

BOLAND AMATEUR RADIO KLUB

September 2019

The logo for CQ Boland features the call sign 'CQ' in a blue, rounded font with a white outline, followed by the word 'BOLAND' in a large, bold, green font with a white outline and a slight shadow effect. The entire logo is enclosed in a thin black rectangular border.

VAN DIE VOORSTITTER **Conrad, ZS1ES**

Ek sien uit om u weer te sien by BARK se algemene jaarvergadering op Saterdag, 14 September 2019. DIE AJV vind plaas by die Voortrekker terrein in Stellenbosch. LET ASSEBLIEF DAAROP DAT DIE VERGADERING OM 10:00 BEGIN EN NIE OM 11:00 SOOS GEWOONLIK NIE. Na afloop van die vergadering word 'n Bring en Braai aangebied waar die klub 'n slaaitafel asook 'n brood en kaas tafel gaan voorsien. Vir die braai moet u natuurlik u eie vleis en drinkgoed saambring.

By die AJV moet die nuwe bestuur van BARK verkies word. Nominasies moet skriftelik gedoen word en die nodige vorm is by David ZS1DDK beskikbaar. Daar sal ook 'n geleentheid by die vergadering wees om nominasies in te dien. Stel u asseblief beskikbaar om te help met die bestuur van BARK.

Ek maak van die geleentheid gebruik om die lede wie die afgelope jaar op die komitee gedien het te bedank vir hulle bydrae en bereidwilligheid om op die bestuur te dien

Namens BARK bedank ek almal wie betrokke is met die onderhoud van die herhalers in die Wes-Kaap. Dit word opreg waardeer.

Opregte dank aan die lede wie betrokke is met die skryf, herleiding en lees van die weeklikse BARK bulletin. Dankie ook aan Deon, ZR1DE, vir die opstel van CQ Boland.

BARK se ledetal staan tans op 90 maar daar is nog enkele lede wie nie vir die komende jaar hernu het nie. Teen einde September sal lede wie nog nie hernu het nie ongelukkig van die BARK databasis verwyder word.

Onthou dat u op hoogte kan bly deur BARK se webwerf <http://bark.org.za> of Facebook blad [facebook.com/bolandamateurradioklub](https://www.facebook.com/bolandamateurradioklub) te besoek.

DIE PIKETBERG HERHALER

(OORKANT DIE BERG)

Ean ZS1PR

Baie van ons, die uwe ingesluit, weet min of meer wat die meeste herhalers se dekking is in die gebiede waar ons rondry. As ons dan die einde van die dekkings gebied bereik skakel ons oor na 145,500 MHz of nog erger, ons skakel sommer die radio af “want hierdie kant gaan tog niks aan nie”.

Een van die plekke waar meeste van ons dit doen, is sodra ons met die N7 die kruin van die Piekenierskloofpas bereik en oor die Resseberg gaan, want dan “verloor” mens die 145,625 MHz Piketberg herhaler.

Meeste van u sal onthou dat aan die begin van November verlede jaar was daar 'n hele klompie OK's langs die Weskus en van Kaapstad wat ZD7 suksesvol op twee-meter FM gewerk het.

Gedurende hierdie tyd was ek by 'n vakansieoord met die naam “Tree Tops”. Nou om die oord te bereik moet mens afdraai van die N7 na Citrusdal en dan so 'n kilometer verder weer Suid afdraai na “The Baths” vakansieoord. Mens ry dan verby “The Baths” en na nog so tien kilometer verder bereik mens “Tree Tops”.

Ek ry met 'n radio wat skandeer in my voertuig en was verbaas toe ek reeds redelik vêr “af” aan die Noordekant van die Piekenierskloofpas was en hoor hoe iemand die 625 herhaler sneller. Die sein was nogal baie sterk. Toe begin ek self die herhaler sneller om te kyk wat aan. Net na mens op die pad na “The Baths” afdraai het, is 'n stilhou plek met 'n groot toeriste-inligtings bord. Daar was die sein 'n rapsie oor die S9! Al die pad af verby “The Baths” tot by “Tree tops” kan mens die herhaler bereik. Die sein tot naby “The Baths” was so S6 na S8.

By “Tree Tops” maak ek my ryding tussen die bome staan en ons dra al ons goed in na ons ‘Boomhuis’. Later gaan ek terug mobiel toe en sneller die herhaler. ‘n Soliede 59+40 sein kom terug! Ek plaas toe die radio ('n Yaesu FT-8800) in “Kruisband herhaal” modus van 70 cm na die herhaler op twee meter sodat ek met my 70 cm handradio die herhaler uit ons boomhuis kan werk. Daardie twee dae het ek 'n hele klompie stasies gewerk via die 625 herhaler. Party op die 625 en ander via die 625 na 650 herhaler bo-op die Hawequas reeks net Oos van die Paarl asook een OK op die 675 herhaler op Jonas kop.

Die twee dae wat ons daar was, was daar 'n strook Cirrus-wolke wat soos 'n rivier "gevloei" het van Wes na Oos regoor ons koppe en ek en my LV het gewonder of dit nie deel van die effek was nie.....

Die dag toe ons vertrek was ons in Citrusdal dorp in. Daar kon mens die 625 herhaler trek en so S5 terug ontvang. Dit was net as mens styf teen 'n gebou se Noordekant intrek, dan kon die 625 herhaler nie gesneller word nie.

Wat nou?

By die huis gekom, was die groot vraag: Was dit 'n eenmalige gebeurtenis of kan die 625 herhaler altyd aan die Citrusdal kant van die Resseberg gewerk word?

Wel, daar is net een manier om die vraag op korrekte wetenskaplike wyse te beantwoord: Herhaal die eksperiment! Belangrik egter om so veel parameters as moontlik presies dieselfde te hou om vals resultate te verhoed. Dus dieselfde motor, dieselfde radio en dieselfde antenne en natuurlik ook weer na dieselfde plekke as voorheen.

Tweede reis

'n Maand later is ons weer met die N7 Noord verby Citrusdal op pad na Koekenaap.

Ek het vroeër as nodig gery om bietjie tyd in te ruim om 'n paar draaie in en om Citrusdal te maak en te kyk wat se resultate ek kry. Ek het ook vir Rassie ZS1YT gekontak net voor ek ry om seker te maak dat daar nie by die 625 Piketberg herhaler veranderinge gemaak is nie, veral nie aan die twee-meter antenne nie. Rassie het bevestig dat alles by die herhaler nog dieselfde was.

Wel, om 'n lang storie kort te maak, die seine oorkant die berg was nog daar en mens kon nog die herhaler werk, maar oor die algemeen was die ontvangte sein sterktes omtrent so 20 dB af.

By daardie inligting bord waar mens afdraai was die S9+ sein nou net S6. Padlangs was die sein "af" na S3 tot S5. Regoor "Tree Tops" was die sein S9+20.

Mens kan dus die gevolgtrekking maak dat daar wel dekking onder normale toestande is, maar dat met ons eerste besoek daar wel 'n goeie verbetering van toestande was.

Ek het die berg mooi bekyk van "Tree Tops" af en ook van die Piketberg kant af met ons terugreis. Die berg het aan die Suidekant 'n lang plat stuk wat heelwat laer is as die res van die berg wat nogal baie kranse en koppe het. Dus kan mens verwag dat

die sein daar sterk sal wees teenoor die res van die Olifants-rivier vallei Suid van Citrusdal. Mens kan van die Oostekant van die rivier die herhaler met 'n hand stel aanskakel, maar dit lyk nie of mens modulasie kan deurkry met die baie lae krag nie.

Die reis Noord van Citrusdal met die N7 was ook interessant. Ek kon tot 16 km Noord van Citrusdal nog die herhaler gebruik. Kon dit nog so drie km verder aanskakel, maar ek was vir die ander stasies feitlik onleesbaar.

Opsommend kan mens dus sê dat die 625 Piketberg herhaler wel bruikbaar is langs die Olifantsrivier van 20 km Suid tot so 16 km Noord van Citrusdal. Maar jy het 'n redelike sein nodig om goed in te kom. My radio het 40 Watt uitset en ek gebruik 'n Vyf-agste antenne op my mobiel.

Wat van verder Noord?

Wel, verder Noord in die Wes-Kaap is daar in werklikheid nie meer herhaler-dekking nie, maar redelik aktiwiteit op 145,500 MHz. Die OKs monitor die frekwensie en gesels soos hulle rondry vir Soutmyn en ander sake. So moet nie jou stel afskakel nie, maar as jy naby Klawer kom kondig jousef aan op 145,500 MHz en jy gaan waarskynlik 'n kontak/te en 'n lekker gesels kry.

Christo ZS1CDS woon net buite Vredendal langs die R363 na die N7 se kant toe. Hy vertel my dat party aande as toestande reg is kan hy die 145,650 MHz herhaler op Hawequas werk. Die herhaler is 120 km van sy QTH maar glad nie lyn van sig nie.

Hy vertel my dat as mens tussen Klawer en Vredendal van die R363 Suid-Wes afdraai met die gruispad na Lambertsbaai, dan klim die pad uit die Olifantsrivier-vallei en begin weer stadig daal. Op die hoogste punt is daar 'n kol van minder as 100 meter in deursnee waar mens altyd in alle weersomstandighede die Piketberg 145,625 MHz herhaler kan werk. Die posisie van die kol is ongeveer 31° 47' Suid : 18° 29' Oos.

Laat berig: Die OK's "agter die berg" gesels nie net op 500 nie, hulle toets reeds 'n herhaler bo-op die Gifberg by Vanrhynsdorp.

Nou ek weet van my soutmyn-stelsels dat 'n herhaler op Gifberg die hele Olifantsrivier-vallei gebied dek tot by die see.

Mens het van Gifberg af ook 'n UHF pad tot by die Piketberg-herhaler, so moontlik kan die Gifberg-herhaler later ook aan die "ketting" van Piketberg tot George gekoppel word.

Ry met 'n radio

Onthou dan, as u radio kan skandeer laat hom deur die herhaler-kanale en die algemeenste simpleks kanale skandeer.

Ek het al herhalers vêr buite hulle normale dekking-gebied gehoor en gewerk en ook oor fantastiese lang afstande simpleks kontakte gehad terwyl ek ry.

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Es'hail Sat launched successfully

SpaceX successfully launched the Es'hail-2 satellite on Thursday, November 15 from Launch Complex 39A (LC-39A) at NASA's Kennedy Space Center in Florida. Liftoff occurred at 20:46 UTC, and the satellite was deployed to a geostationary transfer orbit (GTO) about 32 minutes after liftoff.



Built by Mitsubishi Electric Corp. and owned by Qatar's national satellite communications company Es'hailSat, Es'hail 2 will provide television broadcasts, broadband connectivity and government services to Qatar and neighbouring parts of the Middle East, North Africa and Europe. Es'hail 2 also carries the first amateur radio payload to fly in geostationary orbit. Es'hail-2 will be "parked" 35 786 km above the equator at 25.5°East, nearly due North from Pretoria and

Johannesburg (which are at 28°E).

Es'hail-2's footprint will cover a population of approximately 5.2 billion. This translates to more than 1.5 million Radio Amateurs in nearly 225 countries

Es'hail-2 Linear Amateur Radio Transponder

The published uplink frequency is 2 400.050 to 2 400.300 MHz with the centre of the band being

2 400.175 MHz. Total bandwidth is thus 250 kHz and right-hand circular polarization will be used.

The downlink frequency is 10 489.550 to 10 489.800 MHz with the centre of the band being 10 489.675 MHz. Vertical polarization will be used.

The preferred modes of operation will be SSB and CW. 5 Watt uplink power to a 60 to 75 cm offset dish should be more than sufficient for the uplink. The transponder will also be fitted with a "LEILA" (LEIstungs Limit Anzeige) input power limiter to ensure fair play and that the AGC of the transponder is not triggered (hogged) by a single, high power transmission, thus reducing the sensitivity of the satellite. In short, running higher uplink power than necessary will be counterproductive,

A detailed paper was presented by Hannes Coetzee ZS6BZP at the 2018 AMSAT SA Space Symposium. Plans are being made to have a live demonstration at the 2019 AMSAT SA Space Symposium on 16 March 2019. Down the ZS6BZP [paper here](#).

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A simple satellite antenna that took South Africa by storm

by Hans van de Groenendaal, ZS6AKV

When South Africa was invited to host the International Amateur Radio Union's Youngsters on The Air (YOTA 2018) summer event there were several challenges. The main one was: What could South Africa offer young people, aged between 16 and 25, coming from all over Europe and Africa that was different and something they had not experienced before? The ultimate decision for the South African host team, under the leadership of South African Radio League (SARL) president, Nico van Rensburg, turned out to be an easy one: build a number of pseudo CubeSats and launch them into near space on a high-altitude balloon. It was a great idea but in a short period of time a lot of water had to flow under the bridge, including designing a portable antenna that could be used to track the balloon.

The Secunda Amateur Radio Club offered their expertise in devising a pseudo CubeSat, now named BACARSat (Balloon Carrying Amateur Radio Satellite), and arranged the launch. The Makerspace group, BinarySpace, 3D printed components to make up space frames and a number of volunteers guided the young people, assembled in five teams, through the process of designing the payload with a number of sensors and the software required to encode and decode the output of the sensors. The next challenge was an antenna that could be used with their dual band (2 m/70 cm) handheld transceivers to track the balloon. The antenna had to be portable and be able to be taken apart so that it could be packed in their luggage when flying home.

After much research, it was decided to develop a local version of the design of an “open sleeve” antenna by German radio amateur, Martin Steyer (DJK7ZB), incorporating design enhancements made by US amateur, Larry Brown (WB5CXC).

The open sleeve is a unique design on a Yagi antenna which places the director very close to the driven element. The driven element is sized for 2m with an impedance of 50 ohm. When operating on 70 cm the open sleeve acts as part of the driven element on 70 cm (third harmonic of 2m).

The original concept was developed in 1946 by Dr J T Bolljahn of the Stanford Research institute but was not introduced into amateur radio until the 1950s. Many radio amateurs have used this concept in the design of high frequency (HF) multiband antennas where by adding additional elements near the driven element, the antenna is resonant on several other frequency bands.



The first South African version supplied to the YOTA 2018 participants was a collaborative design by Guy Eales (ZS6GUY) and Dr Gary Immelman (ZS6YI).

The same evening after the young people had assembled their antenna, they were searching the sky for amateur satellites and it was not long before they made contact through several amateur radio satellites with other radio amateurs. During their week in South Africa, YOTA participants also received a very high frequency (VHF) dongle sponsored by MultiChoice and could be seen during their free time looking for other signals from space. The antenna was a winner!

After YOTA, the mechanical structure was redesigned by Dr Immelmann. A choke around the boom was added to isolate the antenna from the coax and reduce the effect human contact has on the antenna. A handle was added on the boom end which makes it more comfortable to hold and further isolates the antenna from the handler.

Now called the AMSAT SA dual band Yagi, it is manufactured in one of Dr Immelman's factories in Vereeniging. It has two elements on 145 MHz and three elements on 435 MHz. He has donated 200 antennas to AMSAT SA to generate funds for their two satellite projects "KLETSKOUS and AFRicube". He also attached the condition that the antenna had to be made available at a very low price. "I like to contribute to the development of the AMSAT SA satellite projects but I also would like to encourage more radio amateurs and in particular the younger generation to become involved in space activities", he said.

For its size the antenna has excellent gain:

- 145 MHz: 4.12 dBd or 6.3 dBi
- 435 MHz: 6.23 dBd or 8.4 dBi

The Yagi is broadband with measured SWR almost flat over the entire bands as follows:

- 145,800: SWR 1.1
- 435,000: SWR 1.12

The antenna is plug-and-play. No tools are needed except for soldering on a connector to suit the application. It comes complete in a carry bag with full instructions. This antenna can be assembled and disassembled in minutes.

The Yagi has taken South Africa by storm with over 150 units already in use. AMSAT SA has received enquiries for the antenna from the USA, Europe and the Far East. Currently individual export is not feasible due to the high international courier cost

but AMSAT SA is exploring bulk shipping to local distribution centres in other countries. Currently the main focus remains on South Africa.

The antenna has various applications which will be discussed in a paper to be presented at the annual AMSAT SA Space Symposium to be held in Midrand on 16 March 2019. More details can be found on www.amsatsa.org.za

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The millimetre bands are useless! Are they?

by Hans van de Groenendaal ZS6AKV

From the dawn of radio by Marconi and others, some segments of the radio spectrum were declared of no real value. The high frequency (HF) bands (shortwave) first earned this “useless position” because long and medium waves were considered the only frequencies of value. Then, radio amateurs pioneered international communications on shortwave and before long it became the most contested radio frequency spectrum for international broadcasting and radio telephone links used to connect continents. Many decades later, international radio telephony was replaced by optic fibre, submarine cables and radio broadcasting by internet streaming. The pressure on the HF spectrum is something of the past!

Millimetre bands are now following a similar trend, not considered of too much use other than some backhaul links and short distance propriety line of sight networks; and spectrum is now hotly contested for 5G and other communication developments. One wonders where this “in and out for favour” will end. For the World Radio Conference 2023 (WRC23), there is already talk about spectrum in ranges beyond 300 GHz.

The major focus at WRC19, which will be held in Egypt at the end of October 2019, is about frequency allocation for 5G and satellite services. With the emergence of the fibre industry there were mutterings that satellite technology would soon be something of the past. A new organisation, EMEA Satellite Operators Association

(ESOA), is of a very different view and believe that satellites will continue to play an important part in communication. ESOA has become very vocal about the importance of affording the same interference protection to satellite services as terrestrial services.

The organisation has pointed out that with the outcome of WRC15, world administrations have given a clear signal that different technologies, fixed and mobile, terrestrial and satellite, will all continue to play a vital role in enabling next generation communications around the world. ESOA warned policymakers to ensure that studies and plans for development of terrestrial 5G, IMT-2020 services and systems are implemented either in the frequency bands currently identified by the ITU for IMT or possibly new bands that might be identified by WRC19. In either case, existing services in the same and adjacent bands must be protected from interference. The use of bands for terrestrial 5G which are not harmonised internationally is not beneficial and would likely cause harm to other services.

As ESOA has no direct participation in WRC19, the organisation has made it its business to attend as many as possible governmental WRC19 preparatory working group meetings to lobby for support. They made a compelling presentation for their call of protection at the Department of Telecommunications and Postal Services (DTPS) WRC19 meeting held in Pretoria in January this year.

If you can't beat them, join them

ESOA and its members are focused on ensuring that satellite communications be an important part of the 5G network of networks. As 5G standards are being developed and implemented, it is critical to identify the conditions to fulfil in order to ensure a smooth integration of satellites with 5G so that satellite solutions can become an increasingly important part of the 5G ecosystem and deliver the expected value in terms of service ubiquity, continuity, scalability and resilience. Ensuring compatibility of satellite in the 5G value chain through the standards process is, according to ESOA, not negotiable. There is a long history of satellite communications and the use of standards. ESOA put forward conditions for maximising the successful integration of satellite into the 5G infrastructure:

- Interoperability of satellite network solutions with the 5G network management system allowing a third party (e.g., mobile network operator or service provider) to manage and configure the satellite network resources.
- Integration of the satellite communications system into the 5G core network to provide secure end-to-end 5G services to and through satellite terminals.
- Multi-vendor interoperability between elements (e.g., terminals, radio access networks – RAN) of satellite network solutions for 5G.

- Technology commonality of satellite network solutions with cellular network solutions to benefit from an economy of scale allowing cost reduction and increased product diversity.

Question of safety

No debate about the millimetre wave band is complete without questioning the safety. Given that systems operating in the millimetre spectrum are essentially short-range systems, which means there will be many of them in a network, how safe will we be walking the street of Cape Town or Johannesburg?

One of the major effects of millimetre waves on the human body is skin absorption. Exposure of EM radiation at millimetre waves will cause skin penetration (60 – 90% in extreme cases) due to dielectric properties of human skin cells (during close exposure). However, researchers observed that the 30 – 40% of the incident power will be reflected from skin. Power of the transmitted signal and time of exposure are significant factors in this scenario.

Many researchers found that long term exposure to microwave and millimetre wave radiation is carcinogenic. The impact may not be obvious in very short terms but could cause serious damage to human cells over periods. Long term exposure of microwave and millimetre wave frequency radiation also could affect other living organisms and plants.

The safety aspects will undoubtedly be an ongoing debate with many different views and arguments, perhaps like with the current arguments in the mobile tower debate: “I don’t want a cell tower at my children’s school because its unsafe”, when in reality directly under the tower it is safer than 500 metres away. Is there currently any unemotional proof? More independent scientific research is definitely needed.

Over the past few years there have been many new developments operating in millimetre wave spectrum, the main reason why ITU study groups have been doing frequency sharing studies. It is quite clear that there are many technologies that are looking for a space in the millimetre wave spectrum. Discussion at WRC19 should prove interesting and pave the way forward. Soon the millimetre spectrum may well earn the position as “high demand spectrum”!

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