23 Days</p> <p>91. Everyday multimeter and its maintenance</p> <p>95. Route 66 on the Air 2026</p> <p>96. That' all Folks!</p> |
|---|--|

On the Cover. Guy Eales, ZS6GUY showing amateur radio to Rovers at the Second African Rover Moot.

Op die Voorblad. Guy Eales, ZS6GUY, wys amateur radio aan Rovers by die Tweede Afrika-Rover-Moot.

Disclaimer. The opinions expressed in this publication do not necessarily reflect the official view of the South African Radio League and the South African Radio League cannot be held responsible for incorrect information published.

South African Radio League Suid-Afrikaanse Radioliga

Founded 20 May 1925
Gestig 20 Mei 1925

The National Body for Amateur Radio in South Africa
Member Society of the IARU Region 1

Die Nasionale Liggaam vir Amateur Radio in Suid-Afrika
Lidvereniging van die IARU Streek 1

The National Amateur Radio Centre
Sender Technology Park, Octave Street, Radiokop
PO Box / Posbus 1721,
Strubensvallei 1735
South Africa / Suid-Afrika
<https://mysarl.org.za/>

Office Administrator:
Kelley Dorey

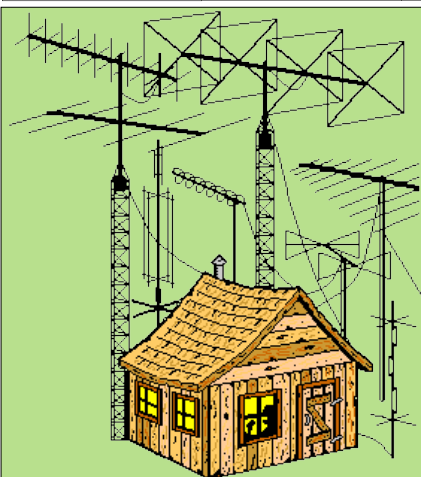


Telephone/Telefoon: 087 822 1464 or 072 023 5995
E-mail/E-pos:
admin@sarl.org.za

President:
Guy Eales, ZS6GUY
Vice President/Vise-President
Phillip van Tonder, ZS6PVT
Treasurer
Corrie de Beer, ZS6CDB
Secretary/Sekretaris
Dennis Green, ZS4BS
secretary@sarl.org.za
Members/Lede
Rassie Erasmus, ZS1YT
Noel Hammond, ZR6DX
Chris Turner, ZS6GM
Nico van Rensburg, ZS6QL
Karel Bezuidenhout, ZS6WN
Gary Immelmann, ZS6YI

September 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30 Worldwide Digital Con-test	31	1 	2 Secretary's Day	3	4	5 the SARL National Field Day, RSGB SSB Field Day, Region 1 Field Day 
6 the SARL National Field Day, RSGB SSB Field Day, Region 1 Field Day 	7	8	9	10	11	12 the European SOTA Day and the Africa FT4 DX Contest
13	14	15 The October RAE registration closes	16	17	18 IARU Region 1 General Conference 	19 Region 1 GC and the ZS SOTA Activity Weekend 
20 Region 1 GC and the ZS SOTA Activity Weekend 	21 International Day of Peace, Region 1 GC	22 Region 1 GC	23 Spring Equinox; Region 1 GC; provincial schools close; International Day of Sign Languages	24 National Braai Day; Region 1 GC 	25	26 World Maritime Day and the CQ WW RTTY contest 
27 World Tourism Day and the CQ WW RTTY contest 	28	29	30 International Translation Day	1	2	3 the East Rand Boot Sale 



ZS2BL's SA Hamshack

(Ye Olde Radio Shoppe)

Direct importer of a wide selection of SWR metres, HF, VHF and UHF base and mobile antennas. Amateur radio transceivers, antenna analysers, etc.

Affordable shipping costs for out of town customers and subsidized shipping to SARL members.

Check out all my amateur radio goodies at

<http://www.sahamshack.co.za/index.htm>

and contact me on 072 026 8909 or zs2bl@sahamshack.co.za

Silent Keys / Stil Sleutels

They shall grow not old as we that are left grow old
Age shall not weary them nor the years condemn
At the going down of the sun and in the morning
We will remember them."

Hulle word nie oud soos ons wat bly vergrys,
Die jare sal hulle nie raak nog die tyd se eis
En, soos die son sak of die môre ontvou,
Eer hul herinnering – ons sal onthou."



Angus Dick, ZS5GV
Thinus Wessels, ZS4TW
Maureen Bellingham, ZR1MYB
Geoff Wagner, ZS5AGM

The 27th IARU Region 1 General Conference

The 27th IARU Region 1 General Conference will take place at the Austria Trend Parkhotel Schönbrunn in Vienna, Austria, from Saturday 19 September to Wednesday 23 September 2026. The Conference will be an in-person meeting with online streaming of the C3 and Plenary meetings.

Conference Papers are available on the conference website at <https://conf.iaru-r1.org/documents/>, as well as <https://mysarl.org.za/special-interest-groups/>. The papers are organized by committee: C2 Credentials and Finance, C3 General Administrative, C4 HF, C5 VHF+, C7 EMC and C8 Youth. Members are invited to download and review the documents and send comments or suggestions to secretary@sarl.org.za.

The Committees will look at the extension of the 40 m frequency allocation for amateur radio in ITU Regions 1 and 3, occupied bandwidth in the frequency range below 30 MHz, the use of the 23 cm band in amateur radio, the UHF Spectrum Situation, the 23 cm band plan working group report, Spectrum Protection, Establishing Morse Code as an Intangible Heritage, the Harmonised Amateur Radio Examination Certificate and more.

The 44th AMSAT Space Symposium

The 44th AMSAT Space Symposium and Annual General Meeting will be held between 8 and 11 October 2026, at the Wyndham Jacksonville Hotel & Conference Centre in Jacksonville, Florida, USA.

More AMSAT SA Space Symposium presentations are now available on You Tube

More presentations delivered at the 2026 AMSAT SA Space Symposium are now available on



the AMSAT SA YouTube channel. They are the HamSCI Personal Space Weather Station, Amateur Radio Pico Balloons – sending data from near space, International Telecommunications Union and WRC27 and Progress on the new Matjiesfontein ground station and expansion of the Hartebeesthoek ground station.

The presentation by Anton Janovsky, ZR6AIC entitled "The quest of efficient powering of satellites" has now been added. He discusses the innovative approach to a satellite power systems, how to maximise the power delivered from the solar panels and the overall protection of the system. More will follow during next week.

The URL's can be found on www.amsatsa.org.za

Newsflash from Icom Japan

The long-anticipated Icom X026 concept radio that has been promoted will finally be revealed at the Tokyo Ham Fair in Japan later this month. This exciting new product has amateur radio operators

(Continued on page 6)

(Amateur Radio News from page 5)

from around the world guessing. Based on clues shown at US, German and UK amateur conventions, it seems the wait will be worth it.

Most experts suspect this brand-new Icom radio will be modelled on the legendary Icom 706 and its variants, packed with the latest modern technology. It might just be the next legend in the making. Search YouTube for the official unveiling at the Tokyo Ham Fair at 01:30 UTC on Saturday 29 August.

Student-Built JAMX01 and BY70-4 Set for 25 August Launch

Two Chinese science-education satellites carrying amateur radio communications systems are scheduled for launch from the Taiyuan Satellite Launch Centre on 25 August aboard a Long March 6C rocket.

The first, known as Jing'an Dream Star and carrying the JAMX01 amateur radio payload, is the result of a multi-year education project involving students in Shanghai's Jing'an District. The project began in 2019 as an effort to give students hands-on experience with satellite development, radio communications, tracking and spacecraft operations. Students and teachers are traveling to Taiyuan to participate in tracking and control activities associated with the mission.

According to the IARU Amateur Satellite Frequency Coordination database, JAMX01 was developed by students from Jing'an District together with amateur radio participants, with support from the Youngster Activity Centre of Jing'an District, Shanghai. The approximately 50-kilogram microsatellite will support telemetry, digital image transmissions and an FM digipeater. It also carries navigation lights and a kaleidoscope experiment intended for science-education activities.

The following frequencies have been coordinated for JAMX01:

- ♦ 145,950 MHz - FM digipeater uplink
- ♦ 435,075 MHz - beacon and SSTV downlink
- ♦ 435,175 MHz - FM digipeater downlink
- ♦ 435,500 MHz - telemetry downlink

IARU frequency coordination for JAMX01 was completed on 6 January 2025.

Shanghai officials say the spacecraft is expected to operate at approximately 500 kilometres altitude. Project organizers also describe several unusual educational experiments aboard the

satellite, including a system designed to make the spacecraft visible as a flashing point of light, a kaleidoscope payload and recorded youth voices for use in space-based broadcasts.

A second educational microsatellite, BY70-4, also known as 8104, BY-04 and Harbin MicroSat, is expected to fly on the same launch. The spacecraft was developed by the LilacSat Team at Harbin Institute of Technology and has a mass of approximately 18,7 kilograms. SatNOGS lists a high-definition camera, miniature camera, polarization camera, educational display and short-message transponder among its payloads. The miniature camera is capable of JPEG and SSDV image transmission.

SatNOGS currently lists a UHF telemetry downlink for BY70-4 on 437,443 MHz using 9 600 bps BPSK, with a format compatible with ASRTU-1. The spacecraft team has said in the Libre Space Community that BY70-4 is intended to share the frequency coordination previously used by BY70-3, which has re-entered. The public IARU coordination database, however, presently shows the 437,443 MHz coordination under BY70-3 and does not contain a separate BY70-4 record. Operators should therefore watch for any additional coordination or operating information issued before or after launch.

Information on JAMX01 is available from the IARU Amateur Satellite Frequency Coordination database at

https://iaru.amsat-uk.org/formal_detail.php?serialnum=1009

The Shanghai Jing'an District announcement is available at

www.jingan.gov.cn/sy/004009/004009010/004009010001/20260813/f8989d84-fce0-46e6-afba-c4e654267a9d.html

SatNOGS information for BY70-4 is available at <https://db.satnogs.org/satellite/EMBU-7314-7883-5821-1365/>

Launch discussion and spacecraft-team information are available from the Libre Space Community at <https://community.libre.space/t/cz-6c-launches-jamx01-2026-08-25-03-30utc/15173>

[ANS thanks the Shanghai Jing'an District Government, the IARU Amateur Satellite Frequency Coordination service, SatNOGS and members of the Libre Space Community for the above information]



Working Groups and Coordinators

Amateur Radio Today: Hans van de Groenendaal, ZS6AKV artoday@sarl.org.za.

ART Relays: Louis Veldkamp, ZR4DJL and Andy Cairns, ZS6ADY

Awards: Tjerk Lammers, ZS1J

Contest WG: Johan Bezuidenhout, ZS6JBZ; Gerhard Coetzee; ZS3TG; Phillip van Tonder, ZS6PVT; Phillip Fischer, ZS6FY; Danie Schnetler, ZS6DPS

Database: Colin de Villiers, ZS6COL

Forum: Roger Conroy, ZR3RC and Andy Cairns, ZS6ADY

IARU IWS:

QSL Manager: Gert du Plessis, ZR6GRT

RAE and Training: Donovan van Loggerenberg, ZS2DL rae@sarl.org.za

Regulatory WG: Hans van de Groenendaal, ZS6AKV; Leon Lessing, ZS6LMG; James Archibald, ZS6NS and Peter Leonard, ZS5PL

Reno Faber Station: Philip van Tonder, ZS6PVT

Repeater Co-ordination:

SARL Beacon Project Manager: Brian Jacobs, ZS6YZ

SARL Hamnet: Brian Jacobs, ZS6YZ; Michael Taylor, ZS1MJT; Andrew Gray, ZS2G; Rickus de Lange, ZS4A; Keith Lowes, ZS5WFD; Gert Botha, ZS6GC and Leon Lessing, ZS6LMG

SARL/ICASA Liaison: Hans van de Groenendaal, ZS6AKV; Nico van Rensburg, ZS6QL and Colin de Villiers, ZS6COL

SARL News/SARL Nuus: Dennis Green, ZS4BS; Dave Reece, ZS1DFR; Rory Norton, ZS2BL; Andy Cairns, ZS6ADY; Vivian Dold, ZS6VD; Herman Erasmus, ZS6CTA; Paul Johnson, ZS1S; Irene Myburg, ZS6IEA; Deon Erwin, ZS1ZL; Christo de Witt, ZS3CDW, Hannes Enslin, ZS6JDE and Kevern Burger, ZR2BK

SARL VHF and Above Records: Bernie vd Walt, ZS4TX

Swap Shop: Rassie Erasmus, ZS1YT

Youth/Jeuq: Vacant

Radio ZS Awards

The Gary Immelman RA Heritage Award Floating Trophy awarded by the SARL Council for the best article of a historic nature describing an event that occurred more than five years previously or an interesting personality that has played an important part in the development of Amateur Radio in years gone by. Donated by Gary 1993.



The JJ Pienaar Trophy awarded by the Editor for the best article published in Radio ZS during the past year.

The Radio ZS Shield awarded by the Editor to a South African Radio League affiliated Club or member who best supported Radio ZS during the year. Donated by the Port Elizabeth Branch in 1966.

Radio ZS

Radio ZS is a forum for South African Radio League members to share their amateur radio experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on e-mail are especially welcome. Material may be submitted in MS Word, Open Office or rtf format, using Calibri 12 pt and English (South Africa). Material may be e-mailed to radiozs@sarl.org.za. The League cannot be responsible for loss or damage to any material.

<https://mysarl.org.za/radio-zs-archives/>.

Use of Articles in Radio ZS. Other IARU Member Societies may on written approval from the author and the editor of Radio ZS, reproduce material published in paper or digital form, for which the publishing author holds the copyright.

Such approval shall not unreasonably be withheld. Material taken for other Member Societies' publications in this way shall have a source and originator acknowledgement included on publication.



SARL News Bulletins / SARL Nuus Bulletins

The South African Radio League, ZS6SRL broadcasts a news bulletin every Sunday in Afrikaans and English at 08:15 and 08:30 Central African Time respectively, on HF and various VHF and UHF repeaters around the country. The bulletin is relayed on EchoLink and AllStar Node 53511 by Johan, ZS6JPL. Audio bulletins can be downloaded from <https://sarlnews.podbean.com>, while the text bulletin is available at <https://mysarl.org.za/sarl-news/>.



Die Suid-Afrikaanse Radioliga, ZS6SRL saai elke Sondag 'n nuusbulletin uit in Afrikaans en Engels om onderskeidelik 08:15 en 08:30 Sentraal-Afrikaanse Tyd, op HF en verskeie VHF- en UHF-herhalers regoor die land. Die bulletin word deur Johan, ZS6JPL, op EchoLink en AllStar Node 53511 herlei. Oudio bulletins kan afgelaai word vanaf <https://sarlnews.podbean.com>, terwyl die teks bulletin beskikbaar is by <https://mysarl.org.za/sarl-news/>.

We invite clubs and individuals to submit news items of interest to radio amateurs and shortwave listeners, in both English and Afrikaans where possible, by uploading the news item at <https://mysarl.org.za/news-inbox/> and/or by sending items to news@sarl.org.za no later than Friday morning preceding the bulletin date.

Ons nooi klubs en individue uit om nuusitems van belang vir radioamateurs en kortgolfluisteraars in te dien, waar moontlik in beide Engels en Afrikaans, deur die nuus item op te laai by <https://mysarl.org.za/news-inbox/> en/of deur items na news@sarl.org.za te stuur nie later nie as Vrydagoggend voor die bulletin datum.

You are welcome to join us every Sunday morning for the weekly radio programme Amateur Radio Today at 10:00 CAT. The programme can be heard on VHF and UHF repeaters countrywide and is relayed on 7 115 kHz lower sideband by Louie, ZR4DJL.

Jy is welkom om elke Sondagoggend by ons aan te sluit vir die weeklikse radioprogram Amateur Radio Today om 10:00 SAT. Die program kan landwyd op VHF- en UHF-herhalers gehoor word en word op die 7 115 kHz laer syband deur Louie, ZR4DJL, herlei.

In Cape Town, you can listen at 10:30 CAT on the 145,700 MHz repeater, with EchoLink to ZS1DCC-R by Dave, ZS1DFR.

In Kaapstad kan jy om 10:30 SAT op die 145,700 MHz-herhaler luister, met EchoLink na ZS1DCC-R deur Dave, ZS1DFR.

A rebroadcast by Andy, ZS6ADY, can be heard on Monday evenings at 19:30 CAT on 3 620 kHz.

'n Heruitsending deur Andy, ZS6ADY, kan Maandagaande om 19:30 SAT op 3 620 kHz gehoor word.

In Bloemfontein, you can listen on the 145,7625 MHz repeater at 08:15 for SARL News and at 10:00 CAT for AR Today.

In Bloemfontein kan jy om 08:15 op die 145,7625 MHz-herhaler na SARL Nuus luister en om 10:00 SAT na AR Today.

The weekly SARL News Bulletins

Subscribe at

sarlcommunications+subscribe@groups.io

Get a copy <https://mysarl.org.za/sarl-news/>

Die weeklikse SARL Nuusbulletins

Teken in by

sarlcommunications+subscribe@groups.io

Kry 'n kopie <https://mysarl.org.za/sarl-news/>

The weekly HF Happenings Newsletter

Subscribe at HFHappenings+subscribe@groups.io

Get a copy <https://mysarl.org.za/hf-happenings/>

Die weeklikse HF Happenings Nuusbrief

Teken in by HFHappenings+subscribe@groups.io

Kry 'n kopie <https://mysarl.org.za/hf-happenings/>

VHF, UHF and Microwave Record Table

The latest table of records is available from the VHF SA Record page. Visit http://www.sarl.org.za/public/local/VHF_SA_Records.asp. Compiled and updated by Bernie, ZS4TX. Send your record claim to

Changes to the Radio Amateur Examination procedure

Veranderinge aan die Radio Amateur Eksamen prosedure

Registration for the 10 October 2026 Radio Amateur Examination (RAE) is now open. Please note that several important changes have been introduced to the examination and licensing process.

From the October 2026 RAE onwards, candidates will be responsible for registering on the ICASA website <https://online.icasa.org.za/> and submitting their own amateur radio licence applications.

As a result, the examination fees have been reduced to R500 for the Class A examination and R450 for the Class B examination. Candidates who successfully pass the examination will now pay the applicable ICASA application and licence fees directly to ICASA.

After the examination papers have been marked, successful candidates who have also completed the required HF assessment will receive the necessary SARL certificates. These certificates must then be uploaded by the candidate as part of their licence application on the ICASA website.

Candidates who pass the RAE will also receive one year's complimentary membership of the South African Radio League (SARL) once they have provided the SARL with their ICASA licence number and allocated call sign.

A PowerPoint presentation explaining the ICASA registration and amateur radio licence application process will be made available shortly. Presenters of RAE training courses are kindly requested to assist candidates with the ICASA registration and licence application process and, where possible, include a short presentation on these procedures as part of their course.



Registrasie vir die Radio Amateur Eksamen (RAE) van 10 Oktober 2026 is nou oop. Let asseblief daarop dat verskeie belangrike veranderinge aan die eksamen- en lisensiëringsproses aangebring is.

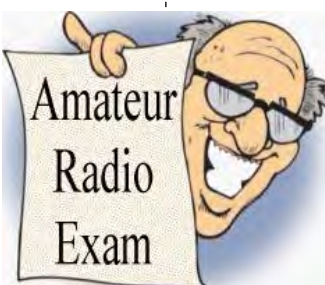
Vanaf die Oktober 2026 RAE sal kandidate verantwoordelik wees om op die OKOSA-webwerf <https://online.icasa.org.za/> te registreer en hul eie amateur radio lisensie-aansoeke in te dien.

Gevolgtik is die eksamengelde verminder tot R500 vir die Klas A-eksamen en R450 vir die Klas B-eksamen. Kandidate wat die eksamen suksesvol slaag, sal nou die toepaslike OKOSA-aansoek- en lisensiegelde direk aan OKOSA betaal.

Nadat die eksamenvraestelle gemerk is, sal suksesvolle kandidate wat ook die vereiste HF-assessering voltooi het, die nodige SARL-sertifikate ontvang. Hierdie sertifikate moet dan deur die kandidaat as deel van hul lisensie-aansoek op die OKOSA-webwerf opgelaa word.

Kandidate wat die RAE slaag, sal ook een jaar gratis lidmaatskap van die Suid-Afrikaanse Radioliga (SARL) ontvang sodra hulle die SARL van hul OKOSA-lisensienommer en toegekende roepsein voorsien het.

'n PowerPoint-aanbieding wat die OKOSA-registrasie- en amateur radio lisensie-aansoekproses verduidelik, sal binnekort beskikbaar gestel word. Aanbieders van RAE-opleidingskursusse word vriendelik versoek om kandidate met die OKOSA-registrasie- en lisensie-aansoekproses te help en, waar moontlik, 'n kort aanbieding oor hierdie prosedures as deel van hul kursus in te sluit.



An Invitation to all Ladies in Amateur Radio in South Africa 'n Uitnodiging aan al die Dames in Amateur Radio in Suid-Afrika

We are working on a special section for the *History of Amateur Radio in South Africa* project, dedicated to the stories of the ladies who have become part of this wonderful hobby over the years. Every lady has a unique story and we would love to hear yours.

Tell us about your journey in Amateur Radio

- ♦ when and where did you obtain your licence?
- ♦ what first attracted you to Amateur Radio?
- ♦ who encouraged or helped you along the way?
- ♦ what were your first call sign and your first radio?
- ♦ which Amateur Radio memories stand out most?
- ♦ were you involved in a club or other Amateur Radio activities?
- ♦ what friendships and special people have you met through Amateur Radio?
- ♦ and, of course, tell us anything else you would like to leave for future generations.

We do not only want to preserve the history of the technology and major events. We also want to remember the ladies behind the microphone. Your story forms part of our history. If you are willing to share your experiences, please email them to Anette Jacobs, ZR6D at jhjacobsza@gmail.com.

Photographs, old licences, QSL cards, club photographs and other memorabilia are also welcome. Let us ensure that the stories of the ladies of South African Amateur Radio are preserved for future generations.

Ons is tans besig met 'n spesiale gedeelte van ons Geskiedenis van Amateur radio in Suid-Afrika – die verhaal van die dames wat deur die jare deel geword het van hierdie wonderlike stokperdjie. Elke dame het haar eie unieke verhaal. Ons wil graag jou storie hoor.

Vertel ons van jou reis in amateur radio

- ♦ wanneer en waar het jy jou lisensie verwerf?
- ♦ wat het jou die eerste keer tot amateur radio aangetrek?
- ♦ wie het jou aangemoedig of gehelp?
- ♦ wat was jou eerste roepsein en jou eerste radio?
- ♦ watter amateur radio-herinneringe staan die meeste uit?
- ♦ was jy betrokke by 'n klub of ander amateur radio-aktiwiteite?
- ♦ watter vriendskappe en spesiale mense het jy deur amateur radio ontmoet?
- ♦ en, natuurlik, vertel ons enigiets anders wat jy vir toekomstige geslagte wil nalaat.

Ons wil nie net die geskiedenis van die tegnologie en groot gebeurtenisse bewaar nie. Ons wil ook die dames agter die mikrofoon onthou. Jou verhaal is deel van ons geskiedenis. As jy bereid is om jou verhaal te deel, stuur dit asseblief aan Anette Jacobs, ZR6D by jhjacobsza@gmail.com.

Foto's, ou lisensies, QSL-kaarte, klub foto's of enige ander herinneringe is ook baie welkom. Kom ons sorg dat die stories van die dames in Suid-Afrikaanse amateur radio nie verlore gaan nie, maar saam met ons geskiedenis bewaar word vir die volgende geslagte. Ons sien baie daarna uit om van julle te hoor!

Why a Battery weighs more when it is Charged

John VA3KOT

It is the middle of December as I write this. My backpack radio kit has not had a good workout since I last took it out in the field for a Parks On The Air (POTA) session a couple of months ago. But we got lucky with the weather one day this past week. The temperature got up to 14 degrees Celsius before strong winds brought in a Colorado low and took the mercury back down to the freezing zone.

I got a chance to set up as a "Backyard On The Air" station to test a new portable antenna I had

Points to
Ponder



(Continued on page 11)

(Why a Battery weighs more from page 10)

built for next summer's outdoor operating season. My Bioenno LiFePO₄ battery was freshly charged for the occasion and I was eager to get out on the deck and fire up the rig to see how well the new antenna would perform.

The Common Cold virus had invaded my bloodstream, I was feeling a little weak as I picked up the backpack containing my Yaesu FT-891 radio, a homebrew L-match tuner, the Bioenno battery and various cables and accessories that I like to carry with me on a field trip. "Strange" I thought, "this backpack feels a little heavier than usual".

Maybe it was just the debilitating effects of my mild illness that was affecting me, but I was not sure. Then suddenly I had one of those "light bulb moments." "Of course," I thought, as my university Physics training began kicking my brain into high gear, "I just charged the battery, so that is obviously the reason the backpack feels heavier than usual".

Now most people have probably heard of Albert Einstein's famous energy/mass equivalence equation, $E=mc^2$. It may not have much relevance to most people's everyday lives. Not so for me. From my teenage years I was on a path toward a lifetime of science awareness. I vividly recall my high school physics teacher's erudite response to a student who complained that his pen had disappeared. "Don't be silly boy; if your pen had disappeared the whole city would be lying in ruins". Do the math yourself. Take the mass of an average pen and multiply it by the square of the speed of light. That is one heck of a lot of Joules to unleash on an unsuspecting city. Old Albert had hit the nail squarely on the head with his $E=mc^2$ equation.

Einstein's genius was further driven home to me when I started my freshman year in college. A bunch of long-haired 1970s yahoos had to be indoctrinated into the wonderful world of Physics. And the faculty staff had a cunning trick to do just that. Teach those long-haired kids how to make an atomic bomb! In fact, teach them all the different ways to build an atomic bomb. Just keep those long-haired weirdos away from any source of Uranium or Plutonium.



those long-haired weirdos away from any source of Uranium or Plutonium.

We did have a radio-isotopes laboratory in which we could indulge our fantasies of playing god

with the World. Special clothing had to be worn when we entered the lab. When we left the lab, we had to undergo a full-body scan with a Geiger counter to ensure we were not sneaking any dangerous isotopes out with which to create criminal mischief. The local police were familiar with our penchant for mischief, so every caution was very well advised.

And so it dawned on me, at last, I understood why my backpack radio kit seemed heavier than usual – I had just charged the battery! I know, you are getting a bit sceptical around about now. "This idiot must be enjoying a little bit too much of the old 'Scottish Champagne'" you may be thinking. You may be right but trust an old Physics grad; the mathematical proof is in old Albert Einstein's equation.

My Bioenno battery is rated at 12 Ah and although it puts out over 13 volts most of the time, let us call it a 12 V battery. Whatever number we calculate for the increased weight can then quite honestly be claimed to be a conservative number.

So here we go

A 12 V battery with a storage capacity of 12 Ah holds 144 Wh of energy.

1 Watt = 1 Joule per second

So $144 \text{ Wh} = 144 \times 3600 \text{ J} = 5,18400 \times 10^5 \text{ Joules}$

Using Einstein's mass/energy equivalence equation, $E=mc^2$

$$E/c^2 = 5,184 \times 10^5 / (3 \times 10^8)^2$$

$$= 5,184 \times 10^5 / 9 \times 10^{16}$$

$$= 5,76 \times 10^{-12} \text{ Kg}$$

$$= 5,76 \times 10^{-9} \text{ g}$$

$$= 5,76 \text{ nanograms}$$

Alright, a handful of nanograms is not a whole lot, but when you are out hiking to a radio spot at the top of a steep hill on a hot humid day, where do you draw the line? Quod Erat Demonstrandum!



The Importance of Ham Radio in Modern Times

Chris, KJ5DJC · President's Corner, Austin ARC

When most people hear the term ham radio, they often think of emergencies, those moments when the power is out, the internet is down and cell towers go silent. And it is true: amateur radio has saved lives countless times by providing a lifeline when everything else fails. But the value of amateur radio in today's world extends far beyond emergency communications. It remains a vibrant hobby and learning platform that connects people, inspires discovery and keeps the spirit of exploration alive.

Amateur radio is often called the "original STEM hobby." Long before coding bootcamps or maker spaces, amateurs were experimenting with antennas, building their own equipment and exploring the invisible world of radio waves. Today, that tradition continues. By getting involved with amateur radio, you don't just learn how to operate a transceiver, you dive into electronics, propagation science, digital communications and even space technology.

Modern amateurs are experimenting with satellites, bouncing signals off the moon and even communicating through the International Space Station. For students and hobbyists alike, radio provides a hands-on way to understand physics, electronics and networking in a way textbooks alone cannot.

One of the most overlooked benefits of amateur radio is how it shapes the mind. Every contact (QSO), antenna project, or interference problem is essentially a puzzle waiting to be solved. Amateurs learn to diagnose, troubleshoot and adapt on the fly, skills that are increasingly rare in an age of disposable technology.

These mental exercises sharpen critical thinking, logical reasoning and creativity. Operators quickly learn that no two propagation days are alike, no two antennas behave the same and no

one-size-fits-all solution exists. This kind of adaptive problem-solving builds resilience, a trait that benefits not just the individual but society as a whole. There is something magical about sitting down at your radio, spinning the dial and suddenly hearing a voice from across the globe. Unlike the internet, where instant communication is expected, making contact on the airwaves is an achievement. It is a blend of patience, skill and a little bit of luck. Each successful contact feels like a discovery, whether it is your first local QSO or a rare remote (DX) station on the other side of the world.

This joy of discovery is what keeps the hobby alive. Every solar cycle brings new propagation conditions, every antenna experiment reveals fresh insights and every contact is a reminder that there are real people behind those voices in the static.

Amateur radio is not just about technology; it is about people. It is about building friendships across cultures, finding common ground in shared curiosity and creating a community that transcends borders. Nets, contests and local club gatherings keep the tradition alive and bring together people of all ages.

For younger generations, it is an opportunity to connect with mentors who have decades of experience. For seasoned operators, it is a chance to pass along knowledge, foster curiosity and inspire the next generation of experimenters.

The same problem-solving and technical skills that amateur radio fosters are also vital to our future. Many of the engineers, scientists and innovators driving advancements in wireless technology, cybersecurity and aerospace got their start as amateurs. The hobby serves as a training ground for the next wave of innovators who will tackle challenges in telecommunications, national defence and space exploration.

On a national level, amateur radio strengthens resilience. When disasters strike, amateurs step in to restore communication, but their value goes beyond emergencies. By cultivating a culture of experimentation and technical competence, amateur radio contributes to the nation's technological edge and prepares individuals to adapt to unexpected challenges, whether in science, engineering, security, or even daily life.



(Continued on page 13)

(The Importance of Ham Radio in Modern Times from page 12)

Perhaps the greatest gift amateur radio offers is its ability to spark curiosity in young minds. Getting a license introduces kids and teens to real-world science and engineering at a level that few other hobbies can match. Building antennas teaches geometry and physics, setting up repeaters introduces networking concepts and operating digital modes touches on computing and signal processing.

For students, amateur radio is a safe and exciting way to experiment, fail and try again, building confidence alongside competence. These experiences can inspire careers in engineering, data science, emergency management and even national defence.

In fact, many professionals in aerospace, cybersecurity and the military communications field trace their first spark of interest back to time spent on the amateur bands. By engaging youth today, we are not only preserving our hobby, but we are also preparing the next generation of innovators and protectors.

Beyond technology and science, amateur radio addresses a very human need: connection. Across our towns, counties and indeed the world, loneliness has become a growing epidemic. More and more people feel isolated, even in an age of digital communication.

Amateur radio provides something deeper than a text message or a social media post; it fosters real conversations. A simple call on a local repeater can lead to a new friendship. Weekly nets provide structure and companionship for those who might otherwise feel alone. And reaching someone across the globe reminds us that, no matter how far apart

we may be, we are part of a shared human experience.

For many operators, the voices on the radio become a lifeline, proving that meaningful connection does not always require video chats or high-speed networks. Sometimes, it is just a voice in the static that says: You are not alone.

In an age dominated by instant messaging, video calls and high-speed internet, some might wonder if amateur radio still has a place. The answer is a resounding yes. The skills we practice, antenna design, RF propagation, digital modes, troubleshooting, are directly relevant to today's world of wireless communication, IoT and cybersecurity. And when the lights go out, amateur radio remains one of the few technologies capable of bridging the gap.

But perhaps most importantly, amateur radio reminds us that communication is about more than just convenience, it is about curiosity, resilience, connection and community. Amateur radio is not a relic of the past; it is a living, breathing hobby with endless opportunities for exploration. Whether you are fascinated by science and technology, seeking the thrill of discovery, or looking to be part of a global community, amateur radio offers something unique. It empowers us to learn, to connect and to serve.

It also prepares us for the next scientific breakthrough, the next national challenge and the next generation of explorers. Amateur radio matters not just because it can save lives, but because it develops minds, builds resilience, strengthens society and helps heal the growing sense of isolation in our communities.



The ZS6BVR Field Strength Meter

Nico, ZS6BVR



Here we have a very simple project that you could build in an hour. This Field Strength Meter uses two 1N5716 Schottky diodes instead of Germanium diodes. With this design we extend the frequency range to the UHF (and even SHF bands if you use a strip line PCB and an SMA connector and surface mount components).

By fitting a BNC Female Connector, we can also use this instrument to measure relative power.

By using a voltage doubler, it makes the meter more sensitive. By using Schottky diodes this will work up to 1,2 GHz

Uses

1. First as a Relative Field strength Meter.
2. You could also compare a known signal level from your signal generator with the output of an

oscillator by adjusting the known signal and comparing it with the unknown.

3. With a variable attenuator in front, use this to determine an antennas polar pattern.

Construction

Use a circular saw attachment on you Drill and slowly drill the hole for the panel meter.

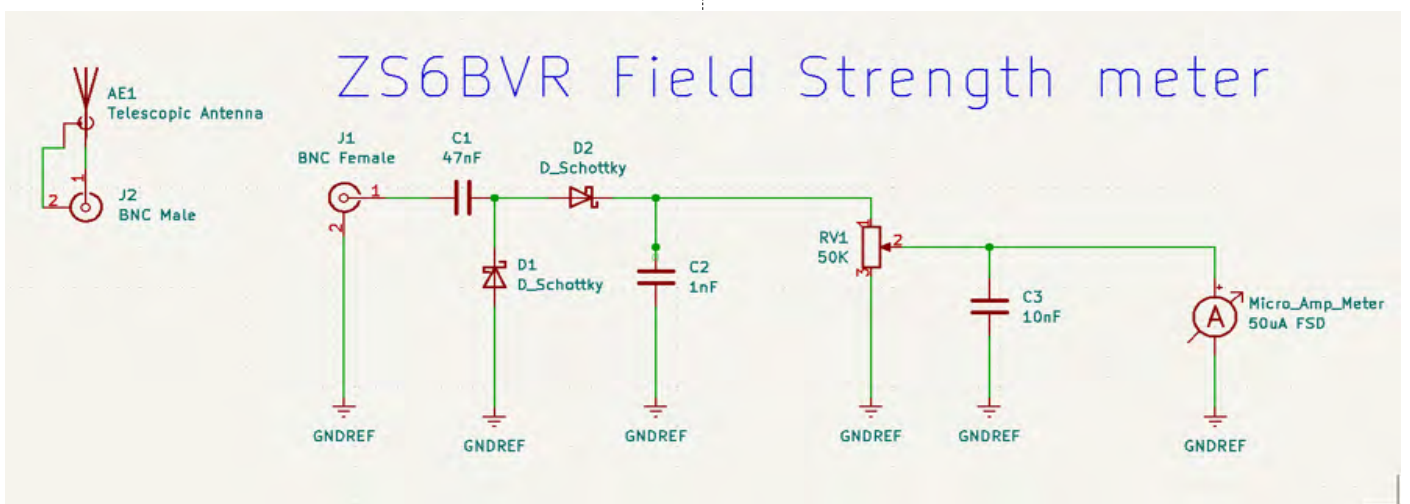
Then use a step drill bit to drill the hole for your BNC Socket

Design

This circuit diagram shows the design of the Field Strength meter.

Please note D1 and D2 are 1N5716 Schottky diodes

(Continued on page 15)



(The Z56BVR Field Strength Meter from page 14)

Description of circuit

Capacitors C1 and C2 together with the two Schottky signal diodes provide a voltage doubling RF detector with a DC output with C3 as a Smoothing Capacitor. One uses the Potentiometer to set the needle of the 50 uA meter to either the centre or full scale for comparing radiated power from antennas being compared. It can also be used to indicate that your transmitter is working

Component list

J1 - Chassis mounted BNC Female Connector
 D1, D2 - 1N5716 or BAT85 or equivalent Schottky signal diodes
 C1 - 47 nF
 C2 - 470 pf or 1 nF
 C3 - 10 nF
 VR1 - 50 K Linear Potentiometer
 Meter - 50 uA FSD Micro Amp Meter

Bibliography

The design is based on this design with four changes made - https://www.utaharc.org/rptr/wdr_fsm1.html

Amateur Radio Abroad: Unlimited Radio Operations on Vacation

WiMo News <https://www.wimo.com/en/ham-radio-abroad>



Your Amateur Radio License While Traveling

If you are a licensed amateur radio operator who wants to go on the air while abroad, you will quickly discover that your own operating license is not valid without restriction all over the world. Global practice shows that your operations are always subject to bilateral or multilateral agreements. Thanks to international agreements such as the European Conference of Postal and Telecommunications Administration/Conférence européenne des administrations des postes et des télécommunications (CEPT) Recommendation, however, operating abroad is now straightforward in many countries. You may go on the air in most European and many non-European countries without prior registration, as your German license

is automatically recognized. However, there are important organizational and legal considerations to keep in mind before traveling. Here you will find all the information you need to safely reach your destination and make connections around the world.

The CEPT Agreement

A CEPT license is an internationally recognized document for amateur radio operators. Thanks to this regulation, holders of a German Class A or E amateur radio license can operate temporarily for up to three months in numerous countries in Europe and around the world without having to apply for a separate visitor's license. This directive

(Continued on page 16)

This article comes from WiMo (<https://www.wimo.com/en/>), one of the big amateur radio dealers in Germany.

The South African Class A (ZR/ZS) licence is part of Recommendation T/R 61-01 from CEPT. So in the article below where the German Class A licence is mentioned, you can substitute South Africa Class A licence.

The South African Class B (ZU) licence is based on Recommendation ECC/REC/(05)06. BUT, the ZU licence is only valid in South Africa. Our regulator, ICASA does not recognise the Recommendation. So Novice licence holders in other countries can use their licence while travelling, except in South Africa. Therefore the German Class E licence is not recognised in South Africa - no Novice licence, except ZU, is valid in South Africa.

(Amateur Radio Abroad from page 15)

from the European Conference of Postal and Telecommunications Administrations governs the mutual recognition of amateur radio license classes. It applies in nearly 50 countries, including all EU member states as well as many non-EU countries such as Australia, New Zealand, South Africa and the United States. Since this is a voluntary agreement, European countries work closely together to harmonize technical rules and frequencies. However, member countries decide for themselves whether to adopt these recommendations and implement them into national law.

In practice, a distinction is mainly made between two key CEPT recommendations. For holders of a full Class A license, Recommendation T/R 61-01 applies. Within CEPT member states, your German license is thus recognized without any problems, without the need to obtain an additional visitor's license. It entitles you to use almost all amateur radio frequencies in the host country. Operating is straightforward: simply prefix your own call sign with the respective country code.

For the Class E novice license, however, Recommendation ECC/REC/(05)06 applies, also known as the CEPT Novice Radio Amateur License. It is intended for beginners, although the authorized frequency bands and transmission power levels abroad are more limited than those of the full license. It is valid in all countries that have implemented the specific "Novice" agreement. Whether you are allowed to operate immediately, however, depends on the specific host country. In some countries, operation is permitted right away; in others, you must still apply for a guest license in advance.

CEPT in Practice

Call Signs and Rules in your vacation destination

After successfully passing the amateur radio

Which are the CEPT Signatories?

Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czech Republic; Denmark; Faroe Islands; Greenland; Estonia; Finland; Aland Islands; France including Corsica, Guadeloupe, Guyana, Martinique, St Bartholomew, St Pierre/Miquelon, St Martin, Réunion (Glorieuse, Jean de Nova, Tromelin), Mayotte, French Antarctica (Crozet, Kerguelen, St Paul & Amsterdam, Terre Adelle), French Polynesia & Clipperton, New Caledonia, Wallis & Futuna; Germany; Greece; Hungary; Iceland; Ireland; Italy; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Monaco; Montenegro; Netherlands; Norway, Svalbard; North Macedonia; Poland; Portugal; Azores; Madeira; Romania; Russian Federation; Serbia; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; Ukraine; United Kingdom – England, Isle of Man, N Ireland, Jersey, Scotland, Guernsey and Wales.

Australia, Canada, Israel, overseas countries within the Kingdom of the Netherlands and overseas territories of the Netherlands in the ITU Region 2 – Aruba, Curacao, Bonaire, St Eustatius, Saba and St Maarten; New Zealand; Peru; South Africa and the USA.

exam in Germany, you automatically acquire CEPT privileges. If you then travel to another CEPT country, such as France or Italy, you may go on the air there immediately without incurring additional fees or having to apply for a new call sign. You simply need to carry your original domestic license or a certified copy of it and be able to present it upon request.

During your stay, simply place the country code of the host country before your own call sign. For example, if you are a German amateur radio operator transmitting in Austria, your temporary call sign would be OE/DL1ABC. The familiar suffix "/p" for portable operation is technically not required

(Continued on page 17)

(Amateur Radio Abroad from page 16)

under the CEPT regulations alone but is generally tolerated on the bands internationally.

Even if you are using your familiar German license, a fundamental principle applies abroad: You must strictly adhere to the local laws, frequency bands and power limits, even if they are more restrictive than in Germany. When in doubt, the stricter limit always applies. Therefore, be sure to check the website of the local authority or the national amateur radio association in advance for regionally varying band plans, transmission power limits, or specific channel restrictions. The DARC's detailed CEPT country list provides an excellent guide here, allowing you to quickly see in which countries your license is recognized and under what conditions. <https://www.darc.de/der-club/referate/ausland/funken-im-ausland/cept-laenderliste/>

HAREC: Recognition for Long-Term Residents

For longer or permanent stays, as well as for a complete move abroad, the HAREC (Harmonized Amateur Radio Examination Certificate) greatly facilitates the recognition of the exam you have taken. This Europe-wide standardized certificate serves as official proof that you have passed an amateur radio exam that meets international standards. In Germany, a Class A amateur radio license is automatically equivalent to the HAREC certificate.

Thanks to its comprehensive international recognition, this document facilitates worldwide amateur radio operations beyond short vacation trips. Most CEPT member countries accept this certificate without issue. So, if you move permanently to another country, you can often use your HAREC certificate to apply directly for a local license from the local authorities there, without having to retake the written or practical exam in your new home country. The Federal Network Agency provides detailed information directly regarding issuance and validity in Germany. Since regulations for long-term amateur radio operation vary greatly depending on the destination country, it is also recommended to consult the DARC's specific country guides in advance to ensure that all necessary application forms are submitted on time.

Radio Operations Outside CEPT Member States and the IARP

In countries that do not recognize the CEPT

Agreement, the legal framework governing your amateur radio operations while on vacation is completely different. Here, everything depends on your specific license class, as this determines your privileges in the respective destination country. As a rule, radio operations in these regions must be registered in advance, or you must apply for a separate visitor's license. Plan for a preparation and lead time of at least four to six weeks and contact the national telecommunications authority of your destination country directly for information.

An invaluable resource for travel outside the CEPT zone, such as to South America, is the International Amateur Radio Permit (IARP). This official document allows you to temporarily use your amateur radio equipment in another participating country and exempts you from having to apply for a time-consuming local guest license on site. The agreement applies primarily to member states of the Inter-American Telecommunications Commission (CITEL), so you can easily go on the air in many North and South American countries, such as Argentina and Brazil.

In Germany, the IARP is issued by the DARC for amateur radio operators with permanent residence in the country, while in the US, the ARRL is responsible for this. If, on the other hand, you are planning a trip within Europe, you generally do not need an IARP, as the CEPT Agreement applies almost everywhere there. Regardless of your destination, however, the following applies worldwide:

You must always carry the original copy of your license, your HAREC certificate and the original IARP with you (if applicable). In addition, you may only use frequencies and transmit power on the bands that are permitted by both your German license and the regulations of the host country. In case of doubt, the more restrictive limit always applies.

FCC and ISSED Regulations in North America

The so-called FCC rules refer to the legal regulations issued by the US Federal Communications Commission (FCC). In amateur radio, these regulations precisely define who is permitted to operate radio equipment, which frequencies may be used and how interference in radio communications can be effectively prevented. The FCC itself issues three consecutive

(Continued on page 18)

(Amateur Radio Abroad from page 17)

license classes for American amateur radio operators, each with increasing privileges: Technician, General and Amateur Extra.

Fortunately, if you are a German amateur radio operator who wants to operate in the US, you do not need to take a new exam. Thanks to international agreements, your German Class A or E license is recognized as a guest license for up to three months. You can then operate on-site quite easily in accordance with local FCC rules, adjusting your transmit power and frequency limits to meet US requirements. It is important to note that all radio equipment operated in the US must comply with FCC technical standards. For example, the well-known Part 15 of the regulations specifies exactly the maximum amount of electromagnetic interference an electronic device is permitted to emit.

Just across the border in Canada, Innovation, Science and Economic Development Canada (ISED) serves as the national regulatory authority for the economy, innovation and technology. Its regulations are legally binding for all radio operations and ensure that all electronic devices, radio systems and telecommunications products on the Canadian market are completely safe and operate without interference. ISED's regulations fulfil three main objectives: first, they specify which radio frequencies may be used for which applications; second, they ensure that devices do not interfere with one another; and third, they define strict limits for electromagnetic radiation. Every product containing radio technology must be certified according to these ISED standards before it can be operated or sold in the country. Contrary to a commonly held belief in the amateur radio community, FCC certification alone is generally not sufficient for the Canadian market. Officially approved products therefore receive a special conformity label for the Canadian market, which often includes an ISED number or an older Industry Canada designation.

Customs, Travel Logistics and Homemade Devices

In addition to the purely legal radio regulations, travel planning outside the EU also requires attention to logistical and customs matters. To avoid being charged import sales tax on your own transceivers when re-entering Germany, you should declare expensive amateur radio equipment to German customs as "returned goods" upon

departure. It is best to use the official INF-3 form for this purpose, which serves as proof of ownership. You should also familiarize yourself well in advance with the specific import regulations of your destination country. If you are carrying rechargeable batteries and modern lithium-ion batteries for portable radio operation while on vacation, be sure to observe the airlines' strict safety guidelines. These energy storage devices are subject to precise transport regulations and, as a rule, must be carried in your carry-on luggage. To prepare thoroughly before your trip, use the DARC's detailed country overviews to check frequencies, look up country-specific requirements, or view any necessary documents directly.

An interesting special case when operating abroad is the use of homemade equipment. Operating homemade equipment is generally permitted under certain conditions, though the same strict regulations apply to it as to commercially manufactured radio equipment. The most important requirement for legal operation in the host country is that technical compliance is absolutely guaranteed. Your equipment must always comply with the conditions of your own amateur radio license as well as the applicable limits of the host country regarding harmonic suppression and electromagnetic compatibility (EMC). Since this involves custom-built equipment, it is strongly recommended that you carry detailed technical documentation, such as schematics, block diagrams, measurement logs and verified measurement values, in your luggage. This prevents time-consuming misunderstandings during customs inspections and reliably demonstrates to local officials that the equipment is genuine amateur radio equipment and in no way commercial or illegal radio equipment.

Well-prepared for the global radio adventure

Amateur radio operations abroad impressively demonstrate that international understanding can still function directly and without borders, even in the digital age. However, it requires meticulous preparation on your part beforehand, preparation that is not limited to simply putting together the right equipment. At the outset, careful research and some organisation is required, which, depending on your destination, unfortunately involves varying degrees of red tape.

For those who dare to embark on this

(Continued on page 19)

(Inside the Summit from page 18)

adventure, operating beyond their own country's borders opens a unique and immensely enriching perspective on our hobby. Using amateur radio equipment while on vacation or traveling perfectly combines intercultural exchange with the spirit of camaraderie that defines our radio community. No matter where you choose to travel: Always

familiarize yourself with country-specific regulations and local customs before you leave to ensure that your radio operations on site are completely legal and run smoothly.

We at WiMo wish you a fantastic start to your international radio operations, a steady hand with your logbook always and fascinating DX contacts on your next vacation!

Awards from the Namibian Amateur Radio League

<https://www.narlnam.com/awards.html>

There are two awards you can get from the Namibian Amateur Radio League (NARL) and the first one is easier than a WAZS!

The Namibia Award

The Namibia award is available for contacts with Namibian stations. Endorsements for band and mode are possible.



Stations Outside Namibia (Non-SADC Stations)

- ◆ Proof of 5 confirmed QSOs (email or WhatsApp or personal presentation of QSL cards / log entry)
- ◆ Format: Printed Certificate
- ◆ Fee: US\$10-00 or Euro 10-00
- ◆ Contact: Please contact Charly, DK3ZL to apply for your award and arrange for payment via PayPal.

SADC Stations

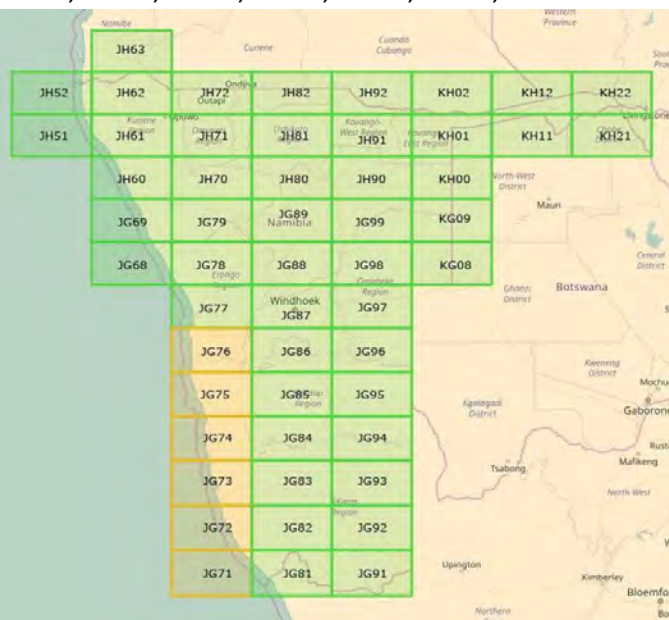
- ◆ Proof of 10 confirmed QSOs (email or WhatsApp or personal presentation of QSL cards / log entry)
- ◆ Format: Printed Certificate
- ◆ Fee: N\$10-00 for NARL members and N\$ 50-00 for non-NARL members.
- ◆ Contact: the NARL Awards Manager, Johan, V51JH via address narlgridna[at]gmail.com.



The V5 WAGS Worked All Namibian Grid Squares Award

The aim of this award is to involve any licensed amateur radio station in a fun activity to collect at least one contact from each of the maidenhead grid squares.

There are 53 Namibian grid squares which are listed here - JH51; JH52; JG68; JG69; JH60; JH61; JH62; JH63; JG71; JG72; JG73; JG74; JG75; JG76; JG77; JG78; JG79; JH70; JH71; JH72; JG81; JG82; JG83; JG84; JG85; JG86; JG87; JG88; JG89; JH80; JH81; JH82; JG91; JG92; JG93; JG94; JG95; JG96; JG97; JG98; JG99; JH90; JH91; JH92; KG08; KG09; KH00; KH01; KH02; KH11; KH12; KH21; KH22.



Duration

This award runs perpetually and contacts may be made on any date and at any time.

Frequencies and Modes

- ◆ All bands HF, VHF, UHF and Microwave.
- ◆ All amateur modes
- ◆ Contacts via Satellite repeaters are accepted.
- ◆ Contacts made via terrestrial repeaters, or by

(Continued on page 20)

(Awards from the NARL from page 19)

Internet connection such as Echo-Link or IRLP are excluded.

Participation Classes

Two classes of operation are defined as follows:

Hunters are amateur radio operators who operate from their home QTH and who seek out and work contacts with stations in other grid squares.

Activators are amateur radio operators who operate a portable or field station from:

- ♦ Inside their home grid square but away from their home QTH; or
- ♦ Inside another grid square for the purposes of activating the grid square for other Hunters.

Activators may claim credit for the activated grid square, provided a minimum of 2 contacts are made with other stations from the portable or field station during the operation and provided a log of all contacts made during the operation is submitted. In addition, an Activator who makes 5 or more unique contacts from any of the rare grid squares or 2 or more unique contacts from any of the Sperrgebiet grid squares may apply for the Activator's Award. To be considered as unique, multiple contacts with the same station must be on different bands or using different modes.

Rare Grid Square

For purposes of this rule, a rare grid square is defined to be a grid square in which no currently active radio amateur resides on a permanent basis. This rule will be interpreted on a flexible basis by the Awards Administrator, to encourage the activation of the more remote, difficult or unpopulated grid squares on a regular basis.

Activators may claim any contacts made from the activated grid square.

Sperrgebiet Grid Square

A Sperrgebiet grid square is any one of the following 6 grid squares: JG71; JG72; JG73; JG74; JG75; JG76. These grid Squares are virtually impossible to activate and will be rewarded with a special "Diamond" endorsement. They are part of the normal V5 WAGS and can be used for a special V5 WASGS Award.

Sponsor and Contact Details

This award is sponsored and administered by the Namibian Amateur Radio League with special

thanks to the Sandton Amateur Radio Club for the use and permission to adapt their rules.

Correspondence can be directed to the V5 WAGS Award Administrator at e-mail narlgridna@gmail.com

Snail mail: NARL Awards Administrator, PO Box 1100, Windhoek Namibia

Website: <http://www.narlnam.com>

Any disputes are to be addressed to the Awards Administrator. Upon receipt the dispute will be addressed by the Committee of the NARL whose decision will be final in the matter.

Log Information

Logged information for each contact must include Call Sign, Date, Time, Band, Mode, Power, QTH and the 4 character Maidenhead locator, example 'JG84'. The standard log template is to be used, which can be obtained from the NARL.

If the station worked does not know its grid square, an acceptable alternative would be to use their street address or some other reliable point of reference. E.g.: "25 km north of Okahandja on the road to Otjiwarongo".

One can then use that information to establish the correct grid square. If there is any uncertainty or doubt regarding the correct square the contact should not be used for the award. All participants must keep a log of the stations worked.

Hunters

The log information must be transferred to the official application form / log sheet, indicating the station worked against each claimed Namibian locator square.

Activators

Must submit a complete log of all stations worked from the portable / field station in order to claim the activated grid or apply for the Activator's Award.

Applications for Awards

Applicants for awards must be able to prove that they have achieved one contact in each of the required number of grid squares for the respective award. The application forms and log sheets are available on the NARL website www.narlnam.com. Applications for awards are to be sent to the Award Administrator at narlgridna@gmail.com and must include an E-Mail address where the PDF copy of

(Continued on page 21)

(Awards from the NARL from page 20)

the certificate can be mailed to.

Notes to applicants

The Namibian Hunter's home QTH grid square is automatically allocated as worked, i.e. each Namibian hunter automatically begins with a V5 WAGS count of one.

Activator applications are those that travel to a certain grid square in order to "activate" it and must submit their entire grid square operating log to the Award Administrator for operations in that grid square. A photograph of your portable / field station at the grid square is required as proof (and will be used in our gallery of interesting stations and locations!)

A contact with any station will be valid as long as the station is operating from within one of the 52 listed grid squares. This will include stations legally operating in foreign countries, or maritime mobile.

The use of paper QSLs or the online e-QSL is encouraged but is not a requirement.

The system is based on honesty and trust.

The Award Administrator may request proof of any contact claimed.

The Award Administrator will accept applications submitted from 1 January 2010 onwards.

All contacts count towards the award including those from the past.

Each station is to keep track of its own status. For example: V5 WAGS 22/53 achieved.

Awards

Hunter's award

Awards will be based on an incremental contact system. Once 10 grid squares are achieved you may apply for the first certificate and subsequent certificates may be applied for when sufficient contacts have been made. A certificate will be issued to an applicant who achieves contacts in one of the following categories:

V5 WAGS 10 – 10 grid squares worked.

V5 WAGS 20 – 20 grid squares worked.

V5 WAGS 30 – 30 grid squares worked.

V5 WAGS 40 – 40 grid squares worked.

V5 WAGS 50 – 50 grid squares worked.

V5 WAGS 53 – All 53 grid squares worked.

V5 WASGS 2 – 2 Spergebiet grid squares worked.

V5 WASGS 3 – 3 Spergebiet grid squares worked.

V5 WASGS 4 – 4 Spergebiet grid squares worked.

V5 WASGS 5 – 5 Spergebiet grid squares worked.

V5 WASGS Diamond – All 6 Spergebiet grid squares worked.

Additional endorsements may be applied for in the following categories:

- ◆ Single band: All contacts must be made in one band only
- ◆ Single mode: All contacts must be made in one mode only.

Modes are restricted to the following:

- ◆ SSB: This will be the normal mode for contacts made on HF
- ◆ CW: All contacts made using CW only
- ◆ FM: All contacts made using FM only
- ◆ AM: All contacts made using AM only
- ◆ Satellite (any mode): All contacts made via satellite
- ◆ Digital (any digital mode): All contacts made using a digital mode
- ◆ A combination of a single band and a single mode as specified above.
- ◆ QRP: An additional endorsement may be applied for on any award where the transmitting power for all contacts is limited to a maximum of 5 watts.

Activator's award

The Activator's Award will be made to any operator who makes a minimum of 5 unique contacts from one of the rare squares as defined above. Awards will be administered once a month, so please allow for delays in regard to issuing of the certificates. The Spergebiet Activator's Award will be made to any operator who makes a minimum of 2 unique contacts from one of the Spergebiet squares as defined above.

Award Format: PDF

Fees: The award is now free

Note: Should you require a printed copy of the award, please contact the NARL for a price. It is however strongly recommended to obtain the award in PDF format and print it yourself or at a local copy and print shop.

All about locations

Determining grids:

Accurate Maidenhead locator information is available from various sources:

Using a GPS

Using a map

(Continued on page 22)

(Awards from the NARL from page 21)

Google Maps

By Calculation

The NARL website <http://www.narlnam.com/v51wags-grids-map.html> shows Maidenhead grids to 4 character precision. This award only uses a 4 character grid (1 degree latitude by 2 degrees longitude). On the bottom center of the display enter the 4 character Maidenhead locator you wish to see. TinyLocator is an excellent piece of freeware for not only working out the Maidenhead grid square from a number of sources, but will give you distances between them too. A Google search will direct one to its website for download.

Doubtful locations very close to the boundaries between grids must be resolved in accordance with the WGS84 geodesic system. This is the system used for official purposes by the Surveyor General of South Africa. The GPS system uses the same standard. Google Earth also uses this standard. If you have a problem determining your locator, contact the Award Administrator.

Stations on grid boundaries or grid intersections:

An activating station located within 30 meters of the boundary between two grids, as determined by a GPS using the WGS84 geodesic system, may claim both grid squares for each contact made and any Hunter who makes contact with that station may claim both grid squares for the single contact. An activating station located within 30 meters of the point of intersection of four grids, as determined by a GPS using the WGS84 geodesic

system, may claim all four grid squares for each contact made and any Hunter who makes contact with that station may claim all four grid squares for the single contact.

NB: For any claims for the Activator's award/s or credit towards the Hunter's award/s for stations on grid boundaries, PLEASE submit photographs of the station AND a photograph of the GPS showing the location, or other proof of the exact location.

Glossary of Terms

Echo-Link – An amateur communication service which uses Voice-over-IP to connect radio amateurs and amateur radio repeaters

GPS – Global Positioning System, commonly used by devices for determining ones position on the earth with accuracy of as little as 3 feet.

IRLP – Internet Relay Linking Project, which connects amateur radio repeaters via the internet

QRP – Low power radio transmission either telephony or Morse

QTH – Station's current location

e-QSL –Online QSL service, online service for electronic exchange of QSL information.

NARL – Namibian Amateur Radio League, the body which administers amateur radio in Namibia.

VOIP – Voice over Internet Protocol, method by which voice may be transmitted as data over a data network such as the internet.

WGS84 – World Geodetic System scheme 84 defines a reference frame for the earth in GPS terms and is valid until 2010.

V5 WAGS – Worked All Namibian Grid Squares.

V5 WASGS – Worked All Spergebiet Grid Squares.



Why Is Ham Radio Critical For STEM Education

Ham Radio Prep

In this article

- ◆ What is Ham Radio?
- ◆ Benefits of Ham Radio in STEM Education
- ◆ Ham Radio Activities for STEM Education
- ◆ Ham Radio in Schools and Colleges
- ◆ How to Get Started in Amateur Radio
- ◆ Conclusion

In today's world, STEM education is an essential part of preparing students for rapidly changing technological advancements. Radio is all around us, from our cell phones to Wi-Fi and understanding it is important. Teaching amateur radio as part of STEM learning is critical and interesting.

Ham radio, also known as amateur radio, involves using radio equipment to communicate with other amateur radio operators around the world. Even though there are newer forms of communication, amateur radio remains relevant and important for those interested in science, technology, engineering and math (STEM) fields.

What is Amateur Radio?

Ham radio, or amateur radio, is a fascinating and complex field that involves the use of radio equipment to communicate with other amateur radio operators around the world. Amateur radio is all about using radio waves to transmit and receive messages, whether for fun, experimentation, or emergency communications.

There are different ways to get involved in amateur radio. You can build and operate a radio station, participate in contests and events, or conduct experiments and research. One of the missions of amateur radio from the FCC is to **"contribute to the advancement of the radio art."**

Amateur radio offers opportunities for learning and exploration. Whether you're interested in tinkering with electronics, improving your communication skills, or simply making connections with other like-minded individuals, amateur radio has something to offer for everyone.

Benefits of Amateur Radio in STEM Education

Getting involved in amateur radio provides a wide range of benefits for students and educators in the STEM fields.

1. Develop Your Technical Skills

Amateur radio provides students with an



excellent opportunity to develop technical skills, as they learn about the equipment and technologies involved in radio communications. As you build and operate your radio stations, you will gain hands-on experience in areas such as electronics, circuit design, antenna theory and signal propagation.

In addition, the technical challenges of amateur radio, such as interference reduction and optimizing transmission efficiency, can help students develop problem-solving skills that are valuable in many other technical fields. Some kids who started in amateur radio have gone on to found major tech companies like Apple (Steve Wozniak) and Atari (Nolan Bushnell).

2. Improve Your Problem-Solving Skills

Amateur radio operators are often presented with technical challenges that require creative problem-solving skills. For example, they may need to optimize their antenna designs for maximum efficiency or troubleshoot interference issues that are disrupting their transmissions.

By learning to overcome these challenges, you can develop problem-solving skills that are valuable in a wide range of technical fields.

3. Better Communication Skills

Effective communication is a critical skill in many STEM fields and amateur radio provides an excellent opportunity to sharpen these skills.

(Continued on page 24)



(Why Is Ham Radio Critical For STEM Education from page 23)

Operators learn how to communicate effectively using limited bandwidth and other technical constraints, which can be valuable for students interested in careers such as journalism, public relations, or emergency response.

Additionally, by communicating with other operators from around the world, students can develop cross-cultural communication skills that are increasingly important in our globalized society.

4. Provides Hands-On Learning Opportunities

One of the most critical benefits of amateur radio is the hands-on learning opportunities it provides. By operating a radio station, participating in contests and events and collaborating with other operators, students can gain practical experience in the application of STEM concepts.

This type of hands-on learning is often difficult to replicate in a traditional classroom setting and can help to make STEM education more engaging, fun and accessible! For instance, you do not buy an amateur radio station from your home from a kit, you choose the parts that make it work best for you. Radio, antenna, power, cabling and safety all require unique decisions and play a role in your performance.

5. Encourages Scientific Curiosity

Amateur radio encourages scientific curiosity and a love of learning. By exploring the fascinating world of radio waves and the many ways in which they can be used for communication and experimentation, students can gain a deeper appreciation for the wonders of science and technology, which can be extremely valuable for students pursuing a career in STEM fields.

It works both ways too, Dr Joseph Taylor spent his days using weak signal radio options to listen to pulsars and won the Nobel Prize for Physics. He then turned his attention to weak signal amateur radio for communication using the moon and meteors.

Amateur Radio Activities for STEM Education

Many different activities in amateur radio can be valuable for STEM education.

1. Build and Operate a Radio Station

One of the most rewarding aspects of amateur radio is building and operating your own radio station. While it may seem intimidating at first, it is actually quite simple to get started.

Here are some steps to guide you through the process:

1. Get your amateur radio license from ICASA after completing the radio amateur exam.
2. Choose a radio transceiver (a transceiver is a



(Why Is Ham Radio Critical For STEM Education from page 24)

transmitter and receiver in one unit) that meets your needs and budget.

3. Select an antenna that is appropriate for the frequency bands you plan to operate on, based on your license level.

4. Set up your radio station with appropriate grounding and safety measures.

Learn the basics of radio operation, including proper etiquette and safety procedures.

By following these steps, you can have your amateur radio station up and running in no time!

2. Participating in Contests and Events

Another great way to get involved in amateur radio is by participating in contests and events. There are many different contests and events held throughout the year, ranging from short-duration contests to longer-term events.

These contests can provide a great opportunity to hone your radio skills, connect with other operators and even win prizes.

Here are some resources to help you find contests and events:

- ♦ The South African Radio League (SARL) maintains a comprehensive list of upcoming local contests on <https://mysarl.org.za/contest-menu-2/>.
- ♦ The weekly HF Happenings newsletter contains a list of international contests, find a copy at <https://mysarl.org.za/hf-happenings/>

The Parks on the Air (POTA) group is an active cadre of amateurs who practice mobile radio operations from state and national parks. They are at parksontheair.com.

Summits on the Air (SOTA) is a group of amateurs who practice portable radio operations from mountain summits. Read more at <https://www.sota.org.uk/>



Heritage On The Air (HOTA) is an amateur radio initiative that motivates operators to discover,

learn about and preserve history by activating historical sites across South Africa using SSB, AM, FM, CW and even heliographs. They are at <https://heritageontheair.co.za/>



Your local amateur radio clubs and organizations may also hold their own contests and events, so be sure to check with them as well.

3. Try Fun Experiments and Research

Amateur radio also provides a great platform for conducting experiments and research in the realm of radio communications.

For example, you could experiment with different antenna designs to see how they affect signal propagation or conduct a survey of radio propagation conditions at different times of the day or in different weather conditions.

By conducting your own experiments, you can gain valuable insights into the technical aspects of amateur radio. One such event is the annual “Strange Antenna Challenge” where amateurs use anything metal to try and radiate a signal and make contacts. Ladders, crutches, street signs and aluminium foil are all fair game.

You can also get involved in the [HamSCI](#) group, which is “Ham Radio Science Citizen Investigation.” They work with universities to do crowd-sourced experiments related to radio. They are mobilising amateurs to help explain [how the ionosphere changes during an eclipse](#).

4. Communicate with Other Amateurs Around the World

One of the most exciting aspects of amateur radio is the ability to communicate with other operators from around the world.

By using a variety of different modes and frequencies, you can contact other operators in foreign countries and learn about their cultures and experiences. This type of cross-cultural

(Continued on page 26)



(Why Is Ham Radio Critical For STEM Education from page 25)

communication can be valuable for learning more about the world and environment.

5. Collaborate with Other STEM Enthusiasts

Finally, amateur radio provides a great opportunity to collaborate with other people interested in STEM. Whether it is through participating in a contest or event, joining a local amateur radio club, or simply making contacts with other operators, amateur radio can help you connect with like-minded individuals who share your passion for science, technology, engineering and math.

By collaborating with others, you can learn from their experiences and come up with new ideas and insights. Here is one example, every year college students get on the air to compete and see who can make the most contacts in a weekend. It is called the Collegiate QSO party and while it is not the “Final 4” it is a fun event we call radio sport.

Amateur Radio in Schools and Colleges

Amateur radio can also be valuable in formal education settings, such as schools and colleges. There are many schools and colleges around the world that have incorporated amateur radio into their STEM education curricula.

Examples of Amateur Radio Programmes in Schools and Colleges

Some schools offer after-school amateur radio clubs or electives, while others may have dedicated amateur radio labs or facilities. Here are a few examples of schools and colleges that offer amateur radio programmes:

- ♦ **The Massachusetts Institute of Technology (MIT)** has a dedicated Amateur Radio Society that offers a range of activities and events for students, just like other big tech schools like the Georgia Institute of Technology (Georgia Tech).



- ♦ **The University of Texas at Dallas** has a student-run amateur radio club that participates in contests and conducts experiments
- ♦ **The STEM School Highlands Ranch** in Colorado offers a amateur radio programme as part of its engineering curriculum

(Continued on page 27)



(Why Is Ham Radio Critical For STEM Education from page 26)

Benefits of Amateur Radio in Formal Education

There are many benefits to adding amateur radio into a formal education setting, such as:

- ♦ It can help to develop technical skills and problem-solving abilities, as students learn about the equipment and technologies involved in radio communications
- ♦ Can improve communication skills, as students learn how to convey messages effectively and accurately using limited bandwidth and other technical constraints
- ♦ Amateur radio provides hands-on learning opportunities that can be difficult to replicate in a traditional classroom setting, as students build and operate their own radio stations and participate in contests and events
- ♦ Amateur radio encourages scientific curiosity and a love of learning, as students explore the fascinating world of radio waves and the many ways in which they can be used for communication and experimentation

Integrating Amateur Radio into STEM Curricula

If you are an educator interested in incorporating amateur radio into your STEM curriculum, there are many resources available to help you get started. One exciting example is the Amateur Radio on the International Space Station (ARISS) programme. ARISS pairs educators with an astronaut on the Space Station. This allows kids to ask questions about STEM and space exploration live via amateur radio while the crew member passes over their school on the ISS.

Also, the ARRL offers a range of educational resources and curricula for schools and colleges, including lesson plans, activity guides and certification programmes.

By integrating amateur radio into your STEM curriculum, you can provide your students with a



unique and valuable learning experience that can help to prepare them for the rapidly-evolving technological landscape of the future.

How to Get Started in Amateur Radio

If you want to get started with amateur radio, the SARL provides you with resources to help you!

1. Amateur Radio License Requirements

To operate an amateur radio station, you will need to get an amateur radio license from ICASA. There are three different classes of amateur radio licenses, each of which requires passing a different exam.

The entry-level license is the Novice or Class B, which allows you to operate on 80, 40 and 2 segments on 10 metres as well as 2 metres and 70 centimetres. You will find the documents for the Class B licence at <https://mysarl.org.za/rae-training-documentation/>.

The Full licence or Class A allows you to operate from 137 kHz up into the GHz bands. The Class A licence is also part of the CEPT TR61/01 and TR61/02 Agreement. You will find the documents for the Class A licence at <https://mysarl.org.za/rae-training-documentation/>.

There are Clubs who present in-person as well as online courses for the May and October radio amateur exams.



(Continued on page 28)

(Why Is Ham Radio Critical For STEM Education from page 27)

2. Amateur Radio Clubs and Organizations

Joining your local amateur radio club or organization can be a great way to connect with other operators near you, learn new skills and get involved in contests and events.

There are many different organizations around the world, ranging from informal groups of enthusiasts to larger, more established organizations. In South Africa, many amateurs get involved with the South African Radio League (SARL). Other countries have their own amateur radio groups, like Radio Amateurs of Canada (RAC), American Radio Relay League (ARRL), the Radio Society of Great Britain (RSGB), the Deutscher Amateur Radio Club e.V. (DARC), the Japan Amateur Radio League (JARL), the Wireless Institute of Australia and the New Zealand Amateur Radio Transmitters (NZART).

Beyond national societies, you will find groups that focus on particular types of operating. This includes the Islands on the Air, Earth-Moon-Earth, AmateurSCI, Amateur Radio Direction Finding (ARDF), ARISS groups and more. Morse code aficionados, space weather fans and high-altitude balloon enthusiasts are a few of the groups that gather in person and virtually as well.

3. Amateur Radio Equipment and Tools

To get started with amateur radio, you will need to have the right equipment. At a minimum, you will need a radio transceiver and an antenna, as well as various accessories such as a power supply, cables and connectors.

There are many different types of equipment available, ranging from entry-level handheld radios to more advanced base station setups.

Some popular brands of amateur radio equipment include Yaesu, Icom and Kenwood. As you can see, it is simple to get started with amateur radio and begin exploring the exciting world of radio communications.

Conclusion

Getting involved in amateur radio is an amazing way to level up your STEM education. From



developing technical skills to enhancing communication abilities, amateur radio offers a range of advantages for both students and educators.

If you are an educator interested in incorporating amateur radio into your STEM curriculum, there are many resources available to help you get started, including educational materials and certification programmes.

For students, amateur radio offers a unique and exciting way to explore the world of radio communications and connect with other STEM enthusiasts from around the world. Students can gain practical experience in the technical aspects of radio communications, while also improving critical thinking and problem-solving skills that are valuable in many different areas of STEM.

Whether you are a student or an educator, there are many resources available to help you and we encourage you to get started with amateur radio and level up your STEM education.



Youngsters On The Air

2026 Jamboree on the Air/Jamboree-on-the Internet

2026 CQ Hou Koers

Are you ready for JOTA/JOTI 2026? JOTA/JOTI is the world's largest digital and radio Scout event promoting friendship and global citizenship that takes place every year in October. It is a great opportunity for Scouts/Scout Groups to take part in an international Jamboree.

JOTA/JOTI stands for Jamboree on the Air, short wave radio communications through amateur radio stations and Jamboree on the Internet, internet-based communications, with easy access on any connected device.

Date

JOTA/JOTI 2026 is taking place from Friday 16 October to Sunday 18 October 2026.

2 million+ Scouts take part in JOTA/JOTI every year! Scouts take part from all over the world and join in either on the internet or over amateur radio. Scouts around the world take part in lots of fun activities and learn about each others' countries.

Who can take part?

Everyone can take part! JOTA/JOTI is open to anyone and is for all ages - Meerkat Dens, Cub Packs, Scout Troops, Rover Crews, Scout Groups. You just need to register your Branch or Group on the JOTA/JOTI website <https://www.jotajoti.info/>!

How to take part!

The best way to take part in JOTA/JOTI 2026 is to build it into an event about communication and international Scouting/Scouts around the world.

The Scouts could plan a JOTA/JOTI themed camp or activity day for that weekend? It is not difficult to set up a JOTA/JOTI event at the Scout Hall.

Getting on the Air

For the Scouts to get on the air, they will need a helping hand from someone who holds an amateur radio transmitting licence to set up a JOTA station. Yes, many Scouts and Scouters are licenced amateurs, but they will be involved with the Scout side of the programme.

The Scouts have been informed that the National JOTA/JOTI Coordinator will assist them with getting in touch with one of the local Amateur Radio Clubs. Or they will have a look at Hopefully

CQ Hou Koers is die Voortrekkers se nasionale amateur radio kommunikasie-dag en vind plaas op Saterdag 17 Oktober 2026. Ja, dieselfde naweek as JOTA as ook die BACAR-14 lansering! Gesels per amateur radio met ander Voortrekkers en Padvinders van regoor Suid-Afrika, Namibië en selfs die wêreld. Leer meer oor 'n interessante stokperdjie wat uitstekend is vir weerbaarheid en puik inpas by dit wat Voortrekkers doen in terme van diensbaarheid.

Kontak Andries Visagie, ZS6VL by andries.visagie@gmail.com vir meer inligting oor CQ Hou Koers en om jou hulp aan te bied om 'n Voortrekker Kommando op die lug te sit.



Die Voortrekkers

that information is up to date!

There is a certain magic of the crackling airwaves! It is an event that has something of a thrill about it for Scouts of all ages, becoming a highlight in the calendar for many.

Jamboree on the Internet

If you are organising a JOTI-only event, all you need is a computer and a good Internet connection. All the details are online and available to you when you register.





ZS SOTA Winter and Queen of the Mountain Weekend 2026

Adele Tyler, ZS5APT

The 2026 ZS SOTA Winter and Queen of the Mountain Weekend was exceptionally well supported by both activators and chasers. We were blessed with beautiful winter weather, excellent propagation and plenty of fun on the summits. It was wonderful to hear so many familiar and new voices on the air and to welcome new activators and chasers to the programme.



Weekend Statistics

Saturday 13 June 2026

- ♦ Thirteen summits were activated, five of which were first-time activations.
- ♦ Twenty-two activators, including six YLs.
- ♦ Seventy-five ZS chasers, including four YLs
- ♦ Seven DX chasers.
- ♦ Two Namibian chasers.
- ♦ ± five hundred and fifty-two Chaser QSOs
- ♦ Four hundred and ninety S2S QSOs
- ♦ The furthest chaser was Hiroaki "Waka" Wakaomi, JG0AWE, 12 500 km from ZS/MP-095

Sunday 14 June 2026

- ♦ Five summits activated.
- ♦ Ten activators, including three YLs
- ♦ Fifty-one ZS chasers, including five YLs
- ♦ Six DX chasers.
- ♦ One Botswana chaser.
- ♦ One Namibian chaser
- ♦ Two hundred and forty-nine Chaser QSOs
- ♦ Fifty-seven S2S QSOs.
- ♦ The furthest chaser was Hiroaki "Waka" Wakaomi, JG0AWE, 12 500 km from ZS/MP-097.

(Continued on page 31)



Weekend Totals

- ◆ Eighteen summits activated
- ◆ Nineteen OM activators
- ◆ Seven YL activators
- ◆ Ninety-three ZS OM chasers
- ◆ Six YL chasers
- ◆ Ten DX chasers
- ◆ One Botswana Chaser
- ◆ Two Namibian Chasers

A sincere thank you to every activator, chaser, spotter and supporter who helped make the weekend such a success. Whether you climbed a summit, chased from home, or simply encouraged others along the way, you all played a part in



making this one of the highlights of the ZS SOTA 2026 calendar.

We look forward to hearing you all on the next ZS SOTA weekend of 19 - 20 September 2026!



The Spring ZS SOTA Activity Weekend

This is a fun event to encourage radio amateurs to participate in the Summits on the Air (SOTA) programme. This fun activity is open to all radio amateurs.

All activations must be according to the SOTA rules: Activators must carry their station, mast and antenna to the summit and may not operate from a building or vehicle. Chasers may operate from any station. A summit may be activated as often as desired, but an individual Activator can only claim

points for operation from a particular Summit once in any calendar year. Club stations may not participate in their own right as Activators, Chasers or SWLs.

Register on the database at <https://www.sota.org.uk/Online-Resources>. Summits are listed on the database and visually on the mapping project. Alerts and Spots are on SOTAwatch, so register to use them. Many repeater high sites are

(Continued on page 32)

(ZS-SOTA Weekend from page 31)

SOTA summits, so get your Club members up to the high site, to activate the summit and enjoy a braai afterwards.

The second ZS-SOTA Weekend, the Spring Activity Weekend runs from 00:00 UTC on 19 September to 21:59 UTC on 20 September 2026

Activity is on all amateur bands and modes and the exchange is a RS, RST or RSQ report and the SOTA reference.

You can participate as an Activator or a Chaser.

Upload your SOTA log to the SOTA Database (<https://www.sotadata.org.uk/en/>) as soon as possible after the event.

Both the activator and chaser will receive a certificate for their participation in the ZS SOTA Activity Days. All participants should log the contacts on the SOTA data base.

Start your planning now - decide which summits you are going to activate, check your equipment, charge those batteries, is the mast still serviceable?



Help with project review

This e-mail was received at 07:52 CAT on Friday 28 August 2026 from the IARU Region 1 Secretary.

My name is Ihar Yatsevich, EW3ADH and I am the developer of the open-source **WSPR-beacon** project. I am currently working with the U.S.-based ARDC foundation to obtain a grant for the further development and improvement of the project.

During the review of my grant application, I received feedback from the reviewers that the proposal does not yet provide sufficient evidence of real-world demand for the project or interest in such a solution from amateur radio organizations and clubs.

Would it be possible to ask you to review the project and provide a brief written opinion regarding its usefulness and the value of continuing its development? The deadline for resubmitting my application is 2 September, so I am currently trying to collect relevant feedback and supporting evidence before then.

I would be very happy to provide any additional information about the project and answer any questions you may have. **The project is entirely non-commercial and is intended to contribute to the amateur radio community**, with a particular

focus on making digital-mode experimentation more accessible to newcomers.

I have also published a short article on QRZ.com describing the planned changes and improvements in the next version of the project:

<https://forums.qrz.com/index.php?threads/feedback-wanted-esp32-c3-low-power-digital-mode-hardware-platform.1001784/>

Thank you very much for your time and consideration.

Best regards, Ihar Yatsevich, EW3ADH
igor.nikolaevich.96@gmail.com



BEST EFHW ANTENNA SHAPES

EFHW = END-FED HALF-WAVE • WORKS GREAT WITH A 49:1 UNUN (9:1 UNUN × 5:1)

◆ SIMPLE • EFFECTIVE • MULTIBAND (40–10m+) • EASY TO DEPLOY



1 INVERTED-L

BEST OVERALL

- ✓ Excellent all-around performer
- ✓ Good low-angle radiation for DX
- ✓ Vertical section helps on lower bands (80/40m)
- ✓ Only one tall support required
- ✓ Very popular for portable and home stations



BEST FOR

- 40–10 m
- POTA / SOTA
- General HF Operation

2 HORIZONTAL

BEST IF YOU HAVE TWO SUPPORTS

- ✓ Highest efficiency
- ✓ Lowest noise
- ✓ Best pattern if mounted at least ½ wavelength high
- ✓ Excellent DX when installed high enough

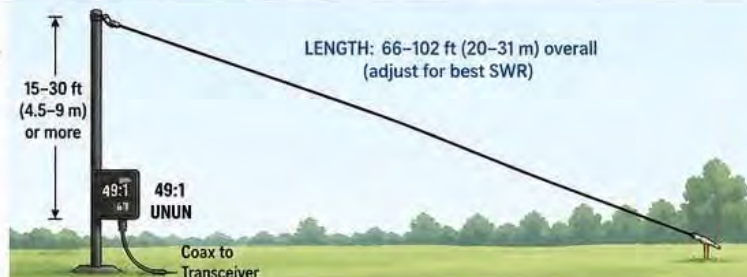


BEST FOR

- Permanent Home Station
- Serious DX

3 SLOPER

- ✓ Needs only one support
- ✓ Naturally favors radiation toward the lower end
- ✓ Good compromise where space is limited



BEST FOR

- Small Yards
- Limited Space
- Lower Band Performance

4 INVERTED-V

- ✓ Easy portable deployment
- ✓ Nearly omnidirectional
- ✓ Good for regional contacts
- ✓ Slightly less efficient than a well-installed horizontal wire



BEST FOR

- Portable Ops (POTA/SOTA)
- Regional Contacts
- NVIS (if low)

QUICK COMPARISON

SHAPE	SUPPORTS REQUIRED	DEPLOYMENT EASE	EFFICIENCY (POTENTIAL)	DX PERFORMANCE	NVIS / LOCAL	BEST USE
1 INVERTED-L	1	★★★★★	★★★★★	★★★★★	★★★★★	All-around / Portable DX / General HF
2 HORIZONTAL	2	★★★★	★★★★★	★★★★★	★★★	High DX / Low Noise Permanent Stations
3 SLOPER	1	★★★★★	★★★★	★★★★★	★★★★★	Small Yards / Limited Space
4 INVERTED-V	2	★★★★★	★★★★	★★★★★	★★★★★	Portable / Regional NVIS (if low)

WHICH SHAPE SHOULD YOU CHOOSE?

Long-distance DX	→	HORIZONTAL (high)
Best all-around	→	INVERTED-L
Portable (POTA/SOTA)	→	INVERTED-L
Small backyard	→	SLOPER
Regional / NVIS	→	LOW HORIZONTAL or INVERTED-V

★ MY RECOMMENDATION

For most hams, the **INVERTED-L** offers the best balance of DX performance, multiband operation, easy deployment, and only one support. Pair it with a quality 49:1 UNUN and you're on the air from 40–10 meters (and beyond with a tuner)!



TIPS

- ✓ Keep wire as high as practical.
- ✓ Use good insulators and UV-resistant line.
- ✓ Fine-tune length for lowest SWR on desired band.
- ✓ Use a choke (ferrite or coax choke) at the UNUN.

Amateur Radio at the Second Africa Rover Moot

Stephan, ZS6SKY

The East Rand Radio ARC was tasked with providing interactive displays for the Technology Base at the second Africa Rover Moot being held at Arrowe Park Benoni from 1 to 8 August. Planning started over a year ago and we invited the SARL and volunteers to assist us at the Moot. A lot of hard work went into the planning and as time drew closer we started having online meetings and doing other prep work, some things included having to register DMR ID for ZS6ERB and also trying to get one for ZS9YOTA. Gaining access to the ZS6ERB QRZ web page, so DMR QSOs could be added and testing that these could be confirmed.

Our brief from Peter, head of the local Rover group at Arrowe Park was to showcase Amateur Radio, activities including ADS-B, DMR, Echolink, Weather Satellites, HF, QO-100 and SSTV. SARL Hamnet was also part of the team, providing VARA HF and DMR. Robot Building and Battleships was also part of our groups offering.

Our team consisted of Marc, ZS6MDH (Robotics); Nigel, ZS6RN (Battleships and DMR); Hendri, ZS6HFE and Martie, ZS6MV (DMR); Brain, ZS6YZ and Willem, ZS6WIM (SARL Hamnet stand); Guy, ZS6GUY (SARL stand); Stephen, ZS6SKY (HF, Echolink, Sat coms) and Wayne, ZS6ORB (ADS-B and Geo Weather). Two weeks before the event, we had a dry run, thanks to my team for bringing their tech, I found out that my rig would not communicate with my laptop.

A special word of thanks goes to Anton, ZR6AIC who managed to get his QO-100 system ready at very short notice for us and provide the uplink via EchoLink for us. Anton worked on his system over 3



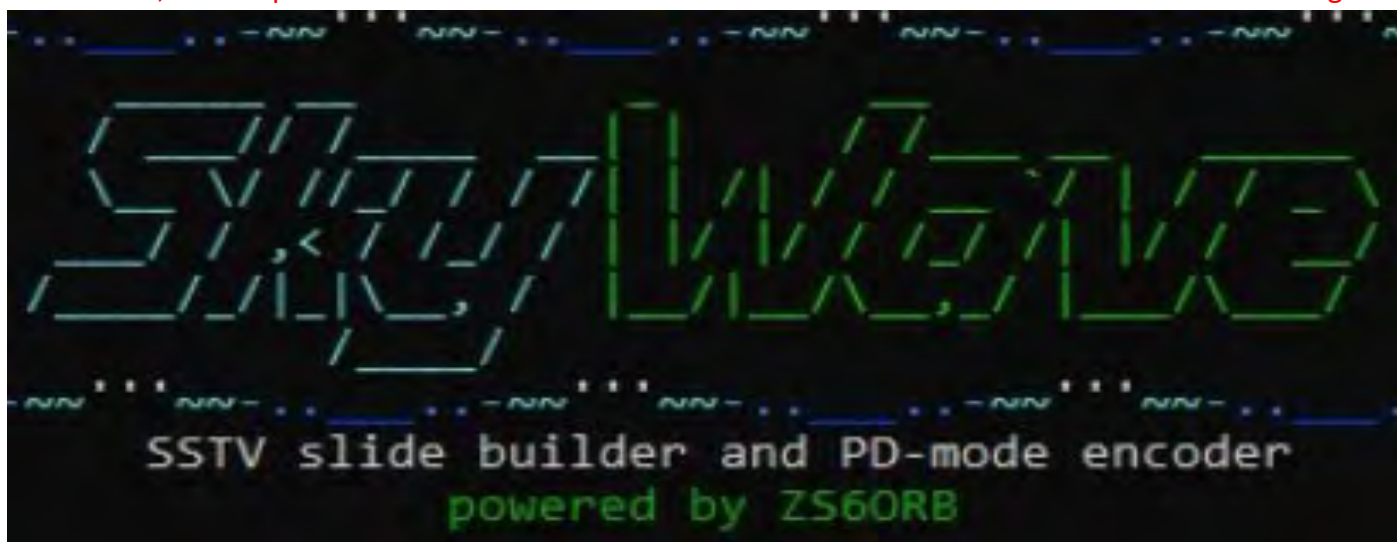
The Rover Moot is an event for senior members of the Scouting movement and other young adult Scouts. Moots provide an opportunity for young adults in Scouting to meet, with the objective of improving their international understanding as citizens of the world. Participants must be 18 – 25 years old at the time of the event.

"Moot" is an Old English word for a gathering. Rover Moots (older members are traditionally called Rovers) took place at provincial, national and international levels.

days, also having to replace a power supply, in order to get his system ready in time. I would also like to give a shout out to Gary Immelman, ZS6YI, for his support and guidance as time drew near, Gary also tried very hard to get a portable QO-100 system ready in time for us. In the end we went with Anton's QO-100 system. We made a handful of contacts on the Satellite over Sunday and Monday. Ian, ZS1OSK was very instrumental in assisting both Peter and myself in arranging contacts from the Cape and KZN, but this being a live event, some contacts just were not possible. Ian provided guidance into how we could make the event more fun for the Rovers and tried to arrange skeds with local Scouts and Rovers.

(Continued on page 35)





(Amateur Radio at the Second Africa Rover Moot from page 34)

Tech

Nigel, for his part, needed to modify the code for the Battleships game. Marc, needed to fix some coding for the Robotics UI and Wayne stepped in to add some customizations.

Wayne built a web based software from the ground up in just days, built specifically to showcase the high resolution images being downloaded from Satellites. Sat Ops was born, a One of a kind software, made specifically for the Moot.

We were also tasked with digitizing and creating a set of images that could be transmitted across the park using SSTV, Peter supplied the images and these were superimposed onto the standard Moot background. This was quite a simple task, but Wayne decided to standardize this further and created another custom app, this one can be used by the clubs for events in the future. Sky Wave is born, no, I did not invent it.

Wayne then used his new app to create these pictures that were transmitted at the Moot. This



did not prove to be very popular this time round though. The transmission was on 145,500 MHz with 1 watt of power and using a small voice recorder and VOX on a portable radio.

1 August started off slow, packing the car, checking I had not forgotten anything, arriving around 12 pm on Saturday, I had the whole afternoon to set up, the opening ceremony got underway a little after 2 pm, there was a band

(Continued on page 36)





(Amateur Radio at the Second Africa Rover Moot from page 35)

marching and the pipe band after that.

Next was the Flag Waving ceremony, 35 countries were in attendance. A totem pole was erected and country flags blew gently in the breeze creating a wall of colour against the winter sky.

Wayne, ZS6ORB arrived a little later and started setting up his displays. I had bought some felt type material, some bright colours, specially chosen, so they would stand out and add colour too, so it would not just be rusty old tables and also to protect our equipment from scratches and scrapes. This was a good choice, as it made our presentations look soo.... much better.

The left display is "Sat Ops" high resolution images available at 15 and 30 minute intervals, Wayne was also monitoring a cyclone off the coast of Japan. The righthand display was Automatic Dependant Surveillance Broadcast, ADS-B for short, using a version 3 SDR dongle and ADS-B base antenna, on a 7 metre mast, we had a receiving range of around 300 km. Being located really close

to OR Tambo Airport and running a highly customized version of SDR Angel, we were even able to see planes moving between runways on the ground and also able to see 3D images of the actual aircrafts were possible, all in all, this presentation drew plenty of attention.

Brian, ZS6YZ and Willem, ZS6WIM spent a total of 8 days at the Moot, SARL Hamnet providing camp coms and learning sessions provided by Brian on digital communications using VARA HF in a modern age. Willem and Nigel, ZS6RN also provided DMR on Sunday and Monday. Focus for the Rovers was on being Prepared and reaching higher and higher.

Focus from SARL Hamnet's side was to showcase Amateur Radio's capabilities in times of disaster and how the Rovers could assist in their communities.

Robotics

Marc, ZS6MDH took lead on the Robotics base,

(Continued on page 37)





(Amateur Radio at the Second Africa Rover Moot from page 36)

assisted by his friend Logan and another assistant, a week before the Moot, Marc had to solder up 400+ pc boards, wires onto motors and each control module needed to be programmed, the programming task alone, took over a day to complete, including having to charge masses of batteries for the units. Once built, in a 45 minute hands on lesson, participants could log into the

units UI and set the controls and motor speeds, etc.

Those that completed their robots in time, could compete in a game of robot soccer.

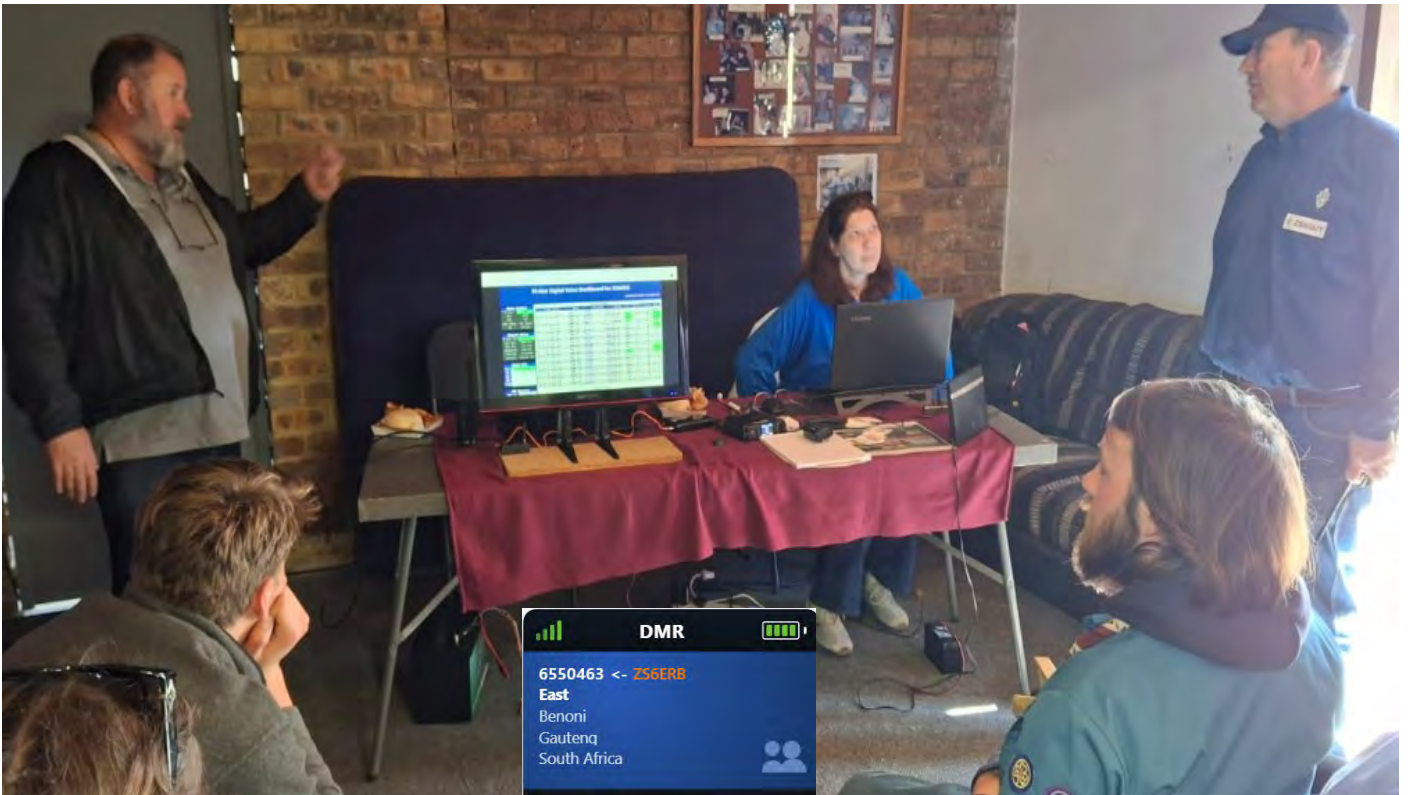
DMR Base

Hendri, ZS6HFE and Martie, ZS6MV ran the DMR base, Albert, ZS6AHY from Radio Master provided a mobile DMR Radio on loan, thanks Albert, your assistance is much appreciated.

Hendri and Martie did a lot of prep work in the background, weeks before the event,

(Continued on page 38)





(Amateur Radio at the Second Africa Rover Moot from page 37)

logging into Brandmeister, setting up contacts and skeds.

On Sunday, Hendri and Martie introduced the Rovers to DMR, Rovers from the various countries were able to pick and choose between countries, that were busy in active conversations and then choose to speak with these people, others translated for the rest.

A lot of Rovers got to speak on the airwaves. Logged contacts will each receive a paper QSL card.

The HF Base showcased old and new and how we can use SDR's to modernise older equipment, SSTV was on show, contacts were made on QO-100 via Anton's EchoLink uplink.

The SARL was well represented, with Guy,

ZS6GUY, SARL President, Brian, ZS6YZ, National Director for SARL Hamnet and Noel, ZR6DX for the Youth. Actually, we had 3 councillors, if we count Gary, ZS6YI you assisted us in the background.

Guy met the Rovers on Sunday and Monday and did a show and tell on Amateur Radio activities, covering BACAR to kit building.

Guy also manned the ADS-B interactive display on Monday.

Thank you to everyone that assisted to make this event possible, also to all the stations on stand by to make on air contacts with us.

Credit to the World Organisation of the Scout Movement (WOSM) for allowing us to reproduce some content for Radio ZS.





ZS6STN in Your Pocket - Building a Mobile Companion for Amateur Radio

Mark Burgess, ZS6AMF

Amateur radio has always been about combining proven techniques with new technology. While we still enjoy building antennas, working DX, experimenting with equipment and helping newcomers onto the air, today's amateur radio station often includes computers, digital modes, online resources and portable devices.

With that in mind, the Sandton Amateur Radio Club set out to create something practical for modern operators: the ZS6STN Mobile App.

The app is now available on both Android and iOS, giving radio amateurs easy access to club information, operating tools and useful amateur radio resources from almost anywhere. More importantly, it was designed to be more than just a mobile version of the club website. The goal was to create a useful companion for everyday operating, portable activities and club participation.

Keeping Members Connected

Anyone involved with a busy radio club knows that information often ends up spread across websites, email, social media, WhatsApp groups and on-air announcements. Even active members occasionally miss something important.

The ZS6STN app brings much of that information together in one place. Members can view the latest Sunday Bulletins, listen to available bulletin recordings, keep up with Power Hour Tech Talks, browse club news and stay informed about upcoming events. Repeater information is also easily accessible without having to dig through old messages or bookmarks. In simple terms, if you want to know what is happening at ZS6STN, the answer is now only a few taps away.

Weather, Space Weather and Propagation

Most people check the weather to see whether they need a jacket or umbrella. Radio amateurs often check it to decide whether they are heading out for a portable activation, antenna project or Field Day.

The app includes weather information, space weather data and propagation resources, helping operators get a quick overview of conditions that may affect radio activity. It also provides links to services such as NOAA and other space-weather resources for those who want more detailed



information.

An Offline Logbook for Portable Operating

One of the most useful features in the app is its offline logbook. Portable operators know that reliable internet access is not always available, especially during SOTA and POTA activations, Field Days or operations from remote locations. The logbook continues to function without a network connection, allowing QSOs to be recorded directly on the device.

The app can also determine the operator's location and calculate a Maidenhead grid square, making setup and logging simpler while operating in the field.

Logs can be exported in several formats:

- ◆ ADIF for importing into amateur radio logging software
- ◆ CSV for spreadsheets and analysis
- ◆ TXT for a simple readable log file

Once connectivity is available again, the log can easily be shared or transferred using the phone's built-in sharing features.

Supporting SOTA and POTA

Summits on the Air and Parks on the Air have become increasingly popular among South African amateurs and the app includes dedicated logging support for these activities.

(Continued on page 41)

(ZS6STN in Your Pocket from page 40)

The focus was on keeping things simple. Portable operating already involves enough equipment, planning and, in some cases, a fair amount of walking. Logging software should make life easier, not more complicated. Although designed with SOTA and POTA operators in mind, the logbook is equally useful for Field Days, temporary stations, mobile operations and casual operating away from home.

Learning and Amateur Radio Resources

The app is also intended to support newcomers to the hobby. Users can access RAE learning resources, amateur radio information and links to regulatory information published by ICASA. By linking directly to official sources, users can access the latest available information rather than relying on documents that may become outdated over time.

A Radio Gear and Consumables section provides information on equipment, accessories and other useful items commonly used in the shack or during portable operations.

Connecting the Wider Amateur Radio Community

Although the app carries the ZS6STN name, it is intended to serve the broader amateur radio community as well. The National Club Listing helps users find amateur radio clubs throughout South Africa. For newly licensed operators or those considering entering the hobby, it provides a simple way to discover clubs and connect with other amateurs. As most of us know, earning a callsign is only the beginning. Clubs play a vital role in mentoring, encouraging and supporting new operators as they gain confidence on the air.

Show Off Your Shack

Every radio station tells a story. Some operators have dedicated radio rooms filled with equipment, while others operate from a small desk, a portable case or even a vehicle. The app's "Show Off Your Shack" feature allows members to share short videos of their stations, antenna systems, workbenches and projects. The aim is not competition, it is about sharing ideas, inspiring others and celebrating the many ways people enjoy the hobby.

Helping New Operators Get On The Air

The On-Air Launchpad is aimed at RAE students, newly licensed amateurs and anyone who still feels

a little uncertain about making that first contact. Many newcomers understand the theory but lack confidence when it comes to using the microphone for the first time. Through the Launchpad, members can seek guidance, ask questions and receive support from experienced operators. The objective is simple: not just helping people pass the examination - but helping them become active and confident radio amateurs.

Useful Notifications, not "Information Overload"

The app includes an in-app notification system with preference controls, allowing users to receive updates about Sunday Bulletins, Power Hour presentations, club activities, membership matters and application updates. The idea is to ensure notifications remain useful and relevant without becoming a constant distraction.

Built to Grow

Someone once told me, "...getting your license is merely the beginning, now the real learning starts!", the release of the app on Android and iOS is not the end of the project. It's only the beginning.

An integrated version-checking system allows users to stay informed about new releases, while feedback from members and users will help shape future development. New features will be added where they provide genuine value and help make club information, learning resources and operating tools more accessible.

A First for South African Amateur Radio?

From what we have been able to determine, ZS6STN appears to be the first South African amateur radio club to launch its own dedicated mobile application on both Android and iOS.

Technology will never replace a good QSO on 10 m, a successful Field Day with fellow operators, a club meeting or the satisfaction of building something yourself. What it can do is make it easier to access information, stay connected, learn new skills and participate in the hobby.

Whether you are a ZS6STN member, a newly licensed amateur, a seasoned operator or simply interested in amateur radio, the app provides a convenient gateway to club activities, operating resources and the wider amateur radio community.

73 de ZS6STN

Where Curiosity Finds a Frequency.

The Worked Zone 38 Award

According to the CQ Magazine's Worked all Zones Award programme, Zone 38 is known as the South African Zone.

The following entities are in Zone 38: 3DA – Eswatini (Swaziland), 3Y - Bouvet Island, 7P – Lesotho; A2 - Botswana, V5 - Namibia, ZD9 - Tristan da Cunha and Gough Islands, Z2 – Zimbabwe; ZS - South Africa; ZS8 - Marion Island and some Antarctic stations (the boundaries of CQ zones 12, 13, 29, 30, 32, 38 and 39 converge at the South Pole. Stations KC4AAA and KC4USN are at the South Pole and will count for any one of the listed zones. Most Antarctic stations indicate their zone on the QSL card.)

To obtain the Worked Zone 38 Award, radio amateurs must provide evidence of working 38 stations in Zone 38 starting from 1 January 2019, made up as follows:

- 1 QSO from Eswatini
- 1 QSO from Lesotho
- 1 QSO from Botswana
- 5 QSOs from Namibia
- 2 QSOs from Zimbabwe

5 QSOs from ZS1 (can include ZS7)

5 QSOs from ZS2 (can include ZS8)

4 QSOs from ZS3

4 QSOs from ZS4

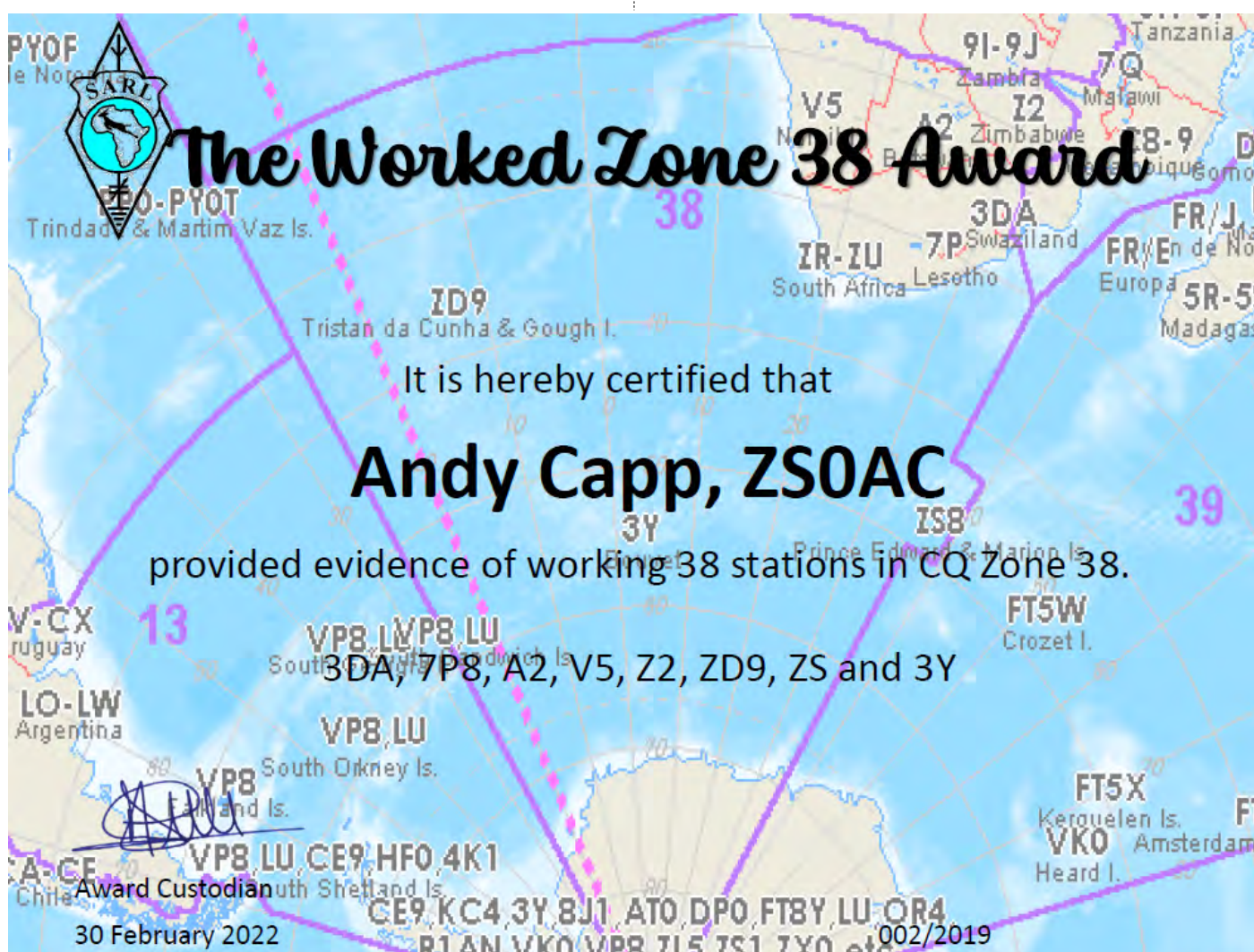
5 QSOs from ZS5 and

5 QSOs from ZS6 (1 from Limpopo; 1 from Mpumalanga; 1 from North West and 1 from Gauteng; the 5th QSO from any province in ZS6).

A QSO with Bouvet Island (3Y) or Tristan da Cunha and Gough Islands (ZD9) can be used as a Jocker.

The Award is available for CW, SSB and Machine Generated Modes from LF right through to SHF. Important - during the QSO, the name and QTH of the operator must be obtained.

An Award application form in MS Word is available on the SARL web site at and must be sent to radiozs@sarl.org.za. The Award will be an A4 PDF document sent out by e-mail.



Effective Communication - The Crux of Field Day

Buddy Sohl, KC4WQ

first published in QST, June 2026

The Bullitt Amateur Radio Society's tips on pooling club members' skills and experiences to operate efficiently on the ARRL Field Day. The aim of the Field Day is to work as many stations as possible on the 160, 80, 40, 20, 15 and 10-metre bands, as well as all bands 50 MHz and above and in doing so to learn to operate in abnormal situations in less-than-optimal conditions. A premium is placed on developing skills to meet the challenges of emergency preparedness as well as to acquaint the general public with the capabilities of Amateur Radio. CW, phone and digital modes can be used - the digital mode must send the exchange of number of transmitters, Field Day operating Class and ARRL / RAC section.

The second leg of the SARL National Field Day takes place on 5 and 6 September at a camping site near you. Read how the Bullitt ARC prepare for Field Day, maybe you can use it f your Club.

The Bullitt Amateur Radio Society, KY4KY, has had very successful ARRL Field Day efforts, primarily because we prepare and we build on past successes and failures.

Operating events held throughout the year are the bread and butter of our success. For each event, we set a personal or group goal. We look at whether there was anything lacking last year (phone station antennas, number of operators at the CW station, equipment needs, etc.) and how we can fix it for this year.

Transferable Member Skills

During the year, many of our members participate in different operating events, all involving skill sets that prove useful during Field Day.

Several members are Parks on the Air® (POTA®) enthusiasts who have developed the skill to handle multiple callers (pileups) and have learned to keep their exchange to just the facts. Another skill set the POTA ops have gained is how to use compromise antennas efficiently and effectively.

Our club has supported the Lewis and Clark Trail on the Air special event since its inception. This is another operation that requires handling the

occasional mini-pileup and getting contacts in the log efficiently and correctly. All those call signs in your log are looking for this special event award. If we get it right, everyone is happy.

Several of our members are contesters. Their success is measured by contacts and multipliers, so accuracy is paramount.

A few of our members love chasing DX. They have developed the ability to figure out a pileup and find the optimal time to insert their call to get through.

These skills become shared assets as members work together toward common goals. And they all have one commonality — effective communication.

Effective Field Day Communication

Exchanging information quickly, efficiently and correctly is the crux of Field Day. As a young air traffic controller, my instructor asked me why I talked so much. I came from a law enforcement background and upon considering his point I realized that there was a lot of unnecessary verbiage in my communications. Those extra words add nothing and actually degrade your effort by introducing points of potential confusion, errors, delays and unnecessary repeats. When you are providing emergency or public service communications, eliminating errors and minimizing airtime are two high-profile considerations.

When we train for Field Day, there is an emphasis on minimizing verbiage and getting the message through quickly, efficiently and error-free. Our members familiarize themselves with the rules of the event, the type of exchange and practice writing out the exchange and verbalizing it out loud several times before they ever key a transmitter. There is a focus on minimizing words, regardless of mode. CW and digital are fairly easy to corral, as so much of our exchange is accomplished with the aid



Tina Sohl, KJ4QFK, at the mic

(Continued on page 44)

(Effective Communications from page 43)

of computers and logging software. Phone communication is where the largest issues arise. We are talkers by nature and an occasional extra hello or thank you does not detract too much from the score, but it's the beginning of a slippery slope.

This increases the amount of time to complete a contact and decreases the number of contacts the station is able to accommodate. Just a bit of simple math — if it takes 20 seconds to complete a two-way exchange using minimal verbiage, you can optimally make 180 contacts per hour. However, by introducing an extra 10 seconds of talking, you've reduced your efficiency to no more than 120 contacts per hour optimally (a 33% reduction). Over the 24-hour Field Day contest window, you have effectively removed the opportunity for 1 440 additional contacts. Another simplification is minimizing the number of exchanges. When you are CQing, answer the caller with their call sign only and the exchange. Do not waste time by verifying call signs or saying, "[call sign] go ahead." All of these introduce opportunities for errors and reduce efficiency. If you got the call sign wrong, they will let you know.

Keep It Simple

If your exchange is "2 Foxtrot Kentucky," (3 Alpha Free State) then that is what should be conveyed. Do not add verbiage such as "please copy" or "2 Florida Bluegrass State KY" or repeat the exchange two or three times or out of sequence. Keep it simple and straightforward and use standard phonetics. Use a speed of voice or CW that is effective for your audience — remember, Field Day has a lot of new and inexperienced operators.

Slow things down a bit. Speak clearly and



Glenn Petri, KE4KY at the CW station



Dustin Rhodes, KM4UNY, hamming it up with the antennas

succinctly. Send what you need to type or write in the log, in the order you would write it. Learn to use the microphone or key quickly and know what you are going to say before you push the push-to-talk button. Certainly, there are those times when fills or repeats will be required. Those become more obvious as you gain experience. But looking at the basics, transmit your information one time. If the receiving station does not get it, they will ask for a fill or repeat.

Listen effectively. In a contest, there will be a sequence to the exchange. Incorporate intelligent listening. You know what should be coming. Anticipate what you should be hearing and verify it in your mind. Decode it and log it, then move on.

The Rewards of Efficiency

The bonus of efficient communication is more contacts in the log and more points. If you have a small pileup and spend too many words on each contact, some of those stations in the queue may well move on to other frequencies. While they may end up in your log later, they also may just be a lost opportunity. Maximize your opportunities for contacts by minimizing your words.

When you send just the needed information, nothing is misconstrued, errors are reduced or eliminated and you are one giant step closer to producing that golden log and being an effective and efficient communicator. Everyone wins when the correct information gets through quickly and efficiently.

All photos provided by the author.

Buddy Sohl, KC4WQ, was licensed in 1979 as

(Continued on page 45)

(Effective Communications from page 44)

KA4JMX and upgraded to Amateur Extra in 1980. Primarily a CW operator and casual contester, he has operated from 25 different states over the years and most recently has been bitten by the POTA bug.

He is a trustee for the Bullitt Amateur Radio Society, KY4KY and coordinated the first Big Project school in Kentucky. A Life Member of ARRL and CWops, he is a retired air traffic controller. He can be reached at buddysohl@gmail.com.

Amateur Radio has never been more Affordable — So why do some things seem so expensive?

Thomas Witherspoon, K4SWL

When I meet a newly minted amateur radio operator, I often start by telling them, “*You couldn’t be entering our community at a better time!*” And I really mean that.

We have incredible support communities, both in person and online. Amateur radio has become far more accessible than it once was. And the cost of getting on the air has dropped dramatically.

That last part is easy to overlook if you are new to this. Those of us who have been around for a few decades have a little more perspective. I became an amateur radio operator in 1997. Some of you reading this have been amateurs for twice as long—or more—and you know exactly what I mean.

The gear available today is, in many respects, astonishingly affordable.

The Incredible Value of Modern Amateur Radio

Today, it is entirely possible to put together a very capable field station - radio, battery, antenna and accessories - for well under \$300. Build your own antenna and you can make that figure smaller



Especially in the QRP world, we are living in something of a golden age

still.

Batteries alone are a good example of how much things have changed. They are smaller, lighter, more energy-dense, less expensive and incredibly ubiquitous. When I started, batteries were heavier, more expensive for what you got and considerably less convenient.

Then there is the sheer number of inexpensive QRP transceivers available. QRP Labs is the perfect example: the QMX five-band, 5-watt multimode kit is just over \$100 and it gives you CW, SSB and digital modes in a remarkably compact package.

And when you look at everything else coming out of the QRP community - the various QRP Labs designs, MountainTopper radios, the CFT-1, the microSDX radios and so many others - the choices are almost overwhelming.

And it is not just QRP.

If you want to operate QRO (20 – 100 watts), you can build a capable portable station around something like the Xiegu G90 or a used Yaesu FT-891 for a fraction of what a comparable station would have cost decades ago.

Some of these rigs are not going to have the



The \$23 Talentcell Li-Ion Battery (<https://amzn.to/4xvxUzS> affiliate link)

(Continued on page 46)



That is an incredible amount of radio for the money

(Amateur Radio has never been more Affordable from page 45)

refinement or audio quality of a contest-grade transceiver, of course. But they do not have to. They work brilliantly. They get you on the air.

And that is the important part.

What \$700 Meant to Me in 1997

I think about this a lot, because I remember very clearly what it was like to get my first amateur radio equipment.

In 1997, I had just finished my undergraduate degree. There was a period of about a year when I was working odd jobs, trying to make money before landing my first “real” job. My wife and I were essentially living on a student’s salary.

I saved up for a used Icom IC-735. I believe I paid nearly \$700 for it from an amateur radio shop in New Jersey. That was \$700 for a *used* radio. Using the US Consumer Price Index, \$700 in 1997 is equivalent to roughly \$1,450 today.

And that was just the radio. My antenna, a manual MFJ antenna tuner (\$200) and an Astron linear power supply (\$190) were all additional expenses. The antenna was the exception, because I built it myself - though I still had to buy the wire, window line and components (\$80), since I had not yet accumulated any supplies of my own.



Compare that with today, when a few hundred dollars will put a tremendously capable QRP or QRO field station in your pack.



Original IC-735 sales flyer

(Aircraft Enhancement from page 46)

But Then I Hear: "That's a Rip-Off!"

Here is where this gets interesting. Because I run QRPer.com and a YouTube channel devoted largely to portable amateur radio, I see an enormous number of comments about the cost of equipment.

And I completely understand where those comments come from, especially when folks feel pricing is too high.

There have been periods in my own life when I could afford virtually anything I wanted and periods when I could not afford much of anything. I know what it is like to look at a piece of equipment and think, "That's simply not in my budget."

There is absolutely nothing wrong with that. I cannot afford everything I would like, either.

But there is a real difference between something being too expensive *for me* and something being priced too high (i.e., a "rip-off"). Those are not the same thing and I think we sometimes run them together - especially when we are talking about products made by small, independent manufacturers.



There are cheaper alternatives to the PackTenna, but there are few antennas more durable and effective

The Real Cost of Production

Over the past month alone, I have seen several



comments about products from small businesses and cottage-industry manufacturers - antennas, 3D-printed accessories, portable-radio components and other specialized bits of gear - where someone declares that \$40, \$60, \$100, \$300 or more is "too expensive" and a "rip-off."

Sticker shock is real. But it is worth asking what that price is actually covering.

When you buy a product from a small manufacturer, you are not simply paying for the plastic, wire, connectors and screws that went into it. You are paying for the equipment they bought in order to make it and for the maintenance of that equipment. You are paying for electricity, packaging, shipping supplies, transaction fees and all the other overhead that comes with running even a tiny business.

And you are paying for someone's time. Someone had to design the product, order the materials, manufacture it, test it, package it, answer your e-mail, process your payment, print your shipping label and get it into the mail. All this, while possibly holding down a separate full-time job.

The raw materials are the smallest part of that equation.

If they are spending an evening making

(Continued on page 50)

BOMBASTIK

AMATEUR RADIO ACCESSORIES

**Bombastik Crew Offer Great
Customer Service and Quality
Above All.**



**COUNTRY
WIDE
SHIPPING**

OUR SERVICE:



Antennas: See our high quality hand crafted antennas and accessories.



Radios: Premium-quality Chinese radios. No cheap knockoffs—only high-spec, unbeatable value!



Accessories: A wide range of top-quality equipment that you'll be proud to own.



082 785 7763



<https://www.bombastik.co.za>



HAMSHACK PRETORIA

Grootste nasionale verspreider van ICOM™ produkte
Handelaar sedert 2005

Jan (Pine) ZS6OB - 082 447 7823



IC-7760 HF/50 MHz High Power 1~200W (nuwe model)

ID-52E



IC-7610 SDR HF/50 MHz



IC-2730E VHF/UHF Dubbel band



IC-7100 HF/VHF/UHF



IC-7300 HF/50/70 MHz * 5 MHz opsie



IC-9700 VHF/UHF/1200 MHz SDR



IC-705 HF/VHF/UHF



IC-PW2 LDMOS 1 kW HF/50MHz versterker (nuutste model)

H/V 801 Neilspoor & Malmesbury Straat, Wingers Park, Pretoria

E-pos: www.hamshack@gmail.com

Vriendelike raad en byderbare beskikbaar:
ICOM twee jaar waarborg
Skakel vir meer inligting

Lokale uitwaartse herstelling beskikbaar

OPS: S25-49-21-E26-16-04

Minister van die reks, lars en voorraad

(Amateur Radio has never been more Affordable from page 47)

antennas or 3D-printing accessories, that is an evening they are not spending doing something else. That opportunity cost is part of the price and I think it should be.

So, when I buy from a small manufacturer, I generally expect to pay a little more. And I am happy to do it. I see some of that extra cost as paying it forward.



The Tufteln Reel Antenna design
Size comparison of the original SpoolTenna (left) and the new SpoolTenna Ultra (right)



We are living through a Cottage-Industry Renaissance

One of the things I find most fascinating about modern amateur radio is the sheer proliferation of small manufacturers.

Think about it! An individual, a couple, or a small team can come up with an idea, prototype it, manufacture a small run, put it on a website and sell it to an international audience.

That would have been incredibly difficult and costly when I first became a amateur.

Imagine trying to launch a little amateur radio business in 1997. You might have needed to buy a pricey advertisement in *QST* or *CQ*. You would wait for the magazine to be published. Customers might mail you a letter with a cheque or call you on the telephone. You would process the order, package the product and ship it - and the customer might wait weeks for the turnaround.

Today, someone can have an idea on Monday, put it online Tuesday, take orders Wednesday, ship Thursday and have it in a customer's hands within days. That is extraordinary when you stop and



The Pebble HF QRP 20 m transceiver and Zippy Paddles. All products dreamed up within our own amateur radio community

(Amateur Radio has never been more Affordable from page 50)

think about it. The internet has effectively created an international marketplace for people who make highly specialized amateur radio products in very small quantities.

I love that. And I want those people to succeed!



What About Larger Manufacturers?

The same principle applies further up the scale, although the economics are obviously different.

Take Elecraft. I have been using their equipment for 25 years and I have a particular appreciation for what the company does. The products are designed and manufactured in California - but, as with virtually every modern electronics manufacturer, many of the components are internationally sourced.

That is simply the reality of modern electronics. Domestic suppliers do not exist for a lot of the specialized parts that go into a contemporary radio, so those parts arrive through an international supply chain, carrying shipping, import costs, tariffs and regulatory requirements along with them.

Then there is everything involved in employing

people in a high-cost country: living wages, facilities, equipment, testing, customer service and warranty support. All of that is real money.

So, when I look at the price of an Elecraft radio or antenna, I am not only looking only at the price tag. I am looking at what is behind it - years of accumulated expertise, engineering and manufacturing and a company that still designs and builds equipment in the United States. And, oh yeah, you can call them on the phone, a person answers it and within a couple of minutes an expert is helping you one-on-one in real time.

And yes, I am paying for the higher cost of doing that. When I can, I consider that a privilege.

Perspective Changes Everything

Today, the fully equipped KH1 Edgewood Package is about \$1 450,65. That is obviously a lot of money.

But here is the perspective that blows my mind: adjusted using the CPI, \$1 450 today is roughly equivalent to \$700 in 1997.

In other words, a radio I would have considered **wildly futuristic** as a newly minted amateur costs, in inflation-adjusted terms, roughly what I paid for a *used* IC-735.



My first Elecraft radio was the KX1

(Continued on page 52)



The Elecraft KH1 is a good example

(Amateur Radio has never been more Affordable from page 51)

\$700 1997 dollars for a five-band, fully self-contained, high-performance, 5-watt transceiver with built-in telescoping antenna, automatic antenna tuner and rechargeable battery, so you can work DX while hiking? That is almost absurd.

And then consider, on the other end of the pricing spectrum: the QRP Labs QMX. At about \$102, that is roughly \$50 in 1997 dollars. **What!?**

This is where our hobby has been unusually lucky. Food, energy, labour, services - most of what we buy costs more than it used to. But amateur radio technology has followed a very different trajectory, riding economies of scale, improved manufacturing, miniaturization, digital processing and a truly global electronics industry.

I am not suggesting every radio today is cheaper in absolute terms than it was thirty years ago. I am saying the amount of capability we get for our money has changed *dramatically*.

That is an important distinction. And in QRP especially, we have an embarrassment of riches.

We have never had it this Good

My point is not that we should all spend more on our radios. It is that we have never had more options.

If you want the very best, it exists - extraordinary receiver performance, sophisticated DSP, integrated batteries and ATUs, colour displays, GPS, Bluetooth, remote operation - capabilities that

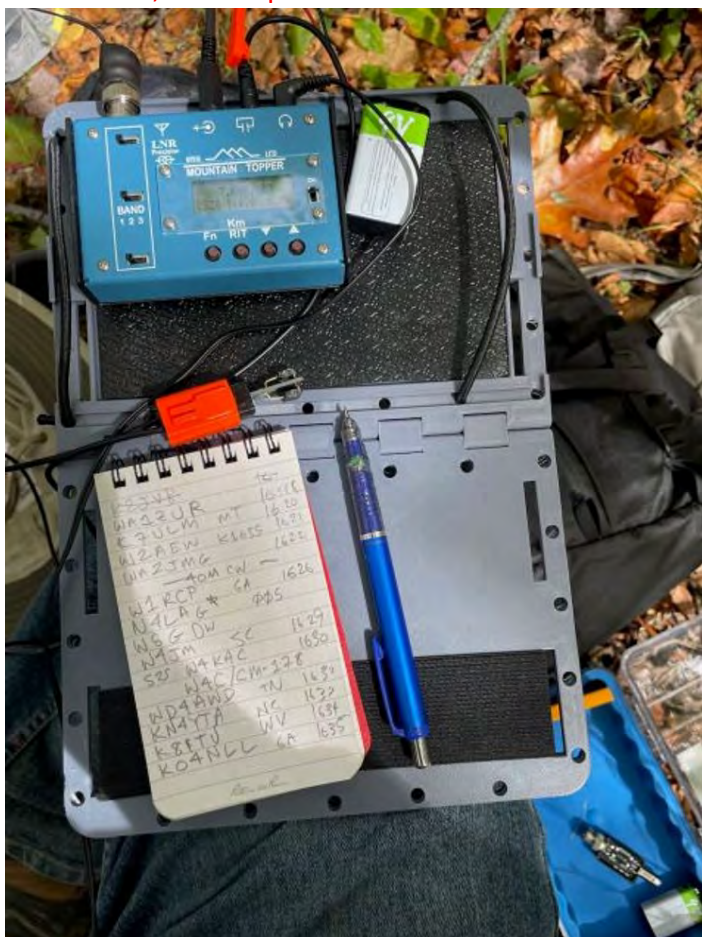


The AX4 antenna prototype in the UK this summer



would have read as science fiction when I was licensed. And much of it costs less, in inflation-

(Continued on page 53)



(Amateur Radio has never been more Affordable from page 52)

adjusted terms, than the far less capable gear I saved for in 1997.

If you would rather spend a few hundred dollars, that station exists too. Buy used. Build an antenna. Put together a kit.

Whichever end of that range you are shopping from, I meant what I said at the start: ***you couldn't be entering this hobby at a better time!***

And there has never been a better time to be the person building radios in a garage, a workshop, or a small factory.

That is worth remembering the next time we look at a price tag and think, "*Wow, that's expensive!*"

Sometimes it is.

But sometimes, perhaps, it is simply the price of making something amazing.

The Tinus Lange 7066 Technical Excellence Award

Do you enjoy building pieces of equipment to use in or outside the Shack? Or software to use for amateur radio? Well then how about entering for the Tinus Lange 7066 Technical Excellence Award?

The award is bestowed annually on the League member who submits a technical project in any of the following categories – a) the design and/or construction of projects such as a pre-amp, SWR bridge, patching unit, automatic ID'er, practical antenna ideas, mast, portable gear, power supplies, etc., or b) any software for use in Amateur Radio.

The submission must include the actual items (if size and mass allow) or photographs (particularly in the case of antennas, masts, etc.) And a complete write-up in article form with illustrations/pictures, ready for publication in Radio ZS.

The Award is a framed certificate and a cash award of R1 000. The closing date for entries is midnight on Sunday 31 January 2027 and must be sent to secretary@sarl.org.za.



Amateur Radio in STEM Education

David Witkowski and Suresh Ohja

IEEE Microwave Magazine, April 2016

Much has been said in recent years about the need for increased focus on scientific, technical, engineering and mathematics (STEM) education in the United States. It is argued that compared with students from other countries, US students perform less well on tests; moreover, they often do not fare well when competing with foreign students and immigrants for college admission (see Figure 1) and jobs. While there are counterarguments that a hyper-disciplined focus on math and science is not healthy, the obvious increase in foreign STEM students at major universities has led to calls for a shift in focus in US primary and secondary education from trades and general education to college prep, specifically, prep for STEM degrees.

Shifting Educational Values

In making this shift from trades and general education, secondary schools in the United States have stopped offering practical electives and replaced them with advanced placement courses. Auto shop, home economics and sometimes even physical education are no longer required and, in some schools, they are not even offered as electives. Electronics shop, a practical elective that for many older engineers was where we got our first exposure to amateur radio, has been swept away along with many other subjects not focused on the “college track.”

It can be argued that this is a good thing: it is now increasingly difficult in the United States to make a living with only a secondary-school diploma; obtaining a college undergraduate degree is now the minimal requirement for a majority of entry-level technical jobs. In fact, most job postings in engineering now list a master's degree in engineering or an MBA degree as a basic requirement, with a Ph.D. degree often added as a preferred requirement.

David Witkowski (dtwitkoski@gmail.com) is executive director of the Joint Venture Silicon Valley Wireless Communications Initiative, San Jose, California, United States.

Suresh Ohja (suresh.ohja@ni.com) is with National Instruments, Santa Clara, California, United States.

Digital Object Identifier 10.1109/MMM.2016.2515305
Date of publication: 7 March 2016



The Value of Practical Skills

Given these trends in job requirements, many may suggest that we not allow our young people to waste school time on trade skills and focus instead on getting them into a trajectory that leads to advanced degrees. Many undergraduate programs focus heavily on equipping students with the latest knowledge base of a rapidly changing electronics field, in a sense, the undergraduate programme has replaced the trade skills aspect of secondary education. Most advanced degree programs focus on theory and are taught using simulations and theoretical constructs, a course of study that often ignores the challenges of building real-world systems and fails to teach the practical troubleshooting and system-integration skills that form the basis of the technology on which our economy increasingly depends.

An internationally known Silicon Valley company, famous for having a very young employee demographic, has begun hiring older engineers as it expands its efforts beyond web apps and the cloud into smartphones, wearable devices and semi-conductors. The reason is simple: making wireless systems and semiconductors requires practical skills in troubleshooting, system integration and real-world design that can only be learned by a repeated doing–failing–redoing cycle. And these are not skills that are taught in many master's and Ph.D. degree programmes.

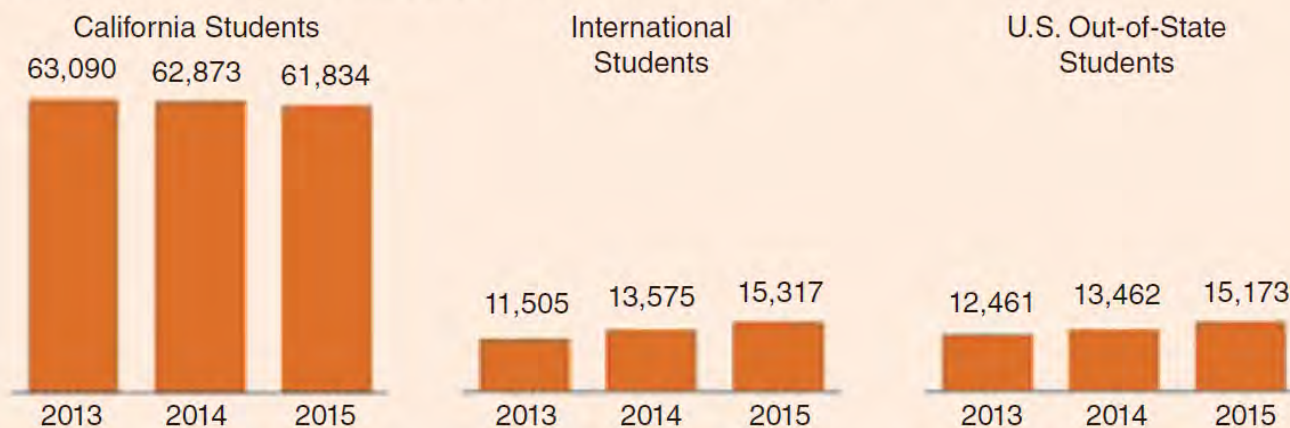
Amateur Radio As a Hands-On Educational Tool

Practical experience building real-world systems is critical to a meaningful post-secondary education. Private industry is also demanding

(Continued on page 55)

Tougher Odds

California Freshman Admissions Have Declined at UC Campuses:



Note: 2013 and 2014 Data Include Spring Admissions Offers to Berkeley. Data for 2015 Include Spring Admission Offers to Merced. Data Also Include Referral and Waitlist Offers.

Source: University of California Office of the President

@latimesgraphics

Figure 1. Admissions for international students at the University of California increased by 33% from 2013 to 2015. (Source: The University of California and the Los Angeles Times. Reprinted with permission of the Los Angeles Times.)

(Amateur Radio in STEM Education from page 54)

engineers skilled in troubleshooting and system integration. This is why amateur radio has increasingly become a popular tool for professors seeking to complement theoretical understanding with practical circuit-building and system integration skills. Amateur radio (or ham radio, as it is popularly called) offers postsecondary students a direct opportunity to apply the theory they learn in engineering courses. Additionally, it gives them an appreciation for system-integration concepts as well as troubleshooting techniques.

These advantages are especially acute for RF and microwave engineering. Many universities may not have available spectrum analyzers, network analyzers and other expensive test and measurement instruments needed to supplement RF and microwave theory courses. However, amateur radio gives them a low-cost opportunity to engage students in building circuits and systems operating in the RF realm and to teach them how to get things done with improvised equipment and minimal resources.

There are very few postsecondary curricula that allow universities and students to have this comprehensive “audio-to-antenna” experience, an approach that is possible with amateur radio.

Real-World Examples

A number of universities, however, have noted this demand for graduates well versed in comprehensive electronics skills. The following

schools have responded to this demand by incorporating amateur radio into their curricula.

Cal Poly–San Luis Obispo

Known widely for its hands-on approach to technical education, California Polytechnic State University (Cal Poly) at San Luis Obispo, under the leadership of Dr Dennis Derickson, chair of the school’s electrical engineering department, is notable for its work in designing and building satellites: they have launched eight and are currently building two more. Because these satellites use amateur radio frequencies for uplink/downlink, students in the Cal Poly satellite project are required to have amateur radio licenses. Other programmes at Cal Poly are similarly practical and require students to be licensed.

University of California, Davis

The University of California (UC) campus at Davis has always had a practical electrical engineering program with a number of RF and microwave courses. In 2009, Dr Linda Katehi, well-known for her work in RF and microwave design, became chancellor of UC Davis and the electrical engineering department has since become a recognized leader in millimetre-wave and THz research. Undergraduates who participate in the senior design project build a work Moffett Field in Silicon Valley offers a very hands-on, graduate-level engineering programme; under the leadership of

(Continued on page 56)



International Microwave Symposium IMS2016 IEEE 22-27 May 2016 San Francisco, California MTT-S

(Amateur Radio in STEM Education from page 55)

Dr Robert Iannucci and Dr Martin Griss, the students at CMU Silicon Valley with amateur radio licenses are given an opportunity to participate in unique research projects that focus on solving practical, real-world wireless engineering challenges.

Tribhuvan University, Kathmandu, Nepal

Dr Sanjeeb Panday and his students at Tribhuvan University's Institute of Engineering have been on the forefront of a unique journey. Nepal has been recovering from a terrible civil war and making the transition to a constitutional republic and the country is only now beginning to allow amateur radio within its borders. Under the leadership of Dr Panday, the number of licensed amateurs in Nepal has increased from only five to nearly 100 and his students were able to successfully install the country's only VHF repeater system in the midst of the major aftershock of the huge earthquake that devastated Nepal in April 2015. Dr Panday and his students have overcome numerous economic, social and political obstacles because they recognize amateur radio's potential as an educational tool.

Real-World Value

Each of these universities utilizes distinct and innovative approaches to incorporate theory, design elements and licensing in amateur radio into their coursework. Increasing numbers of universities are adopting this approach. The consequence of this work has been substantial and, in the case of the work being done in Nepal, potentially life-saving.

Amateur Radio at IMS2016 and Beyond

During IMS2016, there will be a moderated panel where professors from the universities described here discuss their experiences using amateur radio as a vehicle for teaching engineering electronics. These instructors will share their motivations for using amateur radio, the way in which amateur radio is incorporated in their curricula and the impact this has had on graduates of their programmes. The panel session will be followed by a hosted social event for IMS2016 attendees who are also amateur radio operators.

For over 100 years, amateur radio has been a way for people to make friends and contacts in distant locations. Increasingly, it is being used by universities to impart requisite skills in hands-on troubleshooting and the system design and integration necessary for today's engineering graduates.

It is increasingly difficult for employers to find talent with hands-on RF experience and amateur radio experience aids in understanding radio systems and radio construction. Many engineers in the field are amateur radio operators and so amateur radio can be a good ice breaker during interviews. Finally, networking within the amateur community can help young job seekers find career openings.



Meet the CubeSatSim

Mark Samis, KD2XS

AMSAT, ARRL and ARISS joined forces to help students learn about amateur radio satellite operation first published in QST September 2026

In early 2019, I came across the CubeSat Simulator (CubeSatSim) Project Page (<https://cubesatsim.org>), an educational project sponsored by the Radio Amateur Satellite Corporation (AMSAT). It offered detailed instructions on how to build a low-cost, fully functional cube satellite emulator.

Over the years, I had been intrigued by small educational CubeSats and considered building one for myself, but the real, space-ready models were expensive and difficult to assemble. The CubeSatSim, however, being just a simulated satellite, does not need space-certified parts and can therefore be built on a reasonable budget — it uses readily available components and the four-part frame is available for 3D printing. What is more, it is open source all the way through, with the bill of materials (BOM) and other hardware information, including Gerber files, linked on their project wiki (see <https://github.com/alanbjohnston/CubeSatSim/wiki>). Notably, the device can be considered a true CubeSat, because its hardware and software are compatible with most space-worthy cube satellites.

Building the CubeSatSim

The CubeSatSim uses a Raspberry Pi Zero 2 W for a brain and it contains sensors for temperature, humidity, pressure, altitude, battery voltage and current, as well as voltage and current for the six solar panels and three rechargeable batteries that power the device.

The completed simulator uses a handful of printed circuit boards (PCBs) and because the board Gerber files are all available, all I had to do was send the files to a PCB manufacturer — in this case, PCBWay (www.pcbway.com) — and within a couple of weeks, I had the assembled boards. I had to buy a minimum of five copies of each PCB, so I planned to assemble several CubeSatSims to give to friends. I ordered the other parts individually, mostly from DigiKey, Adafruit and Amazon.

An important part of the CubeSatSim Project is the accompanying Ground Station, which receives and decodes all the telemetry and images from the CubeSatSim. The assembled Ground Station uses *FoxTelem*, an open-source AMSAT telemetry



The fully assembled AMSAT CubeSatSim. [Photo courtesy of Mark Samis, KD2XS]

decoding software application designed by Chris Thompson, GØKLA/AC2CZ (www.amsat.org/foxtel-em-software-for-windows-mac-linux) and it includes a Raspberry Pi 4B connected to a software-defined radio (SDR) and a 433 MHz antenna. Detailed assembly instructions are available at <https://github.com/alanbjohnston/CubeSatSim/wiki/3.-Ground-Station>.

I spent quite a bit of time putting the simulator together and the designer of the project, Alan B. Johnston, PhD, KU2Y, an associate professor of electrical engineering at Villanova University and Vice President for Educational Relations at AMSAT, was extremely helpful and answered all my questions. His CubeSatSim was based on the original ARRL Education and Technology Programme's CubeSat Simulator, designed by Mark Spencer, WA8SME and published in two parts in *The AMSAT Journal's* September/October 2009

(Continued on page 58)

(Meet the CubeSatSim from page 57)

(www.arrl.org/files/file/ETP/CubeSat/CubeSat-Pt1-SepOct09.pdf) and November/December 2009 (www.arrl.org/files/file/ETP/CubeSat/CubeSat-Pt2-NovDec09.pdf) issues.

Surprisingly, building the CubeSatSim from scratch took only a few hours once I received the PCBs.

There were no surface-mount devices, because those devices were already mounted on boards. It was all through-hole soldering, with no toroids to wind — if you have ever built a kit with through-hole soldering, you should not have a problem. The construction took about 6 hours in total, spread over 2 days.

The simulator includes three boards: the main board, the solar board and the battery board. Alan's instructions are very detailed, with great pictures and videos for each board. The main board is exactly what it sounds like — it holds the transceiver chip, one button for mode change, a USB-C connector for power input, myriad LED lights and a "Remove Before Flight" switch for power on/off. Of course, there are also a few resistors, diodes, capacitors and the general-purpose input/output pins, which are on all boards as the "back-plane" of the entire project.

A Raspberry Pi Zero 2 W running the CubeSatSim software, connected at the bottom of the board stack, is the primary control for all the boards. The main board is by far the most difficult to assemble, simply because it has the most components — it holds sensors that detect temperature, pressure, motion, battery voltage, solar voltage and current. The battery board is very simple by comparison. The solar board is also simple and very repetitive because it monitors each of the solar panels.

I recommend arranging the components for each board on your work area *around* the board they are intended for, as shown in the directions and following those directions in the correct order. The final steps are to stack the boards, construct the 3D-printed frame around the stacked boards, attach and mount the solar panels and do the final tests. The instructions also outline some tests you should do throughout the soldering of each board. Please do not skip those tests; otherwise, it may be difficult to solve any issues found at the end of the construction.



The PCB stack for the no-solder CubeSatSim kit, consisting of a main board, solar board, battery board and a Raspberry Pi Zero 2 W, assembled during a 2025 ARRL Teachers Institute on Wireless Technology (TI) Space Comms and Radio Astronomy session. [Matt Severin, NSMS, photo]

After I built the CubeSatSim and learned as much about the device as I could, I gave it to one of the many science teachers I know to try it out, along with an old VHF/UHF handheld transceiver so he and his students could listen to the signals from the simulator. I explained how he could monitor the current and voltage being produced by each of the solar panels, use the attached slow-scan television (SSTV) camera to capture images and monitor the transmitter's signal strength both on the Ground Station and on the hand-held. He was blown away by the realistic feel of the simulator and the amount of data that it could transmit for reception by the Ground Station, which he assembled in the classroom with his students.

The ARRL Teachers Institute on Wireless Technology (TI) has also included the CubeSatSim in its curriculum. Teachers attending the TI Space Comms and Radio Astronomy class sessions had the chance to assemble the newer, no-solder version of the simulator and perform experiments. The teachers could then bring the CubeSatSim back to their own classrooms and demonstrate the device to their students in turn (for more information about the ARRL TI programme, visit www.arrl.org/teachers-institute-on-wireless-technology). STEM classrooms in countries around the world have also been working with the CubeSatSim and AMSAT has been collecting data and reactions from students and teachers to help

(Meet the CubeSatSim from page 58)

implement lesson plans for all education levels.

After building my own, I kept up with the CubeSatSim's development progress over the years as new upgrades and features were regularly added. Then, after I retired in 2021, Alan, KU2Y, asked me to join the CubeSatSim Educational Materials Team, alongside David White, WD6DRI and Fredric Raab, KK6NOW. Since I started on this journey, it has been incredibly exciting to see how many teachers, students, administrators, hobbyists, amateurs and scientists have become CubeSatSim evangelists, both across the US and around the world.

Keeping Up with the CubeSatSim

Even though the costs of parts have increased, it is still very inexpensive to build — and, if you do not want to build your own, educators can borrow one from AMSAT to use for classroom demonstrations. The latest CubeSatSim kits offered in the AMSAT Store are solderless and basically just snap together, making for more build options and an easier path to getting your own simulator (www.amsat.org/product/cubesatsim-kit). If you intend to build your own from scratch, the BOM is readily available.

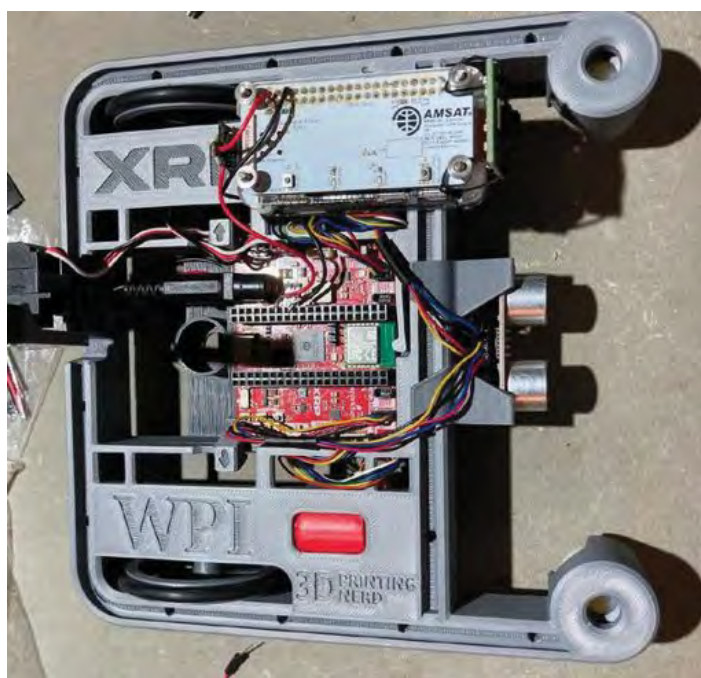
The CubeSatSim has been used both in and outside of the classroom with students ranging from middle school to university level — it is even

been used as a payload in high-altitude balloons! Our education team is always working on new instructional materials and lesson plans for various grade levels — for ideas on how to use the CubeSatSim in the classroom, see <https://cubesatsim.org/ActivityGuides>. Recent additions to the simulator include a Command-and-Control function that allows amateurs to send APRS messages from a handheld radio to the CubeSatSim to change transmission from CW to SSTV, for example. The CubeSatSim can now also act as a cross-band repeater and can transmit yaw, pitch and roll angles.

The CubeSatSim Educational Materials Team has also been working with the Amateur Radio on the International Space Station (ARISS) programme's Space Telerobotics using Amateur Radio (STAR) project, an educational initiative where students can remotely control robots via amateur radio to simulate NASA rover operations. The ARISS Pi is a CubeSatSim Ground Station with various radio and satellite soft-ware pre-installed, which was designed for ARISS use and accommodates both robotic control of a simulated Mars rover and reception of SSTV images from the rover (see <https://github.com/alanbjohnston/CubeSatSim/wiki/Radio-Pi>). The CubeSatSim Lite, meanwhile, is a minimalist build of the original Cube-SatSim (see www.amsat.org/product/cubesatsim-lite-complete) — with its attached camera, it is a perfect addition to the STAR Mars Robot. The Cube-SatSim Lite sends images to the ARISS Pi via SSTV and those images are received within the STAR Mission Control application. The STAR Mars Robot can be controlled directly in the Mission Control application as well as remotely from other ARISS Pi Ground Stations. A licensed amateur radio operator could also control the Robot using APRS commands from a handheld radio.

It is great to see ARRL, ARISS and AMSAT all working together on these educational projects! With all of these capabilities, the CubeSatSim offers a wide variety of avenues for students, educators and hobbyists to investigate aerospace science and unpack the same sorts of fascinating data recorded on real spacefaring satellites. Our educational team continues to work on lesson plans and experiments to produce interesting results and memorable experiences, allowing students to explore the marvels of space from the comfort of the class-

(Continued on page 60)



The ARISS STAR XRP Rover, with a CubeSatSim Lite installed. This device allows students to simulate NASA Mars rover operations; the attached CubeSatSim serves as an SSTV camera and it can also be used as a cross-band repeater. [Mark Samis, KD2XS, photo]

(Meet the CubeSatSim from page 59)

room.

Mark Samis, KD2XS, is Project Manager for the ARISS STAR Project and a member of the AMSAT CubeSatSim Educational Materials Team. He was first licensed in 1967 as WA2GCS and is a former science and computer teacher and an educational technology administrator. He was also a candidate in the original NASA Teacher in Space Programme (1984 – 1986).

CubeSatSim at the ARRL Teachers Institute

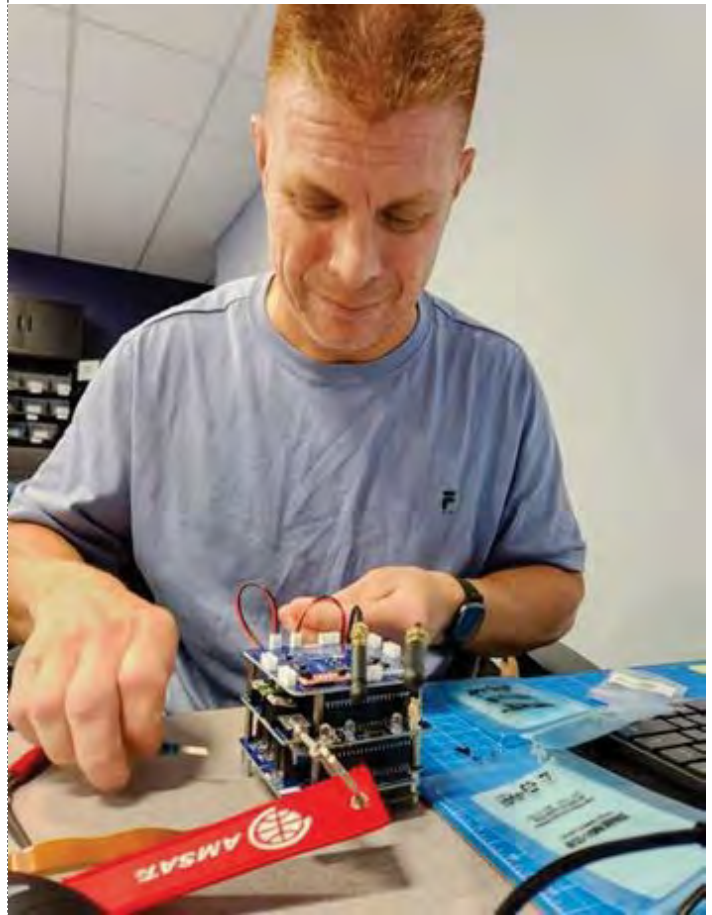
Jeremy Montgomery, KD9RUO, attended a 2025 ARRL TI session on the CubeSatSim. After assembling his own, he went on to introduce the simulator to students, parents and school faculty during aerospace education presentations to Civil Air Patrol (CAP) cadets and the DuPage and Kane County branches of the University of Illinois Extension 4-H STEM Ambassador Club.

Here, Jeremy recounts his experience presenting the CubeSatSim:

In the CAP presentation, which included approximately 25 cadets and five adults, the CubeSatSim served as an opportunity to discuss space-bound payloads - the design, purpose and operation. I demonstrated all of the simulator's modes in real time and explained what each one was, including the real-world applications.

This was all presented on a large screen using an ARRL-provided Raspberry Pi. I had the simulator situated on a motorized turntable to demonstrate its rotation. This allowed me to explain the power telemetry readings on the CubeSatSim software.

In the two presentations for the University of Illinois Extension 4-H STEM Ambassador Club, the Raspberry Pi 5 and the CubeSatSim software were running on a separate large screen alongside my presentation. The CubeSatSim itself was spinning slowly on the turntable and sending telemetry data for all to see. I had it set to CW mode and had a handheld radio set to the same frequency - when I got to the part of my presentation where I



Jeremy Montgomery, KD9RUO, assembling a no-solder CubeSatSim kit during a 2025 ARRL TI Space Comms and Radio Astronomy session. [Matt Severin, NSMS, photo]

discussed the implementation of the CubeSatSim, the attendees were able to hear CW over the radio. I spent some time discussing what it takes for us to get to this point and how the simulator is put together. First, they learned about the Raspberry Pi as an independent course where they learned the software distribution and how to navigate. Next, they learned about SDRs and their many ways of operation. Then, they put these two lessons together to "hack the sat."

Reactions from students were very positive - they asked a lot of good questions and they seemed very interested. Many asked how to get their amateur radio license and some students wanted to incorporate the CubeSatSim into their own county and state fair science projects.

Beyond the Weekly Net: Building a Modern Radio Club

George Lampere, AB9CQ

Many clubs are discovering that a one-size-fits-all structure no longer successfully engages members, but they do not know how to evolve without losing the fellowship, service ethic and shared identity that define amateur radio. Clubs relying solely on legacy patterns can struggle to demonstrate skills, cultivate new leaders, or align with task book-style expectations.

The Waushara Area Auxiliary Radio Network (WAARN), KC9ASQ, in Wisconsin wanted to preserve tradition while building a structure that supported flexibility, competency and modern operating realities.

Five Pillars to Guide Change

Before changing meetings, nets, or tools, WAARN stepped back and questioned why this group existed and what was keeping them engaged. That produced five guiding pillars that now inform every decision.

- ♦ **Serve the community.** WAARN focuses on using amateur radio skills to support local communities, with an emphasis on situational awareness, coordination and preparedness. The mission extends beyond traditional emergency communications to supporting emergency management, Community Emergency Response Teams, hospitals and community partners.
- ♦ **Build camaraderie on and off the air.** Nets, coffee meetups, online chats and joint projects build trust and belonging, ensuring members are connected, even when radio activity is light.
- ♦ **Find purpose and confidence.** Learning new modes, running nets and completing projects give operators tangible accomplishments.
- ♦ **Develop skills that matter.** Show members how individual skills connect to real outcomes, whether for public service or technical experimentation.
- ♦ **Stay engaged and resilient.** Regular participation supports mental sharpness, social connection and readiness.

With these pillars clarified, WAARN could redesign how it operated without losing who it was. We adopted a model that helps members have a visible road map for growth, rather than

ClubTalk



The ARISS STAR XRP Rover, with a CubeSatSim Lite installed. This device allows students to simulate NASA Mars rover operations; the attached CubeSatSim serves as an SSTV camera and it can also be used as a cross-band repeater. [Mark Samis, KD2XS, photo]

drift from activity to activity.

Organizing Activities and Roles

Modern amateur radio spans from CW and HF DX operations to satellites, digital mesh networks and software-defined radio. No one can master it all.

WAARN addressed this reality by organizing activities into *capability domains*, or high-level areas that group related skills and tools geared toward a specific outcome.

First, we identified the domains, such as voice radio communication, digital messaging and data networks, position tracking, power and infrastructure support, research and experimentation and leadership. WAARN recommends starting with three or four domains that reflect your club's existing strengths and expanding gradually as interest grows. Within each domain are *specialty tracks*, or roles, that define focused areas of proficiency, such as voice net operator, Winlink operator, Automatic Packet Reporting System (APRS) specialist and Amateur Radio Emergency Data Network (AREDN) node administrator.

WAARN designed these tracks to align with formal roles found in Amateur Radio Emergency Service®, Radio Amateur Civil Emergency Service, or

(Continued on page 62)

(Club Talk from page 61)

AUXCOMM contexts. This sets us up for success during emergency communication exercises and real-world events because we already know who can reliably run a net, configure APRS for team tracking, deploy a mesh node, or handle digital message traffic.

Evolving Participation Options

Once domains and tracks were defined, WAARN shifted from being a single-format club to having a portfolio of participation options.

Club meetings feature short training segments, project show-and-tells, recognition of achievements and times for conversation. Routine business is handled online or by small committees.

To support members who cannot regularly attend meetings or events in person, WAARN integrated video and online collaboration tools. Virtual training nights, planning sessions and informal social nets complement on-air activity. Shared documents, calendars and a simple website hold resources, while online chat platforms function as a virtual clubhouse.

The result is greater continuity. Members remain connected between nets and meetings, projects progress asynchronously and leaders spend less time on administration and more on mentoring.

Member Growth Path

Once activities were organized into domains with individual tracks, we created a simple, three-level growth model: Technician, Senior and Master. We refer to these as *depths* within each specialty track. The terminology we chose reflects function rather than license class and it aligns conceptually with graded task-book approaches used in emergency communications.

The Technician-level depth emphasizes solid foundations and supported participation. These operators demonstrate clean procedures, basic technical competence and reliable participation in routine activities.

The Senior-level depth represents independent operation and emerging leadership. These operators can run nets, operate across broader conditions, mentor newer members and contribute to planning and exercises.

The Master-level depth emphasizes planning, coordination and mentorship. Masters are trusted subject-matter experts who design operations,

guide others and help sustain capability across the group.

Progression through the depth model is optional, so operators may stop at any level that fits their interests and availability. Experienced operators do not have to start from the bottom; they can assemble a portfolio of prior experience — licenses, certifications, logs and practical demonstrations — for peers to review and place them at an appropriate level. The process is collaborative and supportive, reinforcing shared standards rather than gatekeeping.

Mentorship and Training

To support learning at every level, WAARN uses a simple training cycle: Study the material, discuss it with a mentor, shadow experienced operators, perform tasks with support and review lessons learned. Progress is documented, mentors confirm readiness and advancement reflects demonstrated performance, rather than time served.

For example, a new member was unsure of what equipment to buy or how to meaningfully get on the air after earning his license. He chose the voice radio operator specialty track, which gave him a clear road map for developing practical operating skills. With guidance from a mentor, he gained confidence checking into nets, experimented with EchoLink and began building simple antennas. After upgrading to a General-class license, he advanced to the Senior-level depth and expanded his operating range.

Build Your Way

For clubs looking to adapt, your first steps can be simple: Clarify your purpose, map current activities into a few capability areas, identify one or two specialty tracks that matter most and outline basic expectations for growth. From there, invite members to choose a path, connect them with mentors and open new ways to meet — on the air, online and in person.

Zero-gravity CW paddles?

John VA3KOT

Ham Radio Outside the Box

Ok, I confess, I am a bit of a klutz when it comes to sending Morse Code. I started out, many years ago, with straight keys. I never got along with the typical flat knobs, I preferred “Navy Knobs” – the kind with a big round thing on top that you can really get a firm grip on and a wide flat disc below. The original purpose of the flat disc at the bottom was to discourage operators from touching the high voltage contacts underneath. There was always the possibility that an inattentive operator would touch the metal parts of the key – in the good old days of the electric telegraph, that is, whereupon his sending speed would either suddenly accelerate to 100 wpm or drop to zero, permanently.

My issue was my nervous tight grip. That resulted in me pounding brass in a very literal sense, sometimes lifting the key right off the table. But then I acquired a very nice set of Bencher paddles as part of a package of QRP gear I purchased from another amateur. Paddles require a very light touch and so I learned to relax and control my heavy fist.

Over the years I acquired several more sets of paddles; I even built some of my own – with varying degrees of success. As well as being a klutz I am also of a miserly nature. A set of paddles is really just a simple two-way switch; why the heck should I spend hundreds of dollars for something I can build from an old hacksaw blade and a dollar’s worth of hardware?

And then, my growing interest in portable operating out in the Big Blue-Sky Shack took hold. Now I needed paddles that were small, lightweight but still rock firm and stable. Hmmm? SMALL, LIGHTWEIGHT, STABLE – pick any two! New problem – small, lightweight paddles tend to go

skating across the table unless the operator has a very, very light touch. I do not.

And so it came to pass that I attended a local hamfest recently and picked up yet another set of paddles. They were inexpensive, which checked the miser’s box in the shopping list. They are also small, very small, very lightweight and ... not so stable! Frankly it would take the touch of an angel to operate them without chasing them across the table. I call them my zero-gravity paddles.

I really like my zero-gravity paddles, but I had to find a way to stop them going on haphazard excursions across the table whenever I touched them. Their tiny rubber feet did not provide enough friction to keep them from moving around, so what could I do?

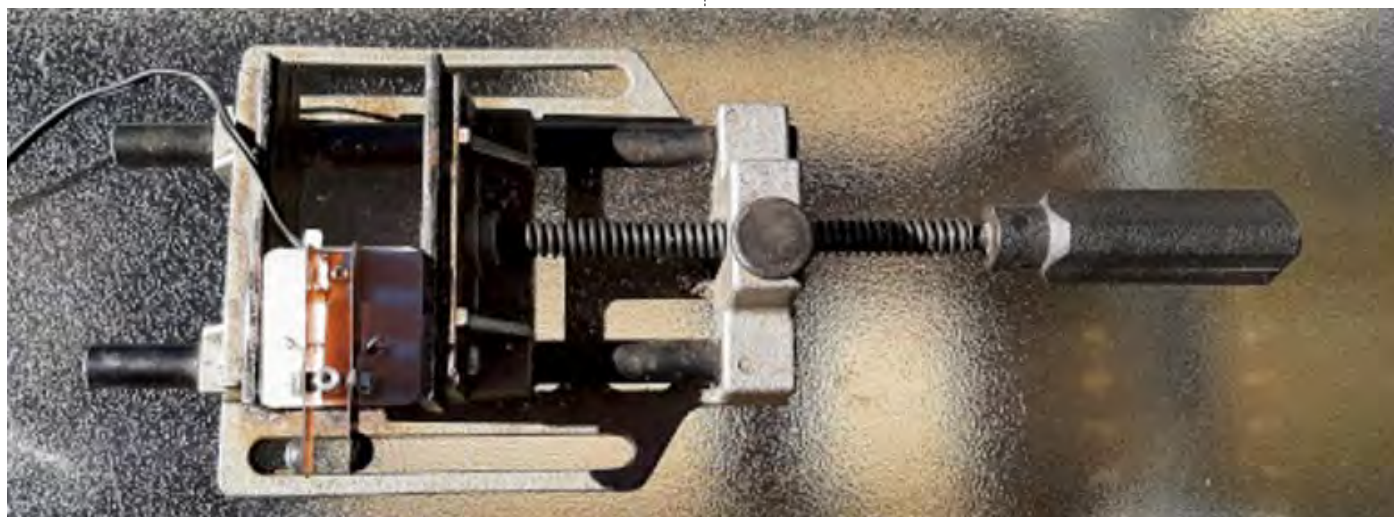
Oh no John, no John, no John, no!

Alrighty then, this first attempt was not my most inspired idea. Carrying a bench vice out to the field is pretty impractical – but it works fine business!

There had to be a better way. As Sir Isaac Newton could have maybe once said, “A set of paddles that are stationary or in motion continue in that state unless acted upon by an external force.” Well, speaking as that “external force”, I knew the onus was on me to create an equal and opposite force to oppose the force of my less than delicate keying.

As a young high school student, I was fascinated by another famous scientist over in the Land of Hope and Glory. Among his many notable scientific achievements Michael Faraday was a pioneer in the field of magnetism. His discovery of

(Continued on page 64)



(Zero-gravity CW paddles? from page 63)

a magnetic field surrounding a wire carrying electric current was perhaps the spark of genius that would later lead to the development of radio.

Thank you, Sir Isaac and Mr Faraday

I am no great scientist myself, but I am willing to learn from those in whose footsteps I am not worthy to tread. Now the solution that emerged from the mist was as simple and obvious as it could possibly be – magnets.

Drawing on the work of Sir Isaac Newton, the force of friction was insufficient to overcome the force of my over-enthusiastic keying, but thanks to the work of Michael Faraday, the force of magnetism is more than sufficient to solve the problem.

So, I carefully removed the glued-on rubber feet and replaced them with small, strong magnets. The paddles came inside an Altoids mint tin – actually a very old Altoids tin that is probably worth the price I paid for the paddles. Altoids were originally made in Great Britain (in fact in Wales) before corporate buyouts moved production to Chattanooga, Tennessee.

That tin serves two purposes – it keeps the rather delicate paddles safe during storage and transport and acts as a base for the magnetically secured paddles. Now everything works as it should (except for my keying perhaps). These



paddles have a very nice feel which improves my sending accuracy.

The amateur who sold these paddles to me did mention the original source which I promptly forgot. If you recognize them perhaps you could let me know in the comments. And, if we meet on-the-air, these are most likely to be the paddles I will be using.

The following copyright notice applies to all content on this blog. This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).



The YL.Beam

Heather Holland, ZS5YH

South African YLs Anniversary month of June

The first news-letter was e-mailed in June 2011 to a small group of YLs. In 2020, yl.beam #83, was sent globally to more than 2 000 amateur radio ladies. How many survive spam and mail filters or be read is unknown! 15 years later (2026), we reflect and remember the women radio pioneers and operators, on whose shoulders we stand today.

The South African Women's Radio Club (SAWRC) was founded on 2 June 1952; the only YL Club in the Southern hemisphere. They started with 33 members and by end of 1952 they had 71. The club was very active in the 1950's and 60's with over 120 YL members.

Founding members, now all Silent Key, were - President Iris Hayes, ZS2AA; Vice-President Muriel Neill, ZS5KG and Joint Secretaries Marie Cormack, ZS6KK and Diana Green, ZS6GH. Diana Green also edited their magazine YL Beam.

The distribution of the yl.beam by e-mail. In June 2021 (10th anniversary), issue 95 was sent to 2 818 e-mails (Africa 350, North America 533, Latin America 446, Asia/Oceania 401, Europe 835 and UK 253). In July 2026 (15th anniversary), issue 154 was sent to 3 425 e-mails (Africa 325, North America 661, Latin America 602, Asia/Oceania 607, Europe 939 and UK 291).

The South African Women's Radio Club (SAWRC)

Page 94 of the January 1968 issue of QST - YL News and Views by Louise Ramsey Moreau, WB6BBO <https://www.worldradiohistory.com/INTERNATIONAL/QST/QST-1968-01.pdf>

S.A.W.R.C.

If the lexicographers have managed to efficiently define words in cold blacks and white that only the basic meaning is present. In most cases, the precise definition in the dictionaries is sufficient, but when we come to words like anniversary and birthday, only those whom the



words affect can truly define them. To each of us these are personal events flavoured with memories peculiar to each one celebrating it.

To historians, June might connote Waterloo, D-Day, or the first YL in space. Traditionally, June is the month of graduation, brides and roses. In the history of YL amateur radio operators, June is the birthday of the South African Women's Radio Club and June 1967 marked the 15th anniversary of this second oldest YL organization in the amateur ranks. SAWRC was founded on 2 June 1952. At that time they were the only YL club in the southern hemisphere. The first Organizing Council was made up of Iris Hayes, ZS2AA, president: Muriel Neill, ZS5KG, vice-president: Marie Cormack, ZS6KK and Diana Green, ZS6GH, were joint secretaries, with Marie the editor of YL Beam, the club magazine. These gals held office for the first six months. The organization began with an enrolment of 33 members and more than doubled by the end of 1952. By June 1967, membership total had risen to about 120 YLs with operators in England, Australia., USA, Denmark and Germany on the roster.

Government of SAWRC affairs is unique in organization planning, for the constitution provides that each of the six divisions will hold office each year in rotation. By this action, responsibility for the welfare and activity of the club is distributed fairly among all the licensed South African women operators.

(Continued on page 66)



(YL Beam from page 65)

One of the best ways of holding any group together, whether it is the office gang or a nation-wide organization, is through a magazine. YL Beam began as an 8-page issue and has increased to 17 or 19 pages, published bimonthly. The Christmas edition runs close to 30 pages. The 1953 Organizing Council appointed Marie Cormac, ZS6KK, as editor. Toni Bauman, ZS6YL, held that office for five years and the present editor is Diana Green, ZS6GH, with Toni as the designer of the cover. Printed news and correspondence of the world-wide membership has made this publication the backbone of the club.

The SAWRC was granted affiliation with the South African Radio League, in 1954. The two groups; work closely together with the women's group assisting the SAR L in all ways. In turn, the League magazine features a "YL of the Month" column, as well as news of the members.

When it comes to contests, SAWRC offers some very tempting awards to licensed YLs who participate in the League contests. Trophies are the Iris Hayes Phone trophy, donated by ZS2AA, the Irvine CW trophy, donated by ZS6GH, the 40 Metre Pearl Trophy, given by ZS4NG, the Edie Bennett 80 Metre Phone trophy and a new SSB trophy donated by the SAWRC.

Certificates sponsored by this very active group include "Worked all YL" and "Key Keen Klub." The latter is strictly for CW gals and it is a challenge to acquire enough contacts for that third "K." The custodian is Margery Snyman ZS1TM.

Anniversaries and birthdays are a time when we remember the past, celebrate the present and look forward to a shining future. The SAWRC has observed its 15th birthday as a club, while the membership celebrated their "Crystal" anniversary. Now, in 1968, the gals of the southern hemisphere, with their global membership, can happily and truthfully say "Age here sweet 16."

Iris Hayes, ZS2AA

South Africa's first licensed YL got her ticket because she wrote a letter. When her children were very small, she was unable to leave them alone on the farm and the enforced stay at home made her an avid SWL. One day, she tuned across 40 metres and heard two OM's chatting. They said that they would welcome a report from anyone listening and Iris obliged. Her report was acknowledged over the air and the men went on to suggest that she learn the code and become the



first woman in South Africa to hold a station license.

That was as much as Iris needed and the studying began. She learned the code the hard way, with the help of a Scout book and then by singing her children to sleep in dots and dashes. Her system was successful despite grave doubts on the part of her OM regarding her sanity. She applied for her license in 1937 and ZS2AA was "born."

Her first love is amateur radio, but Iris is also deeply interested in gardening, music and stamp collecting, with first day covers as a specialty. She is very involved in public affairs and was president of the local Red Cross for 22 years. She is also a member of the Board of Directors of the Maderia Home for the Aged.

When the South African women decided to form a radio club, Iris added another "first" to her honours by becoming the first president of SAWRC. She is also the sponsor of an award for YL participants in the SARL contests.

Diana Green, ZS6GH

Love of people, plus love of travel, plus love of



(YL Beam from page 66)

amateur radio equals ZS6GH, president of SAWRC and current editor of YL Beam. Diana, like so many of us, became interested in radio through listening to the operators on the air. Unlike most of us, she learned the code and could copy 8 w.p.m. Before she touched a key, Ray, ZS6FH, taught her to send and to increase her code speed. The license was acquired a year after she left high-school.

Diana's parents wanted her to teach music, but she wanted to become a journalist. There was little opportunity in that field at the time, so she became a legal typist instead and later, a bookkeeper. She has spent many months overseas meeting amateurs in British Columbia, Canada, the United States, England and Eire. DX hunting is one of ZS6GH's favourite on the air activities and has resulted in WAC-YL, DX-YL, Lads 'N Lassies, WAYL (ZS) certificates and has piled up 120 countries confirmed out of 140 contacts. Recipient of the SARL Merit award, a Scroll and Silver Jug, for meritorious service from SAWRC, Diana is not the only member of the Green family who has been honoured by the South African award.

YL Operator: Diana Green, ZS6GH formerly Tuck, born in New Zealand on 22 April 1916 - SK 27 July 1997, age 81 in Johannesburg. Licenced in 1938. The History of the SA Women's Radio Club Dianna Green, ZS6GH <https://mysarl.org.za/wp-content/uploads/2025/09/RZS-February-2019.pdf>.

Woman in Amateur Radio

Women have played a fascinating and often under-appreciated role in the history of amateur radio. While the hobby was historically male-dominated, women have been active participants since the early 20th century and continue to shape its future. Their involvement highlights the inclusivity and diversity of amateur radio,

expanding the hobby beyond technical experimentation into a global community-building tool.

In South Africa, YLs are part of a supportive network through SARL and local clubs, contributing to contests, education and emergency communications. Currently, the SARL has 44 female members, though many more licensed YLs may not be registered with the SARL. At PARC, we are fortunate to have five licensed YLs and I believe this number will grow by year-end.

One remarkable woman who comes to mind is Annie van der Merwe. Licensed in 1946 in Bloemfontein as ZS4AZ (later ZS1AZ), she was among the first women amateurs in South Africa. Annie served as the founding secretary of the Bloemfontein Branch of SARL (this became Tak Vrystaat. Ed.) and later became Awards Manager in the late 1950s, overseeing certificates and awards. Her dedication to administration, awards and community-building helped strengthen SARL during its formative decades. I was privileged to log her former call sign, ZS4AZ, in 1989.

Her articles in Radio ZS highlighted the role of women in amateur radio and it is fitting that she was inducted into the SARL Amateur Radio Hall of Fame for her pioneering role. Annie's story represents the family spirit of amateur radio in South Africa and continues to inspire future generations of YLs.

Lady amateur operators are not about "pink rigs" or carpeted shacks — it is about family and community building. In all my discussions with YLs, they share the same sentiment: amateur radio is about connection, service and friendship.

Shack Talk by Vernon, ZS6AIG - Woman in Ham Radio, page 14 of WATTS March 2026, the Pretoria Amateur Radio Club Newsletter.

SYLRA 23rd Birthday on 15 August 2026

The Scandinavian Young Ladies Radio Amateurs started on 15 August 2003, when representatives from Denmark, Finland, Iceland, Norway and Sweden met in Copenhagen.

SYLRA 2026 takes place from 3 to 6 September on Fårö, Gotland in Sweden. Listen out for 8S1YL.

Raija Ulwin SMØHNV, (SK)

Raija Ulwin, SMØHNV from Stockholm, Sweden passed away in 2018 at the age of 82. She was first licenced as OH2GX in 1957 and also held OH7YL and OH1RL.



Annie, ZS1AZ and Koos van der Merwe, ZS1AW (SK)

(Continued on page 68)



Contact Us

yl.beam Editor: Eda (Heather) zs6ye.yl@gmail.com

Newsletters can be found at <https://wrarc-anode.blogspot.com/>; the Italian Radio Amateurs Union: QTC URI www.unionradio.it/qtc-la-rivista-della-unione-radioamatori-italiani/ and Ham YL <https://www.facebook.com/ham.yls>.

Murray Bridge in 2002 and Mildura in 2005. In 2011 one was held in Glenelg, South Australia and following it, many of the participants travelled on the Ghan train to Alice Springs and Darwin. Raija, was a quiet person who hated having her photo taken, but had a great sense of humour when you got to know her. She was also very hospitable, as many YLs found when they went to visit her in Sweden.

Marilyn VK5DMS remembers "Many memories of Raija at several meets and meeting her in Stockholm in 2007 and being taken by train to her apartment for a meal - a wonderful evening."

Our ALARA President, Shirley VK5YL, shares this memory. "Fond memories of a wonderful lady. I met Raija at the Mildura Meet (Australia) and remember well the 'hurry up' when the storm was arriving along the river. I motioned to Raija for her to go first and she fair ran up those stairs. She told me afterwards that she did lots of walking/running, etc in Sweden and the stairs were so easy for her. We then shared some bubbly at the winery."

Farewell Raija SMØHNK (Thanks Jenny, VK3WQ for putting this article together). ALARA Newsletter January 2019 Issue No. 168

She was a founding member of the Scandinavian Young Ladies Radio Association (SYLRA) and the YL Beam. SYLRA (pronounced Silra) was formed by YLs from all the Scandinavian countries because they felt that there were too few ladies to form separate groups in their own country.

We believe that she may also have been instrumental in starting the YL International Meets, which saw YLs travel to places in many parts of the world for the Meets.

Raija joined ALARA in 1989 and was sponsored by Bev, VK6DE. Many members who attended ALARAMeets from 1996 onwards would have met Raija, as she attended the ALARAMeets in Perth in 1996, (which Bev organised), Brisbane in 1999,

Focus On She Means Business

Carol Defty, Hospital manager at Mediclinic

From assisting in the pharmacy to hospital leader, Carol Defty's journey has been driven by passion, growth and empowering others.

The hospital general manager of Mediclinic Milnerton, Cape Gate and now Bloemfontein, says she started working at a pharmacy during school holidays. "I always had a passion for people and business and realised while doing vac work that being a pharmacist gave me an outlet for both m passions."

Carol says no two days are the same. Her role includes planning, guiding managers and managing finances.

"I have a passion for the people who work with me. I lead and coach people to uplift them."



Carol, ZS4MOM / ZS1MOM

(She means business from page 68)

"But when hard decisions need to be taken for the longevity of the business, then that is done."

While a pharmacy manager, she was offered the chance to become a hospital general manager in 2003.

"Since then, I have seen potential for business growth and was instrumental in developing the three hospitals I was and am privileged to lead," she says.

A leader she worked under as a pharmacist recognised her potential and gave her the

opportunity to commission a new hospital pharmacy.

"That made me realise that the world is my oyster."

Carol says seeing others grow, especially women, is one of her greatest joys. She credits her husband, brother and former managers as mentors.

A home, she enjoys coffee, crafts, books and quiet evenings with her husband, Doug, ZS4DUG / ZS1DUG, on the stoep.

Youth and STEM Education Leaders at 2026 HamX

The ARRL Letter 20 August 2026

The 2026 ARRL New England Division Convention was hosted by the Northeast HamXposition™, HamX™ between 13 and 16 August at the Best Western Royal Plaza Hotel and Trade Centre in Marlborough, Massachusetts. One only had to walk a few steps into the convention to see the strong youth presence. ARRL Senior Director of Marketing and Innovation Bob Inderbitzen, NQ1R, met students and advisors from New England Sci-Tech (NESci-Tech) throughout the weekend. NESci-Tech is a nonprofit STEM education centre and

makerspace dedicated to project-based, hands-on learning for youth and families across New England.

Among the NESci-Tech team was founder and President Bob Phinney, K5TEC. Phinney led a youth forum on Saturday afternoon, organized as a roundtable discussion. Young amateurs, along with some prospective young amateurs, shared the experiences that inspired their participation in amateur radio.

Inderbitzen invited the students to describe

(Continued on page 70)



Two STEM education leaders chatting at the 2026 Northeast HamXposition in Marlborough, Massachusetts, (left) Everton Henriques, KD2ZZT of Staten Island Technical High School, WS1THS and Bob Phinney, K5TEC of New England Sci-Tech, Natick, Massachusetts. [Phil Temples, K9HI, photo]

(Youth and STEM Education from page 69)

ways they could encourage their friends to become involved in amateur radio. He also encouraged the older students to stay involved as they look ahead to college and careers.

“What do you think many college students are thinking about as they look ahead to their futures?” Inderbitzen asked.

“Jobs,” several students responded.

“Right,” said Inderbitzen. He noted that experiences gained through amateur radio can help young people develop practical skills that can set them apart as they enter the workforce. Building and troubleshooting equipment, working with electronics and communications technology, solving problems, collaborating with others and taking on projects from concept to completion are all valuable experiences that extend well beyond the amateur radio station.

Many of the students also staffed a NESci-Tech exhibit in the convention lobby, where they demonstrated their projects. Displays included pyramidal horn antennas used to detect the 1,42-GHz neutral hydrogen line emitted by interstellar gas clouds in the Milky Way, as well as high-altitude balloons carrying electronic sensor packages and radio transmitters.

The Saturday morning keynote speaker was Everton Henriques, KD2ZZT, an engineering and technology teacher at Staten Island Technical High School in New York. Henriques attended the ARRL Teachers Institute on Wireless Technology in 2023 and 2024 and has served as a TI instructor.

“One of the brightest success stories of this programme is right here with us,” said ARRL Director of Development Kevin Beal, K8EAL, who introduced Henriques.

Henriques shared experiences from his work as a coach and advisor to the SITHS Amateur Radio League, WS1THS; a SeaPerch underwater robotics team and the Seagull Solar Car Racing Team, WSOLAR.

Throughout his presentation, Henriques described the experiences that led his students to what he called “this moment” — the culmination and reward that comes from the hands-on hard work and learning that take place when students engage deeply in problem solving.

Henriques has helped license more than 600 student amateurs and teaches nearly 130 students each semester. His experience illustrates how amateur radio, when integrated with hands-on



5th-grader Hamsini Venkatesh, KC1YTF, of Brentwood, New Hampshire, shows off the pyramidal horn antenna she constructed. [Bob Inderbitzen, NQ1R, photo]

STEM education, can provide young people with opportunities to build technical skills, work as teams, solve real-world problems and discover pathways to future careers.

The convention's Friday and Saturday evening banquets also featured young amateur radio leaders. Max Freedman, N4ML, delivered the keynote at Friday's DX and Contest Dinner. Freedman, who was licensed in 2016 at age 12, was part of the 3YOK DXpedition team to Bouvet Island in February and March 2026. Freedman is a member of the ARRL Headquarters staff.

Saturday's convention banquet featured



Keynote presentations at the 2026 Northeast HamXposition: (left) Max Freedman, N4ML at the DX and Contest Dinner; (right) Katie Campbell, KE8LQR at the convention banquet. [Bob Inderbitzen, NQ1R, photo]

(Youth and STEM Education from page 70)

keynote speaker Katie Campbell, KE8LQR. Licensed in 2019 at age 10, Campbell shared experiences of being mentored and encouraged by individuals and organizations. She also discussed the stark

contrasts that can exist between younger and older radio amateurs – encouraging ways for young amateurs to be supported. Campbell is entering college at The Ohio State University.

What is FreeDV?

Viv Dold, ZS6VD

FreeDV is an open-source digital voice software for high-frequency (HF) amateur radio. Its main advantages include clear communication through static and noise, efficient use of radio spectrum, and a completely free, patent-free design that avoids corporate ownership.

Performance and Operation

- ◆ Works in weak signals: Stays clear and easy to understand even when signals are too noisy for normal single sideband (SSB) voice.
- ◆ No background hiss: Delivers clean voice audio with zero static or background noise when a signal is strong enough.
- ◆ Low power usage: Uses very low peak power, making it great for battery setups or low-wattage radios.

Efficiency and Technology

- ◆ Saves space: Fits a voice signal into a very narrow slice of radio bandwidth (about 1,1 to 1,5 kHz), leaving room for more users.
- ◆ 100% Open source: Uses free public code instead of locked, expensive commercial systems.
- ◆ Works with standard gear: Turns any basic SSB radio into a digital voice station using a computer or small adapter.

While FreeDV has been around for many years, it is new RADE mode, released in July 2025, is a real gamechanger. You get wide-bandwidth, noise-free, almost FM quality audio over noisy HF radio channels only 1,5 kHz wide!

The speech quality is also much improved. However, the main advantage for us is that RADE works on weak signals down to several dB under the band noise level. In comparison, an analogue SSB signal would need to be several S-points stronger to be as readable, but the audio still would not be noise-free and wide bandwidth.

Another huge advantage with FreeDV is the integrated FreeDV Reporter window. This on-line service provides the call signs, locations and frequencies of all the stations, around the world,

using FreeDV. More importantly, you can use it to monitor your SNR at all receiving stations in real time.

FreeDV can be downloaded from <https://freedv.org/download/>.
https://github.com/drowe67/freedv-gui/blob/master/USER_MANUAL.pdf

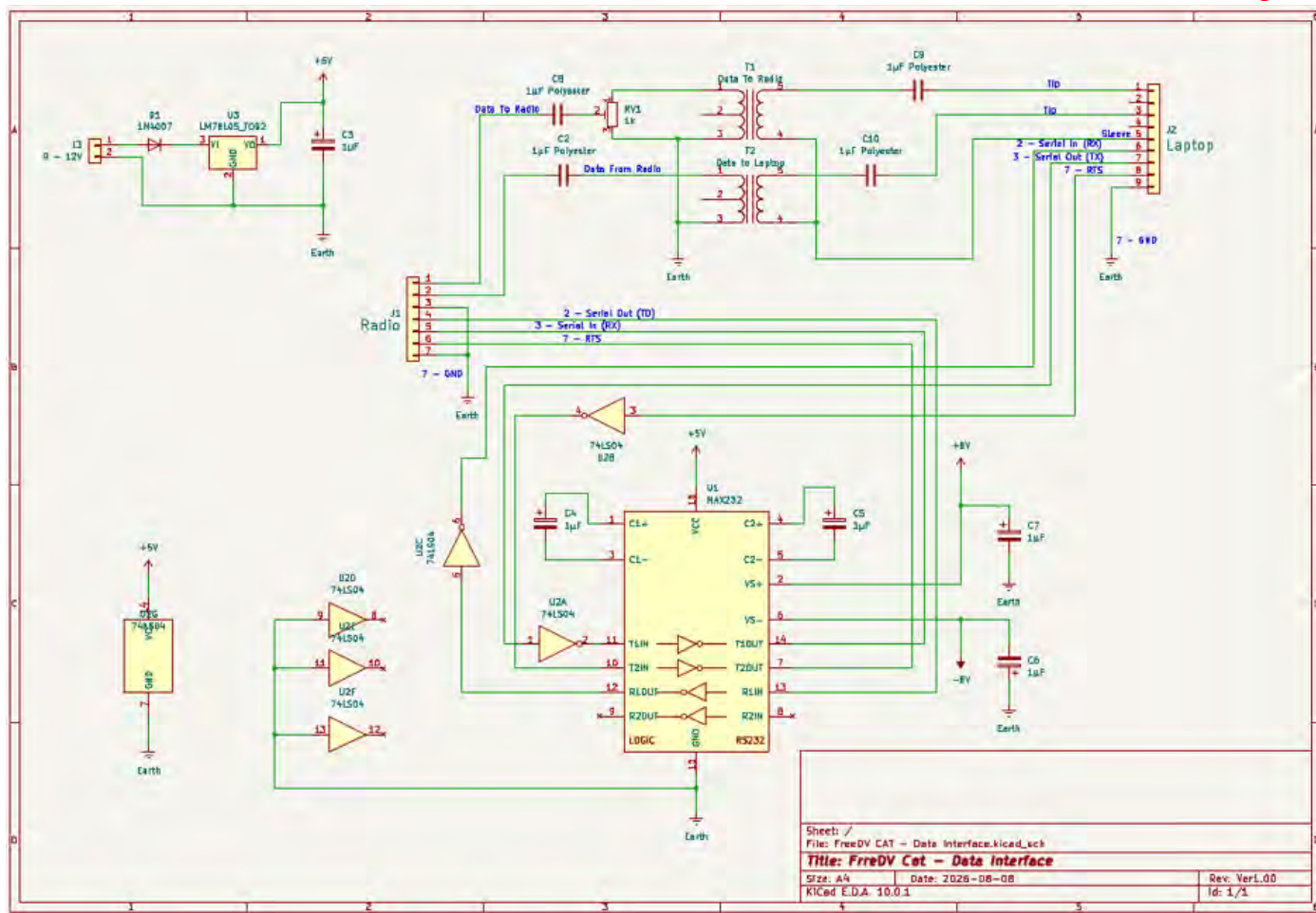
Many years ago, I heard of freedv (APP) that is digital voice using SSB. Requirement for FreeDV is that the PC must have two Sound cards and one COM port. Visiting a local PC shop I got hold of a USB Sound card (dongle). I set my station up and found that nobody was around using FreeDV. I then scrapped the idea. A while ago a friend of mine, told me that there is a small group using FreeDV on 7,115 MHz. Then my problems started.

I installed the app on my PC (Win 10) and started with the configuration of the software. The first thing I had to do was setting up the sound card and COM port. The baud rate of the radio COM Port is: 4800, 9600 and 43800 bps. I configured the PC COM port to 43800 bps at the radio and freedv. The COM port is used by the software to communicate with the radio, setting the mode and frequency using CAT (Computer aided Transceiver). Using the CAT commands, the RS-232 only need three wires, ie TX, RX and ground.

My first problem started with both sound cards of the PC. Although Win 10 was happy with both sound cards, FreeDV could not initialize the sound cards. Using Google for a fix, no suggestion work. After many hours spend in finding a fix with no success, I lost interest in FreeDV. After taking a long break, I decided to try the app on the laptop. Problem was that the laptop does not have a COM port and had no plug for an external microphone. I purchase a USB to COM port (RS232) and I still had the sound card obtained may years ago. My son donated me a USB headphone with microphone. Now to connect all up and configure freedv.

Now the fun started, freedv could not connect to the radio. I then discovered that the USB COM port output is RS232 but the signals were 0v/5v. It

(Continued on page 72)



(What is FreeDV from page 71)

should be -V/+V, that is -12V / +12V. Right, now I had to find a device that can convert the TTL level to the required level of true RS232. Way back I used a MAX232 chip for a project, I retrieved the chip and connected it up between the radio and the USB RS232 device on a bread board. That gave me -8V/+8V. The MAX232 chip generates the required voltages, so no need for a dual power supply. Freedv could still not connect to my radio. I did some test with a scope and found that the RS232 signal is inverted of the TTL signals. What now, I realised I had to invert the signals from the RS232 device to the MAX232 chip.

I remember I used a 74LS04 chip to invert TTL signals many years ago, so I wired it between the USB COM dongle and the MAX232 chip – still on the bread board. Good show, now freedv could communicate with the radio. Freedv prefer to use Hamlib or Omnirig for that purpose. None of them worked. For some unknown reasons, I could not download Omnirig – download failed, even after various attempts. Then I downloaded Hamlib and I could install it. A reboot of the laptop and starting up freedv, it worked. The radio could now be controlled from freedv – frequency and mode using CAT control.

Now for on air test, two could hear my carrier, but no speech. Oh yes, it is using a carrier the same as AM mode. I could see on freedv that there is no audio coming from the PC. Checking the laptop settings under sound, I could see the laptop do not see the USB microphone. After many Google tries that led me nowhere, I decided to uninstall the USB Headset, reboot the laptop and try again the sound setting. Microsoft installed the USB Microphone, and I could use a setting that allow me to hear myself when talking in the microphone - this worked.

Now back to freedv, I was now transmitting my speech. It was pure bliss to have a QSO on 40 m without any form of interference of any kind. This is the advantage of Digital speech using SSB. Only problem, there are only a few stations using digital voice here in the RSA.

I made a PC Board to house all the interface components and are in the process of installing it in a box to make things tidy. Above is the circuit I built up.

I still have a problem to get Microsoft and the laptop to have the USB Headset with microphone to work, it is supposed to be plug and play. What I understand is that manufacturers give their device

(Continued on page 73)

(What is FreeDV from page 72)

drivers to Microsoft to include in their various updates. I could get the USB Headset with Microphone to work by uninstalling it under device manager. Reboot the Laptop, load the device driver again. Then only did it work until I shut down the laptop and when switching on the next day, repeat the same procedure. I can only assume that this

USB Headset is so old that Microsoft do not have the correct driver included in their software updates. Oh well, it means a trip to all the PC outlets to get a more modern USB headset with microphone. Hopefully that will be plug and play.

This was a story of my venture into Digital voice using the Radio and FreeDV. See you soon using FreeDV on Frequency 7,115 MHz LSB.

ZS1CRG at the Cape Point Lighthouse

Lem, ZS1LEM

The first Cape Point Lighthouse (ILLW ZA0014) was built in 1859 at a high altitude of 238 meters above sea level.

However, because it sat above the fog line, low clouds frequently hid the light. Following the tragic wreck of the liner Lusitania in 1911, a new, lower lighthouse (ILLW ZA0013) was built in

1919 at 87 meters above sea level.

The Cape Radio Group arrived at Cape Point Lighthouse on Friday 14 August. Antennas were erected and tuned. A 20, 40 and 80 metre dipole was erected as well as a 160 metre dipole. The 160 metre dipole was erected over our accommodation. An X200 Diamond vertical antenna was erected for VHF and UHF contacts.

The antennas were tested and several contacts were made on HF and VHF/UHF. A delicious braai was enjoyed by all.

The Cape Radio Group were represented by Derek, ZS1DUP; Dieter, ZS1DWH; Mat, ZS1O; Lem, ZS1LEM and Celso, ZS1MYG.

Saturday morning was extremely foggy and visibility was reduced to a few metres, however the fog did not affect band conditions. Many contacts were made on HF as well as VHF and UHF. The highlight of Saturday evening was several HF contacts made on 160 metres. We had another



The new lower lighthouse at Cape Point

(Continued on page 74)

Sunset at the Cape Point Lighthouse





Celso, ZS1MTG operating CW



Derek, ZS1DUP operating on HF

(ZS1CRG at the Cape Point Lighthouse from page 73)

excellent braai to end the day.

On Sunday morning we made a few HF contacts and 5 VHF contacts.

We managed to contact 10 Lighthouses on HF and 1 on VHF (see the attached certificate from the SARL.)

Operating conditions at Cape Point are excellent for HF because there is no man made noise at all, a total of 141 HF contacts and 38 VHF/UHF contacts were made during the weekend.

On Sunday we were even visited



The eland that visited us

by an eland while we were packing up.

A fun time was had by all who participated and we are all looking forward to doing it again next year.



The old Cape Point lighthouse

2026 Southern African Lighthouse Award



It is hereby certified that

*the Cape Radio
Group, ZS1CRG*

Operated by Derrick, ZS1DUP; Dieter, ZS1DWH; Matt, ZS1O; Lem, ZS1LEM and Celso, ZS1MYG, made ten QSOs and contacted ten lighthouses in Southern Africa during the 2026 International Lighthouse and Lightship Weekend



Award Custodian

Dassen Island Lighthouse – ILLW number ZA0030 – IOTA AF-064

17 August 2026

022/2026



Mini-Circuits®

DC TO MM WAVE

7,500+ products
across 27 product lines

400+ new products
every year

Minimal end-of-life
and low returns

RF DESIGN



www.rfdesign.co.za



sales@rfdesign.co.za

ezsamples
Try before you buy

BACAR 14: Mission Skybridge enters final preparation phase

The BACAR 14 team is preparing for Mission Skybridge, planned for launch on 17 October 2026, weather and operational conditions permitting, from the Trichardt Model Flyers airfield east of Secunda.

Flight approval has been received from the Civil Aviation Authority and the team is now moving into the final preparation phase. The mission will test practical airborne amateur radio technologies that may assist SARL HAMNET during disaster response and search-and-rescue scenarios.

The proposed payload list includes contributions from the Secunda ARC, ZS6SRC; Barend, ZS6BAM; Willie, ZS6WBT; Paul, ZS6PQ; SARL HAMNET, Jeugland ARC, Sandton ARC, ZS6STN; BACAR; Sasolburg ARC, ZS4SRK; Hendrick, ZS6HJH; Nathan, ZR6BN, Daniel and Cameron, ZS6CYE. Payloads include APRS, LoRa APRS, LoRa point-to-point links, Meshtastic, SSTV, imaging, telemetry, tracking, a cross-band FM voice repeater experiment and other amateur radio technology tests.

Ground stations are requested within a 300 km radius of Secunda, although participation is not limited to this area. Stations further away are also welcome, especially once the balloon reaches altitude. Ground-station participation will assist with APRS reception, LoRa and Meshtastic testing, SSTV image reception, voice relay tests, logging and signal reports.

The technical frequency table will be frozen by 17 September 2026, 30 days before launch. After this date, no frequency, transmitter power, modulation mode, tone or operating-window changes will be allowed unless approved by the BACAR Coordinator and technical team. Further operator briefings and ground-station information will be shared as the launch date approaches.

Contact: Christo Kriek, ZR6LJK, the ZS6SRC BACAR Coordinator at e-mail christokriek461@gmail.com.

No	Mission Name	Description	TX1	TX2	TX3	RX	Planned Mass (g)	Tx1 Power (W)	Tx2 Power (W)	Tx3 Power (W)	Tx4 Power (W)
1	ZS6SRC	Shuttle					1 660				
2	ZS6BAM	PiCamera Still and Video payload					350				
3	ZS6WBT	SPOT	1616,250				500	8			
4	ZS6PQ	Warp drive and lora telemetry	868	433			500				
5	Hamnet_ER	WouxBand X band	145,850			435,950	500	5			
6	Jeugland	SSTV + ??	144,600				500	0,5			
7	ZS6STN1	UHF SSTV	433,4				500	0,5			
8	BACAR	ADSB/Modes/C Transponder	1090				350	1			
9	ZS4SRK	APRS	144,800	144,500			500	0,5	0,5		
10	ZS4SRK	BBS	144,650				500	144,65			
11	BACAR	Lora APRS, Lora Mode 0,	433,775		433		500	0,01	0,01	0,01	0,01
13	ZS6HJH	Project AeroLink	432	868			500	0,5	0,5	0,1	
14	Hamnet_ER	Meshtastic+APRS	433,775	144,825			500	0,1	0,5		
15	ZR6BN	Blackbox	GSM			GSM	500				
16	Dylan	HoloCube pyramid					500	0,02			
17	ZR6WT	WSRP Hdefn Camera	50,293				500				
18	ZS6WBT	Lora, camera, meshtastic	868			868	1 200	0,1			
19	ZS6CYE	Skunkworks and Lora Tracker and APRS	433,775	144,800			500	0,1	0,5		

HF Update

Dennis Green, 7P8DG



Namibia, V5. Gunter, DK2WH will be operating as V51WH from 25 August until 10 October from a farm near Omaruru. Operation from 160 to 6 metres, including 60 metres. An entry in the CQ WW RTTY contest is included as V55Y. QSL via home call.

Namibia, V5. Hanspeter, HB9BFM will be active as V5/HB9BFM from 26 August to 20 September from different locations. He will be active between 16:00 and 19:00 UTC using Olivia 8/250 at 14 072.000 kHz.

Tanzania, 5H. Chas, NK8O will once again be active as 5H3DX during November. Chas mentions, 'I will be returning to Tanzania in November to host

guests from Dartmouth College. We will potentially have an influx of students and residents from a consortium of medical schools in the Northeast. Picture shows the Guest Hostel in development. Radio shack on the left below the water tank.'

Senegal, 6W. The Italian DXpedition Team has announced their next trip to Senegal sometime between October and November. Operation with 4 stations on all modes and frequencies.

Lesotho, 7P. Wolfgang, HB9CCS will be active as 7P8EA between the end of October and the end of November. Operation mainly on 15 metres using CW and SSB. QSL via LoTW.

DR of Congo, 9Q. The Mediterranean DX Club will be active as 9T0MD between 30 September and 11 October. The 9T prefix has never been used before. Operation from 160 to 6 metres using CW, SSB and digital. Also, on QO-100 and EME. www.mdxsupport/9t0md/

The Gambia, C5. Lui, YT3PL and Luc, F5RAV will once again be active as C5R from near Banjul from 1 October to 4 November. Their humanitarian work is ongoing – so far, they made 3 new classrooms for WILCOS school for children aged 3 to 5 years old. All the money that is donated will be invested in this project – they already spent €7 500 but still need to make new toilets and add new tiles to make new floors. You can donate via [here](#).

Mozambique, C9. The Czech DXpedition group will be active as C8K between 10 and 19 November. Activity from 160 to 6 metres using CW, SSB and digital with several stations. The QO-100 satellite as well. Club Log livestream, QSL via OQRS or via OK6DJ. <https://www.cdxcz/>

(Continued on page 78)



(HF Update from page 77)

Somalia, 6O. The DX-adventure Team will be active as 6O6X during February 2027. Team leader Max ON5UR mentions, *'On 14 February 2026, our local contact was invited to the Ministry of Information and Communication Technology in Hargeisa, where Minister Jamaal Mohamed Jama personally handed over the official licence. During the DXpedition, we will be active under the call sign 6O6X (six oscar six x-ray).'*

Although the Belgian government still advises against travel to Somalia, several reliable sources confirm that Somaliland, located in the northwest, is the safest region of the country. The safety of the team is the top priority, which is why we have deliberately chosen to organise our activities in this area. On average, the country receives barely 500 visitors per year.'

A Belgian-Dutch-American team with Paul, N6PSE; Marc, ON4AMX; Patrick, ON4HIL; Max, ON5UR; Karel, ON5TN; Marc, ON6CC; Wim, ON6DX; Franky, ON7RU; Geert, ON7USB; Francis, ON8AZ; Casper, PA7DX and Ronald, PA3EWP will be active on HF and perhaps QO-100 and EME. The website is under construction.

African Islands

Seychelles, S7. Kasimir, DL2SBY will again be active as S79/DL2SBY between 11 and 21 September. Operation from 80 to 6 metres using CW, SSB and digital. QSL via home call or LoTW.

Sao Tome, S9. Francisco, CT7AKS will be active as S9R with EC7R, D2ACE, CT1BOL, D2IM, CT1BZG and CT3MD between 17 and 31 October. They will be active with 3 stations from 160 to 6 metres using CW, SSB and digital. <https://s9r.viacom.ao/>

Rodrigues Island, 3B9. Kazu, M0CFW will once again be operating as 3B9KW during the CQ WW SSB contest (24 and 25 October) and during the CQ WW CW contest (28 and 29 November). Operation before and after the contest as 3B9/M0CFW between 20 and 28 October and between 22 November and 2 December. QSL via LoTW.

Seychelles, S7. Rudi, OLK2ZA and David, OK6DJ will be active as S79/OL1T between 28 December and 8 January 2027. Operation on various bands and modes. More to follow. QSL via LoTW.

Other DX News

VPOSG South Georgia – update. NCDXF is pleased to announce a \$145 000 grant to the VPOSG DXpedition scheduled for March 2027. The VPOSG



team is perfectly aligned with NCDXF's vision of cultivating the next generation of DXers by including several young amateur radio operators on their team. This initiative builds on the momentum of our youth engagement efforts and is structured to provide hands-on mentoring in a challenging DXpedition environment. These young operators will be integrated into the full cycle of planning, operating, and reporting, giving them both technical exposure and personal growth in the true spirit of amateur radio.

VK9XY Christmas Island – update. Next Generation Takes the Lead: Meet the 2026 VK9XY DXpedition Youth Team. The Pacific Islands DXpedition Group in partnership with Youth on the Air (YOTA) is proud to introduce the VK9XY Christmas Island DXpedition Youth Team.

The team brings together young operators from around the world, each contributing unique skills, experience, and enthusiasm. Every team member has been assigned an area of responsibility, giving them the opportunity to take an active role in planning, preparing, and executing the expedition. <https://www.dx-world.net/vk9xy-christmas-island-2026/>

Grenada, J3. Graham, MM8IJU and Eric, GM5RDX will once again be active as J38DX and as J38LD. They will be active from 1 to 12 September using SSB and digital on 80 to 6 metres. QSL via M0OXO and LoTW.

Samoa, 5W. Jacek, SP5EAQ will be active from Apia as 5W0AF starting on 21 September for 3 weeks. Operation from 40 to 10 metres using SSB.

(Continued on page 79)

(HF Update from page 78)

QSL via SP7DQR OQRS.

Maldives, 8Q. Juergen, DL3JH will once again be operating as 8Q7JH between 20 September and 10 October. Activity on 20, 15 and 10 metres using CW, SSB and digital. QSL via home call, bureau or direct.

Ogasawara, JD1. Rudi, DK7PE will be operating as JD1/JG1PFR between 12 and 19 September. This will be a one-week CW operation. Ogasawara has no airport, so getting there is already part of the adventure. The journey from Tokyo (once a week) is by ship and takes approximately 26 hours each way.

Ogasawara, JD1. From 24 September to 6 October look for Take, JA1UII (as JD1BON), Koji, JI1LET (as JD1BOI), Take, JE1NVD/JD1 and Koji, JI1CRM/JD1 will be active from Chichijima, Ogasawara Islands. They will be active on various bands and modes using a combination of antennas, including Spiderbeam, dipoles and TA33jr yagi. QSL via LoTW.

Ogasawara JD1. Koutarou, JP1IHD will once again be active as JD1BQP from Chichijima between 17 October and 2 November. Operation from 160 to 6 metres with a combo of antennas. QSL via home call direct.

Peter 1 Island, 3Y0. The 3Y0L DXpedition is scheduled for February 2027. A team with 19 operators will spend approximately 20 days in the vicinity of the island. <https://3y0l.com/#Peter-1-DXpedition>

Nepal, 9N. Jan, DL4XT mentions, 'Activity planned in October 2026! This is my biggest DXpedition planned so far. I got a verbal agreement on the callsign 9N7XT, but this is not confirmed yet, so it might still change.' Operation from 160 to 10 metres using CW, SSB and digital with a FT-891 running 100 W. <https://yct.janlabs.de/dx/nepal2026>

Tonga, A3. The Tongan Paradise Contesters will

be active as A31W during the CQ WW CW contest in November. More to follow.

St Pierre and Miquelon, FP. Matt, WF2A will be operating as FP/WF2A from 21 to 26 October. An entry in the CQ WW SSB contest is included with an activity from POTA PM-0025. QSL via LoTW. <https://www.grz.com/db/FP/W2MJR>

Saint Martin, FS. Look for team TO9W with more operators and new equipment from 29 November to 11 December. An entry in the CQ WW DX CW contest is included. Updates will be posted on their Facebook page.

Solomon Islands, H44. A team with 9A2NA, 9A3MR, 9A3CJY, 9A4WY, 9A7Y and DK8ZZ will be active from Guadalcanal as H49A between 9 and 21 October. Operation on HF and perhaps 6 metres. *'H49A callsign has been issued for our expedition, honouring 15 years of charity work of Croatian Sisters of Charity of St. Vincent de Paul in Buma, Malaita Island, OC-047. Our special callsign itself symbolises ties between Solomon islands and Croatia. Part of amateur donations for the expedition will be redirected to charity work in the mission.'*

Malaysia, 9M. Celebrating National Day (31 August) and Malaysia Day (16 September), several special event stations located in various Malaysian states and federal territories are expected to be activated between 22 August and 30 September. Active from East Malaysia will be 9M26MS (Sabah) and 9M26MQ (Sarawak). Active from West Malaysia will be 9M26MA, 9M26MB, 9M26MC, 9M26MD, 9M26MJ, 9M26MK, 9M26MN, 9M26MP, 9M26MR, 9M26MW and possibly 9M26MM and 9M26MT. QSL via operators' instructions.

Mariana Island, KH0. Ken, JO1VRK will once again be active as KH0/AJ6VJ from 29 December to 3 January 3, 2027. Operation on 40, 20, 17, 15, 12 and 10 metres. QSL via LoTW, Club Log. American

Samoa, KH8. A team that previous activated T2C, C21MM and V6D will now be operating as KH8A between 29 October and 13 November. The team includes nine operators DJ9KH, DK5WL, DL1KWK, DL2RNS, DL4SVA, DL6KAC, DL6KVA, DL7JOM and DL7VEE. We are planning to operate 4 stations 24/7 from 160 to 6 m using CW, SSB, RTTY and other digital modes. <https://kh8a.mydx.de/>



4 pin crystal oscillators

Daniel Romila, VE7LCC

It is better to start with the picture of the device I am writing about:



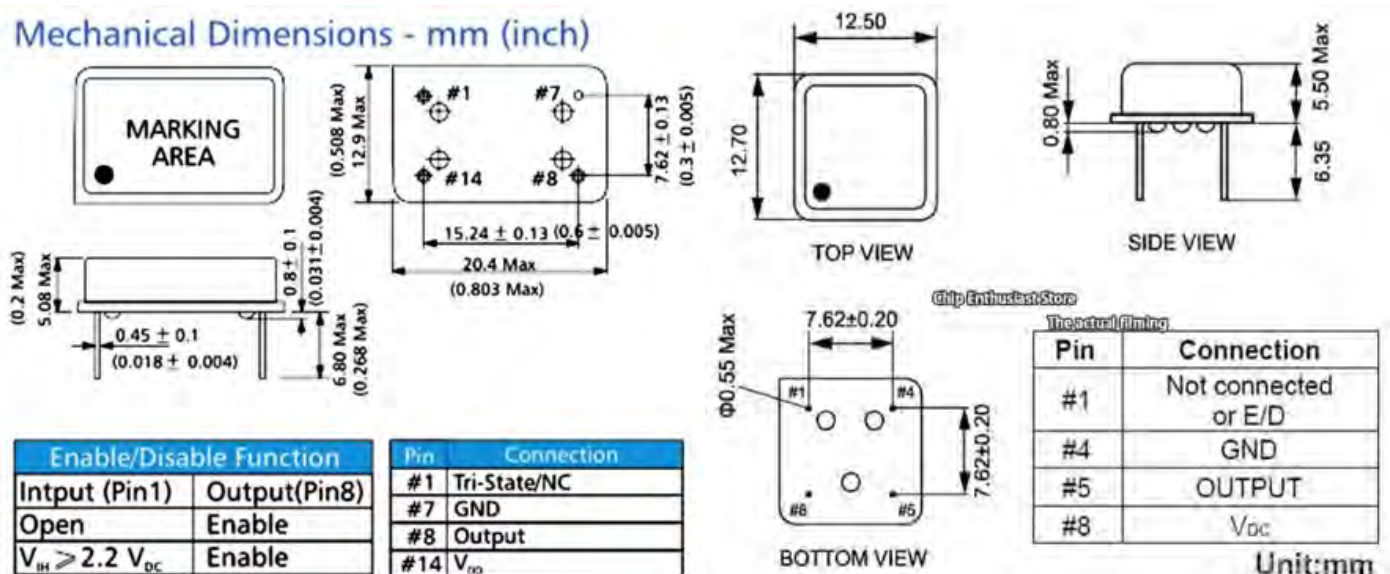
Practically, they are integrated circuits, containing a quartz crystal and an oscillator. There are half size, full size and even SMD (surface mounted devices). I was looking on their datasheets and the size of the device does not look like having any influence on the precision and other electrical characteristics of the device.

They are bigger than a simple quartz crystal. They are more precise as frequency stability, in the range of 20 ppm (parts per million), or better.

One can immediately say it is possible to use a simple quartz crystal, put some adjustable capacitors in series and/or parallel, and obtain – through adjustment – a precise frequency. Yes, it is possible to obtain a wanted frequency, at a certain moment in time; but keeping it there, even for several minutes, does not really work. From my own experience, I was never capable to obtain a stable frequency from a quartz oscillator made by me, not even when I put the quartz crystal on top of a warm power transistor 2N3055, used as thermal stabilizer. The 4 pins oscillators were always better.

It is possible to buy 4 pin crystals with the output frequency even 200 MHz. From my experience, I could count on Hz stability. Pretty impressive. But let us see how it is connected such a device, what are the 4 pins:

Mechanical Dimensions - mm (inch)



2 pins are for power supply. 1 is for output. 1 is let in the air. Most of those oscillators can eventually use this 4th pin for command, to enable or disable the output of the oscillator. Connecting at the GND (ground) makes the oscillator not to output the rectangle signal with the labelled frequency.

Some oscillators are built to be power supplied from 5 Volt. Others from 3.3 Volt. Many Chinese such devices accept both values, 3.3 Volt and 5 Volt as power supply. Many SMD versions are meant for 1.8 Volt power supply.

Those 4 pin oscillators have the same price as a simple quartz crystal, at some 1 CAD each, when

(Continued on page 81)

(4 pin crystal oscillators from page 80)

bought in 5 – 10 pieces, in July 2026. It is cheaper to buy simple crystals, when we talk about quantities in the hundred range.

More expensive, even costing 20 - 30 CAD are high precision oscillators, with 0,1 ppm precision.

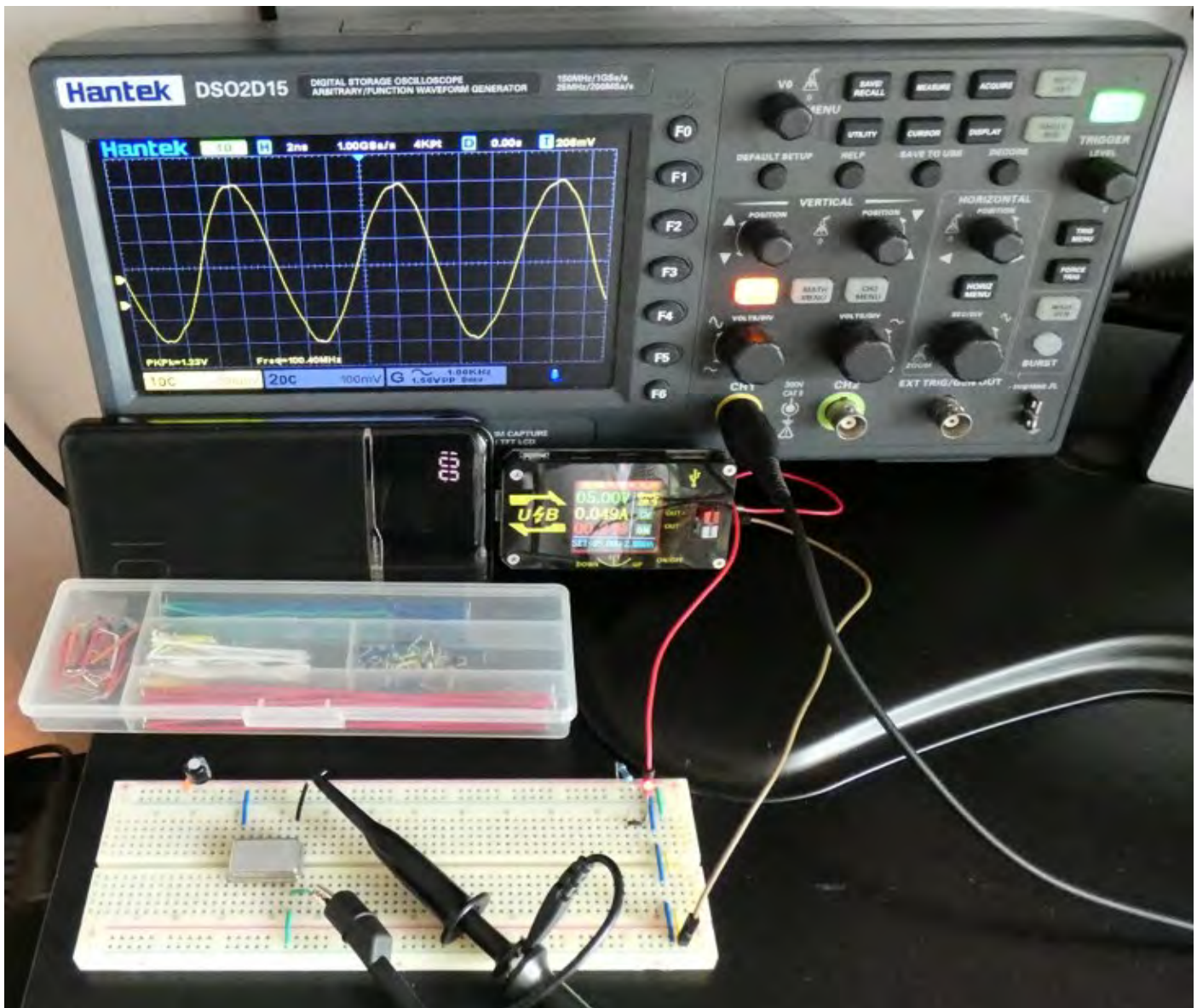
4 pin crystal oscillators are very helpful devices for out hobby projects. They should be used more nowadays, since their priced dropped at the simple crystal price in the last 1-2 years, different than in a distant past.

There are many YouTube videos about those devices. I quickly found one explaining the difference between TCXO (Temperature Compensated Crystal Oscillator, OCXO (Oven Controlled Crystal Oscillator) and VCXO (Voltage Controlled Crystal Oscillator) https://www.youtube.com/watch?v=zKPHaP_AcKM

I end this short presentation article with a picture of my own putting in function of such full size 4 pin oscillator on the breadboard and showing its output on my oscilloscope.

I was using a 100 MHz oscillator power supplied from 5 Volt. The consumption was 49 mA, from which 1 mA was for a tiny LED placed on my breadboard to show I do have DC power supply.

The output shape and voltage of the signal is strongly influenced by the high capacitance of the breadboard (one should not work on breadboard on VHF/UHF!), so I obtained only 1.23 Volt peak-to-peak, and a rounded towards sine signal from the generated rectangle signal. All those things are normal and to be expected. I just put together everything to show it works and how it is to make it work immediately, in comparison with mounting on the breadboard a bunch of components, as needed in the case of using a simple quartz crystal.



The Museum Column

The Radio Set B25 SA and Radio Set B26 SA

WO 1 Dennis Green (rtd) SA Armoured Corps - also ZS4BS



The RS B25 SA Manpack radio as used by the Infantry. On the left, the battery; middle the transceiver and right the Antenna Tuning Unit

The Manpack Transceiver Type RS B25 is an HF SSB communications transceiver suitable for carrying in the field in a harness.

The frequency range extends from 2 to 30 MHz and it operates in the A2J (Morse), A3H (AM) and A3J (LSB and USB) modes.

The frequency is selected by five front panel selection switches which control the output of a synthesiser giving a highly stable output. Selection is in 1 kHz steps and provides a total of 28 000 channels.

Antenna tuning is fully automatic and occurs each time a new frequency is selected and each time the transceiver is switched on.

Power for the transceiver is derived from a

nickel-cadmium battery pack which provides for 12 to 15 hours operation in the A3J mode with a Transmit-Receive cycle of 1 minute to 9 minutes (normal speech).

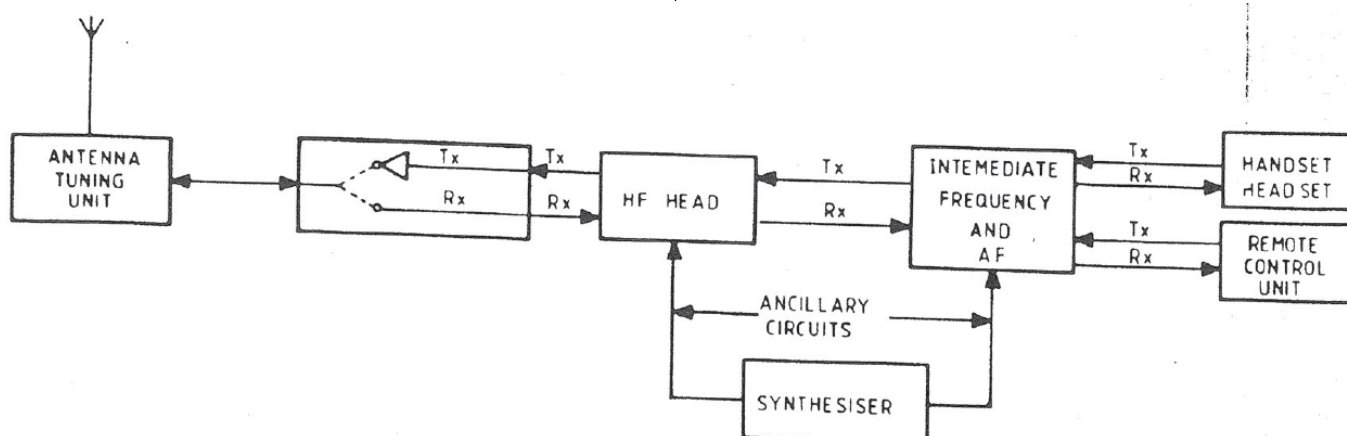
Simplified Functional Description

The transceiver can be conveniently divided into five separate functions as shown below.

The synthesiser provides a highly stable heterodyne frequency which is applied to the HF head and the IF section.

The HF head contains the receive and transmit RF amplifiers. During transmission the synthesiser is mixed with the intermediate frequency to generate the wanted RF signal. During reception

(Continued on page 83)





Open-wire Antenna for the B25

(The Museum Column from page 82)

the synthesiser output is mixed with the received RF signal to provide the intermediate frequency.

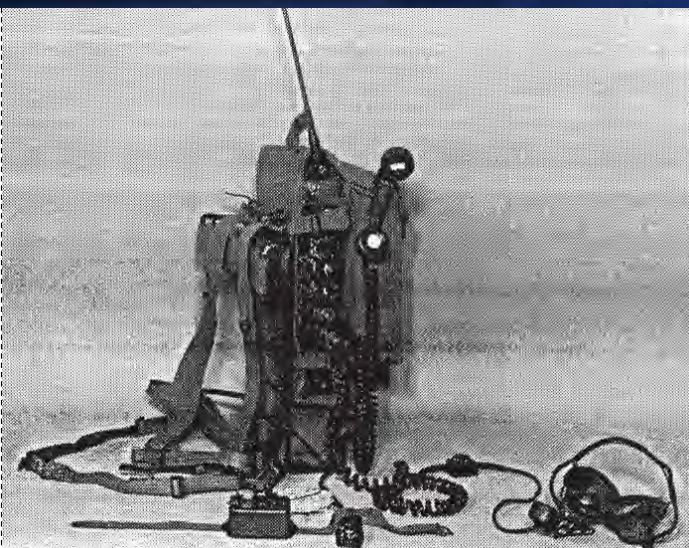
The IF section contains the IF amplification stages and the AF detector and the modulator.

A 20 W RF amplifier provides two RF outputs, 20 W PEP or 6 W PEP into 50 Ohms in the A3H and A3J modes of operation.

The antenna tuning unit provides automatic matching of the antenna to the transceiver at all frequencies within the range 2 to 30 MHz. Facilities are provided for connection to a whip antenna or an open wire antenna.

The complete man pack transceiver includes the following accessories:

- ◆ Battery Unit
- ◆ Spare Battery Unit
- ◆ Battery Charging Cable
- ◆ Remote Control Unit
- ◆ Knee Operated Morse Keyer



- ◆ Open-wire Antenna
- ◆ Whip Antenna
- ◆ Telephone Handset
- ◆ Headset
- ◆ Harness

(Continued on page 85)

Specifications common to Transmitter and Receiver

Type of equipment:	single sideband transceiver with compatible AM capability
Modes of operation:	A2J; A3J on transmission and AM reception; A3J upper sideband and A3J lower sideband
Frequency range:	2 to 29,999 MHz
Number of channels:	28 000
Channel spacing:	1 kHz
Frequency setting:	by decade switches
Autonomy:	14 hours for a cycle of 1 minute transmission and 9 minutes reception (voice)
Frequency stability:	$\pm 1 \times 10^{-6}$ over a temperature range between -15°C and + 55° C.
Antenna:	2,315 m whip. B26 2,8 m whip on the vehicle An open wire, 19 m long which may be reduced to 7 m by means of short circuits, so that the antenna operates on a quarter wave-length
Standing Wave Ratio:	Less than 2

Battery unit:	fitted with built-in charger operating from a variable 10 V to 30 V DC supply. The battery can be can be charged either when coupled to the transceiver or separately. The battery is made up of twelve 4 AH Nickel-cadmium cells.
---------------	--

Transmitter Specifications

Transmitted power in A2 mode	20 W PEP into 50 Ohms during transmission at normal level
Transmitted power in A3H mode:	
Transmitted power in A3J mode (LSB or USB):	6 W PEP into 50 Ohms during transmission at reduced level
Carrier and unwanted sideband rejection	greater than 40 dB in A3J mode
Linearity (intermodulation products)	25 dB
Harmonics	-40 dB with respect to peak power measured on dummy antenna
Dynamic af range	15 dB approximately for constant transmitted power
Compression time rise time	1,5 μ s approximately
Output protection	against short and open circuits
Continuous operation	not detrimental to the equipment

Receiver Specifications

Total bandwidth in A2J mode	300 Hz centred on 1 kHz at 6 dB
Total bandwidth in AM mode	3 kHz
Total bandwidth in A3J mode	2,7 kHz at 6 dB
Sensitivity in A3J mode for an input voltage of 0,4 μ V in 50 Ohms	the signal + noise to noise ratio: ≥ 12 dB
Protection against first image frequency	≥ 90 dB
Protection against second image frequency	≥ 80 dB
Protection against first intermediate frequency	≥ 90 dB
Protection against interfering frequencies	For an interfering signal 15% off tune from a wanted 2 μ V SSB signal The signal + noise to noise ratio is ≥ 10 dB for an interfering signal amplitude of: 0,5 V in the range 2 to 18 MHz 0,4 V in the range 18 to 25 MHz 0,3 V in the range 25 to 30 MHz A SSB signal 100 dB above a wanted 2 μ V SSB signal and 5% off tune gives an output with a signal + noise to noise ratio ≥ 10 dB
AF power output	10 mW in 300 Ohms with a signal distortion of less than 7% 20 mW in 150 Ohms
Automatic gain control	the AF level does not vary by more than 3 dB for an input voltage variation of 1 μ V to 100 mW.



Mechanical Specifications

Weight of transceiver fitted with antenna tuning unit and battery unit:	7,865 kg
Dimensions of transceiver fitted with antenna tuning unit and battery unit:	Length 420 mm Width 215 mm Height 90 mm
Moisture:	fully watertight
Resistance to vibration, bumps and shocks:	meets the requirements for portable equipment



The RS B26 SA Vehicle radio. On the left, the Power Supply Unit; middle the transceiver and right the Antenna Control Unit. The ACU is connected to the ATU by coax cable and a multi-wire control cable.

(The Museum Column from page 83)

The Transceiver Type RS B25 is an HF SSB communications transceiver suitable for mounting in Armoured and other vehicles.

Power for the transceiver is derived from the vehicle battery pack, either 12 V or 24 V. The PSU will ensure that the radio gets 15 V to do its work.

The ATU is mounted close to the antenna base and a 2,8 m whip antenna is mounted on the vehicle.

In the Armoured vehicles, the transceiver is connected to the radio harness. The B56 VHF radio is also connected to the harness. There are control boxes on the harness where the crew members connect their chest pieces and helmets, the harness also provides intercom between the crew members. Typically, the crew commander will select the A Radio (B26) in one ear with intercom in the other ear. The loader will select the B Radio and intercom, while the gunner and driver will have intercom. *(I do remember having the B26 tuned to*

the Afrikaans Service and rebroadcasting the rugby via the B56 to the Infantry clustered around their A55 radios. The harness provided that facility. Ed.)

The technical information for the B25 and B26 are the same. It is the same radio, with different power and ATU options.

Amateur Radio

What is seen around the amateur radio community is what I call the B25,5 or the B25½.

The battery pack is the problem, the batteries have given up the ghost. So, the PSU from the B26 is mounted onto the B25. Because the power cable for the PSU is scarce, the PSU is opened and a power cable is soldered onto the contacts. And there you have a working radio. (The SA Armour Museum has two power cables and I have one - but I need the PSU and the radio!)

A nice radio for outdoor activities and also for the newbie radio amateur - if you can get one at a reasonable price. I have seen one up for sale, but it has been tampered with.



The South African Maritime Mobile Weather Net

The Maritime Net is on the air daily at 06:35 UTC (08:35 CAT) and 11:35 UTC (13:35 CAT) on 7,120 MHz LSB and 14,316 MHz USB. The morning session covers coastal conditions from Maputo, Durban, East London, Port Elizabeth, Mossel Bay, Cape Town and Saldanha Bay ... with “live updates” at end of bulletin. The 11:35 UTC session is the coastal forecast as per the South African Weather Service (SAWS) for up to 50 km seaward, also with a live update of conditions as at 11:45 UTC. Coastal weather and general calls on 7 120 kHz LSB after the main weather broadcast.

The team is Peter, ZS1CH; Marjoke, ZS5V; Woody, ZS3WL and Johan, ZS6WZ.



The Lighthouse that moved 880 metres in 23 Days

Woody Collett, ZS3WL, the Lighthousekeeper

Following a very cold visit to the northern extremities of Norway (Radio ZS June 2026), we now travel to the USA east coast and again to a part of the North Carolina east coast to find out all about a particular lighthouse that moved 880 metres over a period of 23 days. (No, I am not joking) It really happened and ranks amongst one of the greatest engineering marvels in modern times.

Necessity is the mother of invention and the engineers involved in this remarkably ingenious plan had to dig deep (no pun intended) to come up with a suitable method/plan to relocate this lighthouse.

We all are aware of rising sea levels, rouge storms and huge coastal surges (global warming?) and it is due to this that there was no choice but to move the lighthouse or risk its demise.



Showing the revetments on the sea side, a temporary solution

Aerial view of Cape Hatteras Lighthouse prior to its relocation

The Outer Banks of North Carolina are famous for shifting sand shoals and its associated navigation hazards created by these shifting sandbanks have earned this area the name of “The Graveyard of the Atlantic” and due to the warm

waters from the Gulf of Mexico coupled with the Cold Labrador current which meet here, are a perfect place for the breeding of Hurricanes that so frequently either affect Florida, the Carolinas, as well as the American states that are located on the shoreline of the Gulf of Mexico.

(Continued on page 87)

The Original Cape Hatteras Lifeguard Station (it later was destroyed by Hurricane Harvey during the 1907's.



(The Lighthouse Column from page 86)

We now look at Cape Hatteras Lighthouse located on the east coast of North Carolina. Hatteras is the sixth oldest English place name in the USA, originally called "Hatrask" and named as such by Admiral Sir Richard Grenville who commanded an expedition to this area authorized by Sir Walter Raleigh (whose name was later used as a city name for one of the bigger cities in North Carolina.)

As mentioned, these waters off the outer banks of North Carolina are known as the Graveyard of the Atlantic. More than 600 vessels have been wrecked here having succumbed to Hurricanes, storms and the forever shifting sandbanks. Diamond Shoal lies off Cape Hatteras and is infamous for its sandbanks. Local island villagers have over the years assisted in saving many a potential victim. The United States Life-Saving Service had many villagers serving with them from around 1870. Other villagers were staff at lighthouses built to guide Mariners. With today's

modern navigation aids the shipwrecks are fewer, but vessels are still very wary of this area.

When the original lighthouse was completed in 1870 the ocean was +- 460 m away from the lighthouse and even then, storm driven tidal surges would wash over Hatteras Island. Over millenniums this erosion of the coast westwards gradually caused the distance from ocean to lighthouse to get less and in 1970 was only 36 metres away from the lighthouse and if urgent action was not taken it would mean the demise of the Lighthouse. The old lighthouse had long time previously succumbed to the ravages of the tides and erosion.

From the 1930's there have been efforts to halt the encroachment of the ocean, amongst which were sheet pile "groynes" which were a type of wall which was erected perpendicular to the shoreline. The lighthouse was abandoned to the sea during 1936, removing its light to Buxton Woods nearby, located on a skeletal tower.

During the 1960's and 1970's with the ocean

(Continued on page 88)



Aerial view of where Hurricane Isabel cut inlets into the coastline



The Chief Lighthouse Keepers cottage was moved ahead of the lighthouse

(The Lighthouse Column from page 87)

creeping ever closer more efforts including “beach nourishment” (sand replacement) and three new groynes installed helped, but temporarily at best. To make matters worse a severe 1980’s storm further accentuated the oceans encroachment on the lighthouse. This storm completely washed away the foundations of the old lighthouse and now put the present one in real danger.

With time running out and the clock ticking the National Parks Service in 1980 started planning under the National Environmental Policy Act for a long-term solution to this problem, which if not tackled would not go away.

Following a three-year process including public meetings there were several solutions that were mooted. The one that was to be the final solution i.e.: relocation of the lighthouse further inland was considered impractical and shelved. Instead, a concrete and steel sea wall revetment was chosen. This only solved the problem for a short space of time and by the 1990’s drastic action now had to be taken, if the lighthouse was to be saved at all.

The Cape Hatteras Lighthouse and associated buildings, all with historical value were during 1999 successfully relocated about 880 m further inland from where they had stood since 1870. The relocation placed the buildings in the same spatial and elevation relationship as they were before the move.

Hurricane Dorian which made landfall in 2019 thankfully did little damage to the area. The Cape Hatteras area due to its geographic situation always is at peril during the hurricane season. This area ranks as the most exposed hurricane area along the entire USA east coast.

The Original Lighthouse

Following the request on 10 July 1794 by



The Lighthouse on its move on 1 July 1999... a slow and painful process

Alexander Hamilton, the Secretary of the Treasury, that a lighthouse be built after his ship almost crashed, a lighthouse was built and nicknamed “Hamilton’s Light.” Congress agreed the funding \$44 000 and building was done during 1802. It was constructed of dark sandstone which retained its original colour. Eighteen lamps provided the illumination. The building stood 34 m above sea level. Its light was visible for 18 nm (or +/-33 km) on a clear night.

Following its demise, a new light was built, but hereunder are the details of the first lighthouse

Built: 1871

Construction: Sandstone

Height: 27 m later raised to 45 m in 1854.

Light source: Whale oil lamps

First lit: 16 December 1871

Focal height: 34 m

Range: 18 nm or 33 km

This structure was eventually demolished to make way for the new lighthouse.

The New (Second) Lighthouse

Following the demolition of the original lighthouse a new one was built to replace the old one as this vulnerable coastal area could not be left without a lighthouse. This new lighthouse has the distinction of being the tallest lighthouse in the USA at 60,35 m, as well as being the second tallest in the world.

Interesting Facts:

- ◆ It is also one of the tallest masonry structures ever moved at just under 60,96 m and weighing in at 5 080 234 kg.
- ◆ About 1 250 000 bricks were used and its located now at 64 m above sea level.
- ◆ Its tower height is 60,35 m

(Continued on page 90)

Moving Cape Hatteras Light

Lighthouse Crossing: These photos, taken June 26, 1999, show the Cape Hatteras lighthouse en route to its new home 2900 feet southwest of its original location. On this day, crews from International Chimney Corporation and Expert House Movers were just hitting their stride; the lighthouse had covered about 1/4 of the 2900 feet and was moving smoothly past a road intersection.



This closeup photo shows the five layers of the moving system. The big yellow beam at the top is one of the *strongback beams* that provided a rigid cradle under the base of the 200-foot lighthouse. Under the strongback beam you can see the projecting ends of the *cross beams*. The lower yellow beam is one of the *main beams*, which were aligned in the direction of motion. In shadow under the main beam you can make out several of the *hydraulic jacks*, each jack mounted on an ingenious roller dolly. There were 100 of these jacks, and the most critical task of the relocation was to keep the weight of the lighthouse precisely balanced on these 100 support points. At the bottom, the rollers move forward on the *roll beams*, which were laid on the ground to provide a smooth road for the lighthouse to travel.



This photo is taken in front of the moving lighthouse. The roll beams were leapfrogged forward, that is, beams the lighthouse had passed over were moved around to the front to continue the road. Workers are preparing the beams for the approaching lighthouse. Some of them are spreading ordinary Ivory soap on the beams--it proved to be the perfect lubricant for a traveling light tower.



The rear of the lighthouse was the working end of the relocation. The big red cylinder is the oil reservoir for the hydraulic jacks. The operator stands in front of a five-foot-high control board that has gauges and controls for each of the 100 jacks. Behind him, mounted on the roll beams, are the *push jacks*, long-armed hydraulic jacks mounted sideways so that they could slowly push the entire assemblage forward. Each push moved the lighthouse about five feet in a barely perceptible motion cheered on by the watching crowd. Then the push jacks were moved forward on the roll beams for the next push. In this way the lighthouse was moved roughly 100 feet per day southwest, away from the surf.

This was by far the most ambitious lighthouse relocation ever accomplished. Cape Hatteras Light is the one of the world's tallest brick lighthouses, and I believe 2900 feet is the farthest any masonry lighthouse has ever been moved intact. The lighthouse arrived at its destination with no damage whatever.

All photos on this page copyright 1999 Russ Rowlett. All rights reserved.

The above detailed photos and description were taken by Ross Rowlett in 1999 and credit is therefore given to the photographer

(The Lighthouse Column from page 88)

- ◆ There are about 257 steps internally to reach the light.
- ◆ Its day colour is spiral black and white stripes
- ◆ Its light is 800,000 candela.
- ◆ It is visible in clear conditions from over 27 nm or 50 km and in exceptional clear days can be seen from 51 nm or 94 km.

General

The moving and relocation of this lighthouse ranks amongst the most challenging engineering projects of the 20th Century. If this was not done when it took place, it is plainly evident that by the year 2001 it would be no more. The Diamonds shoals offshore will always be there and the yearly hurricanes will continue, but at least Cape Hatteras Lighthouse will now be safe for many years to come.

If you ever are on the USA east coast, make a trip to this area and see for yourself just what a great engineering feat was accomplished.

Credits

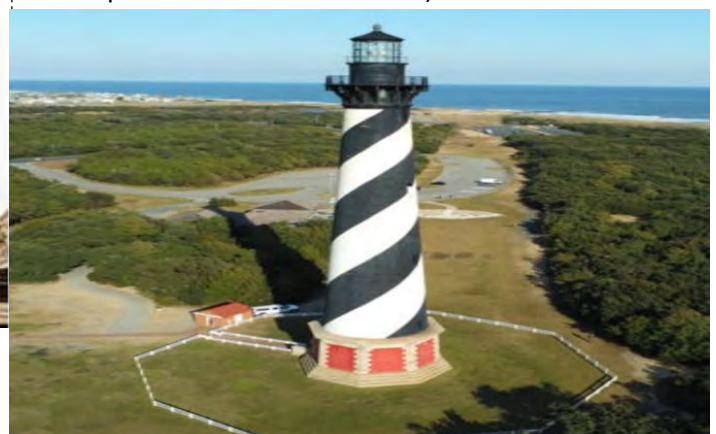
Google Earth, Ibiblio/Lighthouses/University of South Carolina, Wikipedia/ US Coast Guard, Ross Rowlett (the photographer who took the amazing photos of the lighthouse's journey).



Preparation for another few millimetres of movement. Now you know why it took 23 days to relocate everything.



The Lighthouse at its relocated position about 880 metres further inland and now hopefully out of harm's way for the next decades. (The scaffolding is still in place to complete minor refurbishment)



A view of the path that it travelled to arrive at its relocated position. The ocean is now 880 metres away.

Everyday multimeter and its maintenance

Daniel Romila, VE7LCC

Many radio amateurs and non-radio amateurs have in house at least a multimeter for various measurements, like the AC voltage in a wall plug, the DC voltage of a power supply and continuity checks – like verifying antenna cables and antenna connectors.

Many of us have several multimeters. One is always the “go and grab it” multimeter, and usually it is not the fanciest one. I am most probably talking about the multimeter on the right.

At the moment of writing this article, July 2026, such a DT830B multimeter is under 9 CAD, shipping and taxes included on the online Chinese websites. I even saw it with under 6 CAD, and under 6 CAD in traditional brick and mortar stores, like Canadian Tire (this is a well-known chain of mostly automotive products in Canada).

There are many variations of the presented multimeter, with more functions, but if you entered the hobby in the last 30 years, I am almost sure you have this model somewhere. It is not the most precise one. It is not very fancy. But it is digital, it has enough digits, highly visible and with contrast for most of us. It is true I am only 61 and I never needed glasses. I measured on my own multimeter, and the height of the digits (of the numbers on the screen) is 12 mm. It is a generous size.

The multimeter itself, the body, is very solid. There are two wick things with this multimeter, that I found on my own that must be addressed. Unfortunately, those are the same two things to be addressed even with more expensive and fancy



multimeters, so one cannot escape from addressing the problems:

- ♦ The leads break. Sometimes it is possible to see the connectors detached from the wires. Other times the measuring leads no longer have continuity, it is not so visible, but one can touch and feel the electrical connection is no longer there. ***This problem should be addressed before having troubles, not after!*** You do not want to be in a hurry, in panic, to do a measurement, just to find out your multimeter itself needs repair.
- ♦ The battery. On the presented model, DT830B, the battery is a 9 V battery, but the same problem appears with other kinds of batteries, in other multimeters. It is not so urgent as the previous problem. The multimeter looks like working normally, just that it becomes a little slow. Slower and slower, with each measurement, in months, even years. The precision is somehow also affected, but not so much to disturb the function of measuring (it has only 4 digits display, anyhow). One might have battery problem in the last 12 months or so, and not to notice.

So, let us start with the multimeter leads. They

(Continued on page 92)



(Everyday multimeter and its maintenance from page 91)

will break. They will let you down. They cost just some 2 CAD shipping and taxes included – the cheapest ones – and under 7 CAD the more expensive ones. You need to do the measurement NOW. The leads are broken NOW but hey! They are so cheap! You wait 3 - 4 weeks and you will have new multimeter leads, to do in several weeks the measurement that you needed to do NOW, not in 3 - 4 weeks from NOW.

Conclusion: one should have several pairs of multimeter leads, always.

Buying several pairs of already made, dedicated multimeter leads at once is an economic solution. The disadvantage is that those already made leads cannot be repaired. I personally prefer to make my own multimeter leads and repair them when they eventually need. They never needed for me, but I periodically verify them.

Luckily, banana connectors match the mother connectors from the multimeter's body. Even when those mother connectors look like not accepting bananas, try and you will – most probably – see that they are compatible with banana father connectors, too, not only with dedicated specialized connectors your initial multimeter leads have.

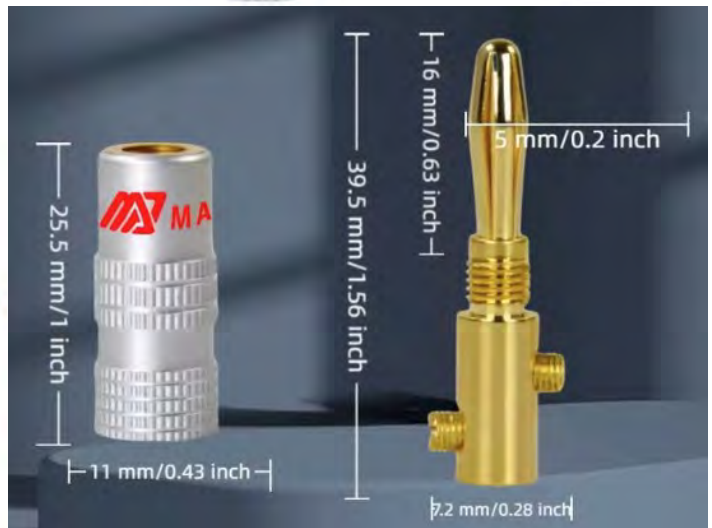


All banana connectors are so cheap, at even under 1 CAD each, just several cents, when one buys 10 or more. We need 4 banana connectors for a pair of multimeter leads.

Because I already hear your comment that those banana connectors do not have thin pointed tips, please look again at the bananas: you can insert thin wires into the metallic ends of the

bananas, which are flexible. More, one can fix like this, in the flexible metallic ends, capacitors, inductors, transistors, and do the measurement without having one own hand touching there, to influence the measurement. The above bananas have screws. We can use thick wire, strong wire, and fix it with screws. No soldering needed. It is easy and fast to verify them and eventually repair them. Such multimeter leads will last forever.

At similar low prices one can find online male banana connectors that have not only one screw for fixing the wire, but two screws.



I cannot underline enough how important is to solve the multimeter leads problem before you need the leads, not in the moment you must measure something.

The battery inside the multimeter is the next thing to address. Even if you just bought the instrument and it is brand new for you, it is unknown how long ago the manufacturer made the multimeter, put the battery inside (if it is a 9 Volt battery, do you know anybody having a good opinion about 9 Volt batteries?). The back of the

(Continued on page 93)

(Everyday multimeter and its maintenance from page 92)

multimeter usually does not encourage you to change the battery because usually – but I saw some different DT830B variants – one has to use a screw driver and unscrew 2 screws, to get inside the instrument.



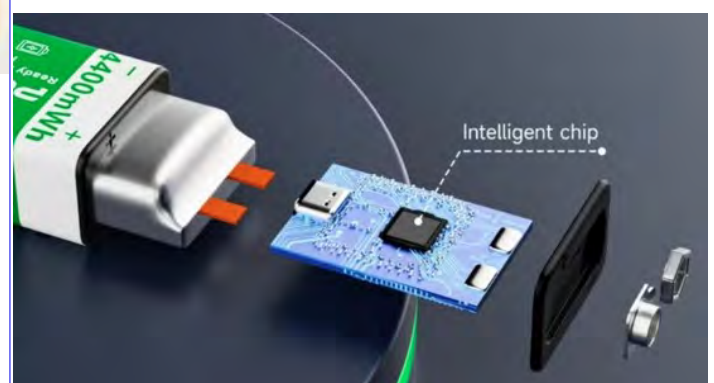
Once you opened the back, the inside looks like in the one of the following pictures.

The battery in the DT830B and many of its variants is a small compact 9 Volt battery, which contains inside a sandwich of even smaller batteries, put in series to get to the wanted 9 Volt. It cannot generate a lot of mAmps. Being a series of



batteries, the internal resistance is already big and growing in time. That means there is a certain voltage with the multimeter OFF. There is a smaller voltage of the battery once the multimeter is switched ON, and the voltage further has a variation during the measurement. This sequence of various voltages from the battery is not so visible when the battery is brand new. What we can eventually see is that the measurements become slower and slower in time, and it gets so bad that – at the end of usability of the battery – when we make a measurement for voltage of something the multimeter shows several intermediate values before stabilizing at the final value.

All the above problems would be avoided if the battery's voltage would be nailed at 9 Volt or close to it. Instead of taking care every 4 - 6 months to have a new 9 Volt battery, I preferred to replace it with a LiPo battery and integrated electronics that



Call us for the best *Hamradio* deals in SA



Daiwa CS-201
Low Loss two-
way coax switch.

DC-30 MHz 1.5kW 150-600
MHz 500W. Insertion
Loss DC-1000 MHz less
than 0.12dB
R700.00 incl. vat.

Spiderbeam 12m

Fibreglass Telescopic Mast.
Under 4kg portable weight.

1.2m collapsed. Ideal for
Field Use – HAMNET, SOTA,
POTA R3575 inc.

Daiwa CN-501H
1.8-150 MHz
15/150/1500W



Highly Accurate Cross
-Needle SWR/Pwr Meter

Selectable Average or PEP Power Reading

R2495.00 *Special Offer* R2350.00 until 30 June 23

Diamond BU-50A 1:1 lightweight Balun. Power Handling
1.2kW covering 1.7-40MHz R750.00 inc. VAT

We are distributors for Alinco, Icom, Kenwood and
Yaesu Transceivers. Please call for prices

SAM's Radio

011 802 2976 Email: Sam.ford@radioacc.co.za

(Everyday multimeter and its maintenance from page 93)

makes it stay at 9 Volt as long as it works and dies suddenly when the integrated electronics decides the LiPo source is exhausted and has to be recharged. What I bought looks like this:



One can argue that 6F22 9Volt normal batteries are very cheap, and that spending some 10 CAD is a waste. I cannot argue with that. My answer is that I use the multimeter almost every day, and I want to rely on it. The measurements are faster since I replaced the battery with a USB rechargeable one,

Route 66 on the Air 2026 is scheduled for Saturday 12 September to Sunday 20 September... a nine-day window for amateur radio operators to participate. Twenty-five special event stations under the 1x1 W6 call sign have been set up for this event.

The goal is to commemorate the history of the "Mother Road" connecting the eastern and western United States. Through stories, songs, and TV shows, the highway came to symbolize the spirit of the freedom of the open road, inspiring many to see America.

Established on 11 November 1926, Route 66 was part of the US highway system and stretched approximately 3 939 km, from Chicago, Illinois, to Santa Monica, California, passing through eight states - Illinois, Missouri, Kansas, Oklahoma, Texas,



with voltage stabilizer in it. I did not know before the measurements can be faster, but once I know there is no coming back.

Just a final note for the hobbyists: since this multimeter is cheap, one can be tempted to buy the multimeter just to disassemble it and use the rotary switch (20 positions) in other projects. Unfortunately, the switch is dedicated to this multimeter, made on PCB (not a separate switch) and my conclusion is that it cannot be taken out and used for something else.

New Mexico, Arizona and California. Known as the "Main Street of America" and later dubbed the "Mother Road" by John Steinbeck in his 1939 novel, *The Grapes of Wrath*, it became an iconic symbol of American mobility and opportunity.

However, the demise of Route 66 began in the 1950s as the US began building the interstate highway system and the highway was officially decommissioned in 1986. Today, small portions of the US Highway 66 still exist in towns and rural areas in several states.

Much of the original Highway 66 has been rerouted into a fast-moving interstate, bypassing many of the small towns and interests of this nation. Every year, Route 66 on the Air takes place to remember, celebrate and share the enthusiasm and memories that Highway 66 represented in its time... and even today.

A map of the original highway shows its route from Santa Monica, California to Chicago, Illinois.

To find stations participating in Route 66 on the Air, browse the calendar at www.route66centennial.org The ARRL [Special Events Stations database](#) also includes listings. Search for the keyword "66".



RONNIE'S RADIO SHACK

Reliable Communications when you need it most

www.ronniesradioshack.co.za



Icom IC-7300 HF & 6m



Alinco DR-735T Dual Band 2m/70cm FM only



Icom IC-9700 2m/70cm/23cm Allmode Radio



Icom IC-7100 HF/6m/2m and 70cm Allmode



Wouxon KG-UVAD-Plus
Dual Band portable



Yaesu FT-4X Dual band Portable



Vertex Standard
VX-1400 HF 100w



Vertex Standard
VX-1700 HF 100w

Shop Online at: www.radiosshack.online

Home

Contents

