Radio ZS

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Congratulations on 70 years of unbroken membership of the South African Radio League as of Thursday 1 February 2018

Al Akers, ZS2U

Ring-rigstraler vir satelliet kommunikasie

The “Largely Plastic" 2 m Antenna

Two Band Quad Loop Antenna

Working for the future of amateur radio

Radio ZS

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

"Celebrating Amateur Radio's Contribution to Society"

International Amateur Radio Union - *Working for the future of amateur radio*

Volume 71 Number 2 February/Februarie 2018
Editor: Dennis Green, ZS4BS radiozs@sarl.org.za

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."

Wessel JR Wessels, ZS6AKY
Norman Ellor, ZS5YM

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 Amateurradio in Suid-Afrika
Lidvereniging van die IARU Streek 1

On the Cover

The Ring beam antenna for 2 m and 70 cm satellite communications built and used by Christie Grobbelaar, ZS4CGR. Read more on page 9

Op die Voorblad

Die Ring-rigstraler vir 2 m en 70 sm satelliet kommunikasie wat Christie Grobbelaar, ZS4CGR, gebou het en gebruik. Lees meer op bladsy 9

Deadline for articles

Contributions for the next issue must reach the editor on or before the last week of the month before publication. Closing dates are:

February 2018 - 25 January 2018
March 2018 - 22 February 2018
April 2018 - 26 March 2018
May 2018 - 24 April 2018

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PARC hosting the 2018 SARL National Convention
PARK die gasheer vir die 2018 Nasionale Konvensie

The Pretoria Amateur Radio Club will be presenting the 2018 SARL National Convention at the Farm Inn Country Hotel and Wildlife Sanctuary (www.farminn.co.za/) at Silver Lakes in Pretoria East over the weekend of 13 to 15 April. The Farm Inn (GPS S 25º 46.981' E 028º 22.177) provides various luxury accommodation for those who would like to stay over on Friday and/or Saturday evening. The accommodation rates for their economy rooms are Single Rooms at R650 per person per night and if you are sharing at R550.00 per person per night. On Saturday after-

(Continued on page 4)

Die Pretoria Amateurradioklub bied die 2018 SARL Nasionale Konvensie aan by die Farm Inn Country Hotel en Wildlife Sanctuary (www.farminn.co.za/) by Silver Lakes in Pretoria Oos oor die naweek van 13 tot 15 April. Die Farm Inn (GPS S 25º 46.981' E 028º 22.177) bied 'n verskeidenheid luukse akkommodasie vir diegene wat graag Vrydag en/of Saterdagaand wil oorbly. Die akkommodasie tariewe vir hul ekonomie kamers is - enkelkamers teen R650 per persoon per nag en as jy wil deel is dit R550.00 per persoon per nag. Op Saterdagmiddag tussen die vlooimark en ander aktiwiteite kan jy 'n wild rit teen R150 per persoon geniet. Alle afgevaardigdes wat graag wil oorbly, moet vooraf akkommodasie bespreek. Om aanlyn te bespreek, gaan na www.farminn.co.za of kontak Farm Inn besprekings by 012 809 0266 of 0277.

Daar is ook baie ander gastehuise en lodges in die onmiddellike omgewing van Farm Inn wat alternatiewe akkommodasie bied, as jy nie by Farm Inn wil bly nie.

Saterdag gebeure

Die SARL AJV begin Saterdagoggend om 09:00 met die SARL-toekennings-dinee die aand om 19:00. Die Pretoria Amateurradioklub reël op

(Na bladsy 4)

Pretoria Amateur Radio Club

Home of Amateur Radio/Tuiste van Amateur Radio

The Pretoria Radio Club was formed in 1929/30. In 1935 the PRC was incorporated in Division 6 of the SARRL. The club abandoned all activities during World War II and in 1944, PARC resumes its amateur activities. In 1945, PARC re-joins the SARRL after its own revival. PARC became an independent branch in 1946. The Pretoria Branch became a Club affiliated to the League with its own logo in 1996. In 2015, a new Club logo was accepted.

PARC aims at promoting the interest of Amateur Radio; creating awareness of the club initiatives, through more active public relationship programmes both internal and external through various media channels; providing emergency and public service communications when normal means of communications are disrupted; PARC is renowned for supplying radio communications on various Motor Rally events in Gauteng, the Free State, Limpopo and Mpumalanga. Conducting programmes and activities to increase the general interest and welfare of Amateur Radio within the Club and the bigger community through collective initiatives and projects and supporting lawful, responsible conduct by its members and the amateur fraternity in general.

Regular events - Club flea markets; monthly Club meetings on the first Saturday afternoon of the month at 14:00 CAT; RAE classes in preparation for the May and October RAE; Club news bulletin every Sunday morning at 08:45 CAT on 145,725 MHz and other HF frequencies including Echolink.

Contact information: Web: www.parc.org.za
Club Chairman: Graham Reid, ZS6GJR, greid@wol.co.za
Secretary: Louis de Wet, ZS6SK, louis.zs6sk@gmail.com

(National Convention from page 3)

noon between the flea market and other activities, you can enjoy a game drive at R150 per person. All delegates who would like to stay over must arrange and book accommodation in advance. To book your accommodation online go to www.farminn.co.za or contact Farm Inn reservations on 012 809 0266 or 0277.

There are also many other guesthouses and lodges within the immediate vicinity of Farm Inn which provides alternative accommodation should you not want to stay over at Farm Inn

Saturday Activities

The SARL AGM will start at 09:00 on Saturday morning 14 April with the SARL Awards Dinner that evening at 19:00. Registration forms for the National Convention will be published on the SARL web site soon. The Pretoria ARC will be hosting a mega flea market, amateur radio displays and information kiosks. The flea market is open to all radio amateurs who would like to sell their excess amateur goods, we also would like to call on all companies and businesses who would like to make use of this opportunity to display and sell their products and/or services. The flea market and other activities will start as soon as the Annual General Meeting has been concluded.

Our aim this year is to promote amateur radio as a service within our community. To this extent we will make available Information kiosks to Radio Amateur or-

(Continued on page 5)

(Nasionale Konvensie vanaf bladsy 3)

Saterdag 14 April 'n mega-snuffelmark, amateur radio-uitstallings en inligting kiosks. Die vlooimark is oop vir alle radio amateurs wat hul oortollige amateur goedere wil verkoop. Ons wil ook graag alle maatskappye en besighede vra om van hierdie geleentheid gebruik te maak om hul produkte en/of dienste aan te bied en te verkoop. Die vlooimark en ander aktiwiteite sal begin sodra die Algemene Jaarvergadering gesluit is.

Ons doel vanjaar is om amateur radio as 'n diens binne ons gemeenskap te bevorder. In hierdie mate sal ons inligtingskiosks aan radio amateur organisasies beskikbaar stel, wat hierdie organisasie toelaat om hul betrokkenheid by amateur radio te wys. Tot op datum het ons AMSATSA, SDR, BACAR, RaDAR, AWA en ander organisasies wat deelneem aan ons plan om amateur radio te bevorder. Die SARL en ander nabygeleë radio amateur klubs het reeds hul inligtingskiosk bespreek en sal hulle hul dienste en rol wat hulle in amateur radio speel vertoon. Let asseblief daarop dat inligtingskiosk gratis aan amateur radio organisasies beskikbaar gestel sal word.

(Na bladsy 5)

(National Convention from page 4)

ganizations, which will allow these organization to showcase their involvement in amateur radio. To date we have AMSATSA, SDR, BACAR, RaDAR, AWA and other organizations that will participate in our drive to promote Amateur Radio. The SARL and other some surrounding radio amateur clubs booked their information kiosks already and will showcase their services and role they play within amateur radio. Please note that information kiosks will be made available to Amateur Radio organizations free of charge.

Tables for the flea market and information kiosks will be made available on the day, take the opportunity now and book your table early to prevent disappointment. Bookings for tables will close on Tuesday 10 April 2018. The information kiosks are aimed at giving organizations the opportunity to promote amateur radio activities and services such as SOTA, satellites, beacons, etc. We would like to call on all businesses and amateur radio organisations like clubs and related institutions to step forward and book your kiosk for the day. More information on the day's programme and the names of organizations who will participate in the day's activities will be communicated to all during the weekly SARL news bulletins.

For more information, please contact Almero du Pesani, ZS6LDP, at almero.dupisani@up.ac.za or call him on 083 938 8955 or you can contact Etienne Naude, ZS6EFN, at etienne@afrigrid.com or call him on 082 553 0542

(Nasionale Konvensie vanaf bladsy 4)

Tafels vir die vlooimark en inligting kiosks sal op die dag beskikbaar gestel word, maak gebruik van die geleentheid en bespreek jou tafel vroeg om teleurstelling te voorkom. Besprekings vir tafels sal op Dinsdag 10 April 2018 sluit. Die inligting kiosk is daarop gemik om organisasies die geleentheid te bied om amateur radio aktiwiteite en -dienste te bevorder, soos SOTA, Satelliete, bakens, ens. Ons wil graag alle besighede en amateur radio organisasies soos klubs en verwante instellings aanmoedig om 'n kiosk vir die dag te bespreek. Meer inligting oor die dag se program en die name van organisasies wat aan die dag se aktiwiteite deelneem, sal tydens die weeklikse SARL-nuusbulletins aan almal bekend gemaak word.

Vir meer inligting, skakel Almero du Pesani, ZS6LDP, by 083 938 8955 of stuur 'n e-pos na almero.dupisani@up.ac.za of kontak Etienne Naude, ZS6EFN, by etienne@afrigrid.com of skakel hom by 082 553 0542

Disentangling a dipole antenna with the Editor

In 2017, a Radio ZS Antenna Design Competition was launched. A number of entries were received and then the Editor's PC decided to mess him around. A call went out again and the entries were sent in (and the Editor ensured that they would not disappear!)

In the January 2018 issue of Radio ZS, you read about the RaDAR – 160 m end fed half wave antenna by Eddie Leighton, ZS6BNE; the Triple Trapper Inverted Vee for 80, 40 and 20 metres by Rob Bareham ZS1SA, and Weekend Antennas no 6: A Coax-Fed Dual-Band Doublet by Andrew Roos, ZS5U *(and I told you where to find WA 1 to 5.)*

In this issue, you can read about 'Ring-rigstraler vir satelliet kommunikasie' by Christie Grobbelaar, ZS4CGR; the "Largely Plastic" 2 m Antenna by Bert von Rahden, ZS6LP and the Two Band Quad Loop Antenna by Al Akers, ZS2U.

The Editor thanks the radio amateurs who entered the competition and providing ideas for other amateurs. After reading each article, the Editor decided -

HIGH category: Christie Grobbelaar, ZS4CGR (prize sponsored by ZS2BL's SA Hamshack, thank you Rory!

LOW category: Eddie Leighton, ZS6BNE.

MIDDLE category: Rob Bareham ZS1SA and Andrew Roos, ZS5U.

Congratulations! The prizes will be sent by courier to you—is much quicker than the Post Office!

The March Radio ZS will contain all the information for the 2018 SARL AGM - reports, motions, etc.

Sam Ford, ZS6BRZ, from Sam's Radios donated radio equipment to the SARL Emergency Fund. Gary Immelman, ZS6YI, received the equipment from Sam. The SARL thanks Sam for his donation and support. The SARL Emergency Fund was started following the devastating fires in the Knysna area.

Following the work done by the SOTA team (ZS6ACT, ZS6BV and ZS5AYC), there are many more South African summits available to the programme. Here we see Brian, ZS6BV and his portable setup on one of the summits in Limpopo.

Adele, ZS5APT created these collages of SOTA activities by herself, Craig, ZS6CHT, and Sid, ZS5AYC.

Relaying Amateur Radio Today

Henry Chamberlain, ZS1AAZ

Years ago, Hans, ZS6AKV phoned me, I think it was on a Friday and asked me if I would do a relay of an Intechnet the coming Sunday. I had never done this before, but I said I would try even if there was not much time to prepare for it.

So, I worked the whole Saturday making a crude printed circuit board with a few components on it and we did the Intechnet, even if it was a bit of a struggle and with a few glitches.

It was necessary to connect the phone line to my 2 m radio and at the same time I should be able to speak through the radio and up the phone line.

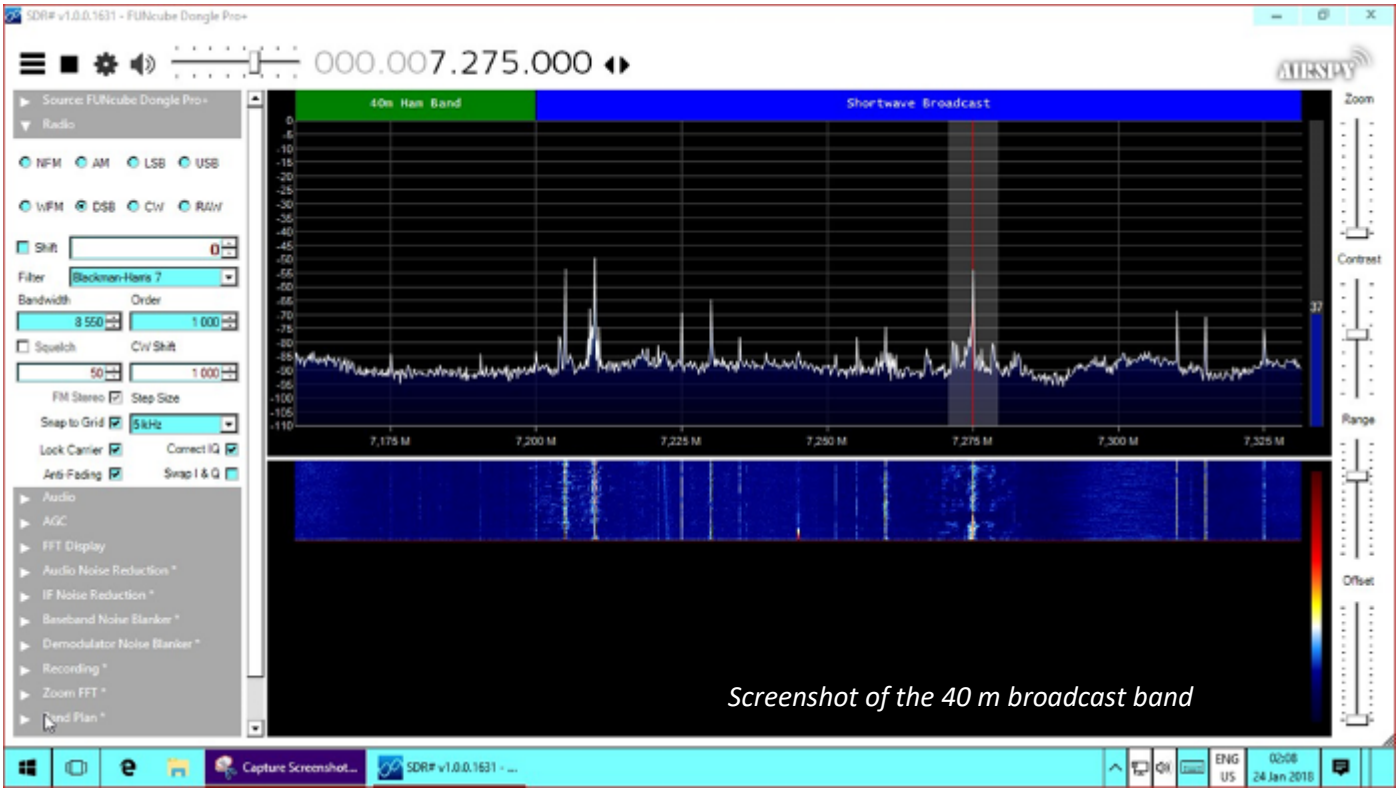
When that was done, I decided that I must make a better patch box and so I started on a new one. The first one was not very successful because it had earth loops in it and there was some hum. In time I learnt to use isolation transformers and operational amplifier mixers, solid state relays and a hybrid circuit to connect two-way conversations through a phone line.

I think my patch box has now matured, after several versions. It can connect to a phone line, to a radio, a computer and I can join in the conversation as well. There is a USB sound card built in so that the computer connection is via USB. I even considered adding Bluetooth but decided it was unnecessary. This makes relays of Amateur Radio Today and similar audio files from the computer possible. And on a Monday evening I can send the ART sound through my phone line to Sentech at Meyerton near Johannesburg. I added an LED bar graph circuit and calibrated it so that I would be sure not to exceed 0 dBm level on the phone line.

While relaying ART to Sentech, I monitor the signal on HF using my Funcube dongle. The Funcube dongle is a Software Defined Radio, also known as SDR, and can receive from 150 kHz upwards and the SDRSharp software on my Windows computer can demodulate AM, FM, Sideband, Double sideband, CW, and so on.

The display on my PC screen is 192 kHz wide and I can see what is going on on both sides of the Sentech transmission. Usually there is lots of interference and some other broadcast stations too. Mostly the signal to noise ratio is good and I can listen in comfort. I can get a very good idea of the modulation level and on two occasions I could see that the Sentech transmitter was in trouble because I could not see the carrier, just the sidebands. I have seen the same phenomenon on a Chinese transmission and I intend to consult a friend who used to be a chief engineer for TWR and ask him what causes it.

(Continued on page 8)



Screenshot of the 40 m broadcast band

(Relaying ART from page 7)

The Funcube dongle is fairly stable with temperature and one can zoom in on the display and measure frequency down to one Hertz resolution. The dongle is not inherently accurate, but one can compare frequencies of several stations and calibrate it against their frequencies and most of them compare to within one Hertz.

I can monitor on my Kenwood TS570S but the dongle has better quality audio. I can vary the bandwidth, apply filtering and so on. An ideal tool for broadcasters to monitor their transmissions.

Mode Usage Evaluation: 2017 was "the Year When Digital Modes Changed Forever"

ARRL Letter

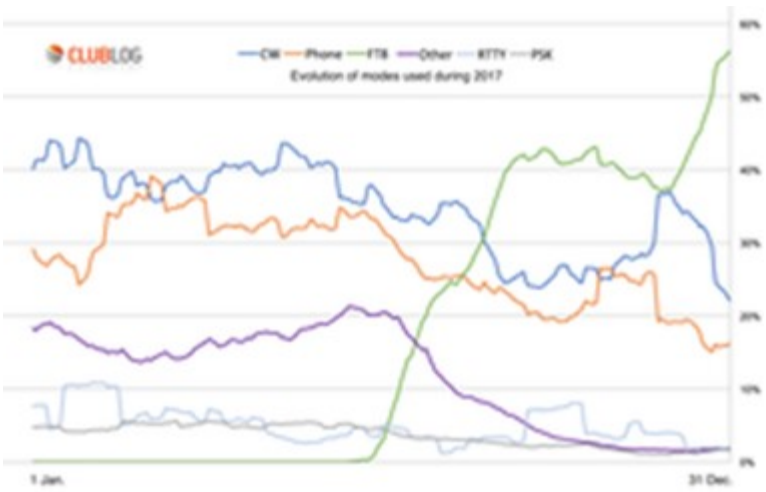
Club Log http://www.clublog.org/ author and UK radio amateur Michael Wells, G7VJR, has reported that data compiled from 8 000 Club Log users indicates the proportion of FT8 usage relative to other modes has risen dramatically since FT8's introduction last year http://g7vjr.org/2018/01/proportion-of-modes-used-on-the-air-2017-update/. Every few years, Wells has posted charts depicting mode usage on the amateur bands, based on log data uploaded to Club Log. Graphs he posted last week show the proportion of contacts on each mode for the last 20 years and then for the last 12 months.

Michael Wells, G7VJR

"2017 was, of course, the year when digital modes changed forever with the advent of FT8," said Wells. "It is a remarkable technical achievement, which has breathed life and enthusiasm into DXing for a whole new audience."

Now out of beta testing, FT8, included in *WSJT*-X version 1.8.0-rc3, continues to capture the imagination of the amateur radio community, luring away many of those who had been using the popular JT65 weak-signal mode https://physics.princeton.edu/pulsar/k1jt/wsjtx.html. FT8 is included in *WSJT*-X version 1.8.0-rc3, with several refinements from the original beta release. Among FT8's biggest advantages is a shorter transmit-receive cycle, with contacts four times faster than with JT65 or JT9; an entire FT8 contact can take place in about a minute. Many DXpeditions now routinely include FT8 operation.

Wells reported that 8 000 Club Log users uploaded FT8 contacts last year, logging 46 000 discrete call signs in that mode. "For reference, in 2017 the total number of QSOs uploaded to Club Log (all modes) was 32 million," Wells said. "Of that total, the number of QSOs made with FT8 was 4,8 million." That works out to 15% of all contacts posted to Club Log, which may or may not be representative of amateur radio activity at large.



Club Log graph showing modes used by radio amateurs in 2017, and the emergence of FT8 (green trace). Lines on the graph are based on 28-day moving averages. Data were smoothed to reduce the prominence of peaks related to mode-specific contests.

Wells' graph for 2017 shows a dramatic increase in mid-2017 in the percentage of FT8 contact relative to other modes, by year's end overtaking CW and SSB usage, already trending downward except for a significant bump in CW usage toward the end of the year. RTTY and PSK31 usage remained comparatively stable over the course of 2017. The usage of "other" undefined modes declined dramatically after the introduction of FT8. Wells explained that the graph does not show absolute levels of activity, just relative levels of activity.

Wells pointed out that the data is smoothed, and the values are for a 28-day moving average. "Therefore, a weekend of only

(Continued on page 16)

Ring-rigstraler vir satelliet kommunikasie

Christie Grobbelaar, ZS4CGR

Agtergrond

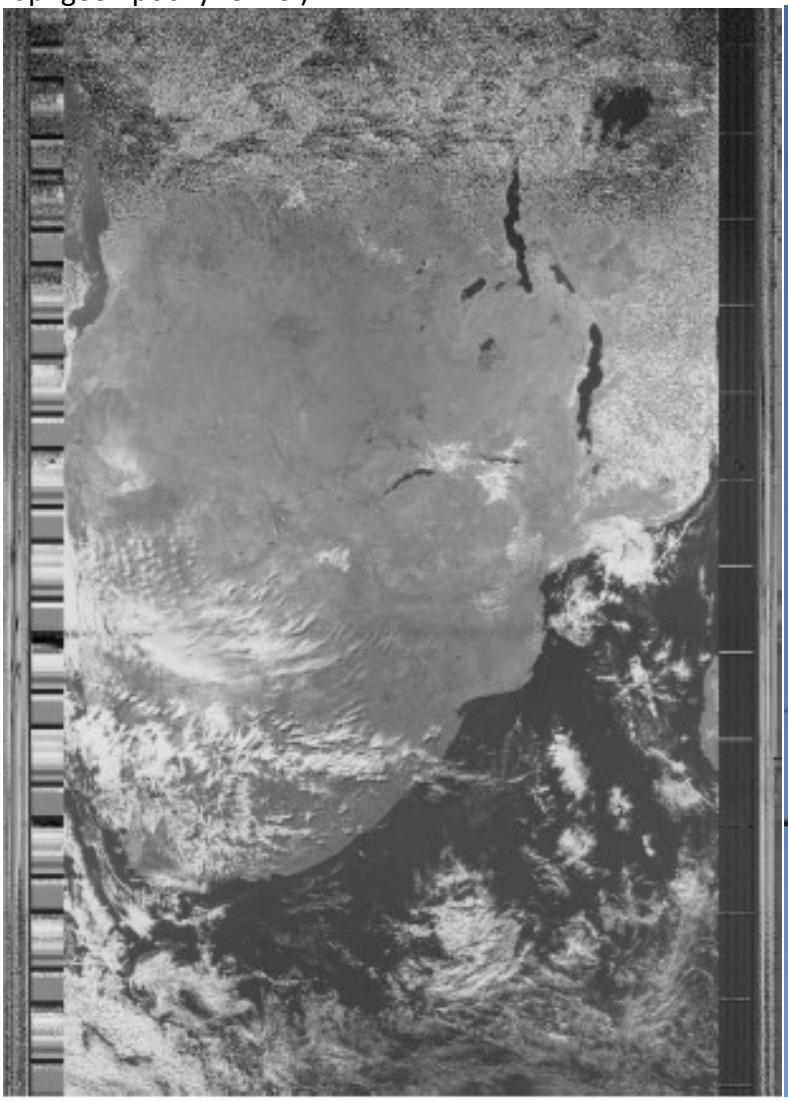
My belangstelling in ringstralers het ek te danke aan Ian Retief, ZS1PR, se tegniese praatjies in die laat '90s. Daardie tyd was ek nog ZR1MM en woonagtig in Wellington.

Wat dit alles begin het, was die eenvoudige stelling dat vir ’n gegewe omtrek, ’n sirkel-vorm die grootste oppervlakte gee. So bv. is ’n vierkant van dieselfde omtrek se oppervlakte 21% kleiner as ’n sirkel se oppervlak. "So what?" Radio seine is elektromagnetiese golwe en ons kan dit vergelyk met die "drade" wat yster vylsels naby ’n magneet maak.

As ons met 1 golflengte van ons frekwensie werk, gaan die maksimum vloedlyne van daardie sein deur ’n sirkel (wat haaks staan) opgevang word in sy oppervlakte.

Ek het reeds ring antennas gebou vir 6, 4 en 2 meter (144 tot 146 asook vir 137 MHz) en 70 sentimeter. Stralers van 1 tot 7 ringe, met kombinasies van enkel frekwensies tot drie frekwensies op een voerlyn.

So lyk die weerfotos wat ek met ring-stralers verkry. Oor die kwaliteit kan u self besluit. Dit is geneem met ’n Baofeng UV-5RA handstel, gedurende 15 Junie, met die “klein ringstraler” op die tweede foto. (Let op: geen poollyne nie.)



Die plant is deel van die antenna! Lees meer oor die plant op bladsy 235, Red.

Goed, hoe bou ons so ’n straler?

In die foto op bladsy 10 (en die voorblad) is die straler wat ons gaan bespreek. Hierdie een is gebou vir satelliet kommunikasie, dus 2 m en 70 sm. Hierdie is die derde konfigurasie wat ek gebou het, in die tweede het ek die 70 sm langs die 2 m gebou, maar dit versteur die swaartepunt te veel en het min

(Na bladsy 10)

(Ring-rigstraler vir satelliet kommunikasie vanaf bladsy 9)

invloed op die werking. Die eerste een het ook soos die een gelyk, maar met ’n bietjie meer pypwerk. Let op die pyp waarin die hoofas inskuif, sien "kepies" op onderste foto, onder aan as.

Die antenna lyk lomp, maar kan binne minute uitmekaar gehaal word en gepak word in ’n hopie van minder as 1 m x 1 m x 100 mm, reg vir vervoer. Aanmekaarsit neem ’n klein bietjie langer. Ek gebruik die antenna ook mobiel, hy ry saam waar my ander radios gaan.

Die kantelaar stel slegs die hoogtehoek deur gebruik te maak van ’n gradeboog wat teen die balk gemonteer is. Ook die kantelaar se kop ry saam waar die antenna gaan.

(Na bladsy 11)

(Ring-rigstraler vir satelliet kommunikasie vanaf bladsy 10)

Reg, wat het ons nodig?

Materiaal	Item	Mate	Hoeveel	Notas
PVC	"conduit" pyp	20 mm	6 m	Spar en balk
PVC	3 Rigting inspeksielaste		2	
PVC	4 Rigting inspeksielaste		6	
Aluminium	Pyp	9,6 mm	6,5 m	
Aluminium	Pyp of draad	6 mm	3,1 m	
Koper	Pyp	6 mm	700 mm	Of 9,6 mm aluminium
	Gradeboog		1	Elevasie meeting
	Haakspeld		1	As vir gradeboog
RG-58	Kabel		2 meter	Kies self die lengte
	Koppelstuk BNC/PL-259		1	Koppeling na radio
	Elektriese koppelblokkies			Las aluminium
Aluminium	Pyp	12 mm	500 mm	Vir laswerk
Hout	'Dowel pin', donker hout	16 mm	1 m	Versterking op 2 m balk
Koper	Draad	1,6 mm	50 mm	Brug koppeling by voerpunt
	Waterpyp klampe	Klein	2	Of 4 vir klampe op aluminium
Fotos	Mas-kantelaar			Jou keuse

Die ringe

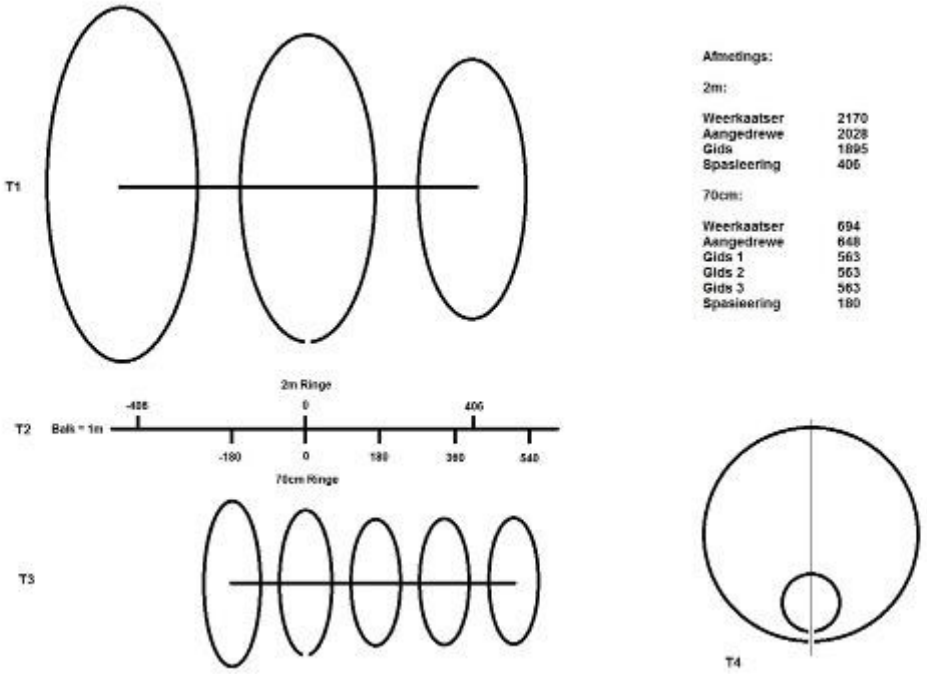
Voordat ek die ringe buig (om enige geskikte grootte ronde ding, bv. gassilinder of sement pyp), merk ek eers die lengte af, dan buig ek en sny die oorbly stukkies op die punte af.

Die aangedrewe ringe bly oop, maar die weerkaatser en gidse sluit ek met 'n "tjoklitblokkie" en die volgende grootte pyp.

Volgende maak ons die balke

Maar om hulle reg te spasieer, bou ons eerste die hoofas.

(Na bladsy 12)



Afmetings:

2m:

Weerkaatser	2170
Aangedrewe	2028
Gids	1895
Spasieering	406

70cm:

Weerkaatser	694
Aangedrewe	648
Gids 1	563
Gids 2	563
Gids 3	563
Spasieering	180

(Ring-rigstraler vir satelliet kommunikasie vanaf bladsy 11)

Rangskik die aangedrewe elemente soos in die tekening hierbo volgens T4. Neem die voerpunt in ag soos op skets regs. Plaas nou inspeksielaste soos hierbo op hul plek en meet wat die pyp lengtes tussenin moet wees. Bou die hoofas.

Hierna word die balke gebou volgens maat.

Onthou om die hoofas ’n ekstra stuk onderaan te verleng om te kan gebruik op die kantelaar.

Ek het slegs op die hoofas gom gebruik om alles te laat stilsit. Al die ander laste druk net in mekaar. Dit bring mee dat die antenna maklik opgebreek kan word en plat verpak vir wanneer ek veld toe gaan of dalk wil toer.

Ons kan nou die voerlyn koppel en begin toets. Hier is my resultate vir die 70 sm *(kyk op bladsy 8)*. My MFJ kom nie daar by nie, daarom het ek die Baofeng en ’n gewone SWR-meter gebruik. Die 2 m lesings is gedoen met ’n MFJ 259 *(op bladsy 8).*

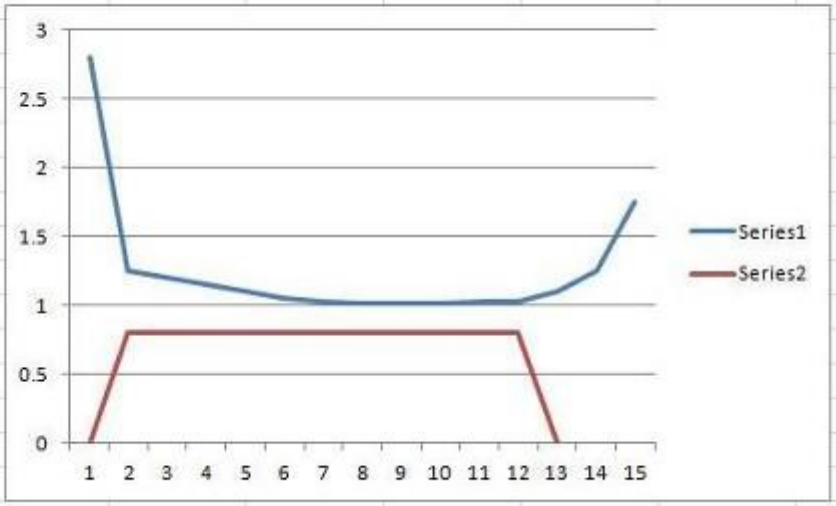
Interessante inligting

2 Element ring rigstraler deur G2BCX vir 144 MHz

Enkel E quad: 1,4 dBd

(Na bladsy 13)

Freq	SWR	Merker
420	2.8	0
430	1.25	0.8
431	1.2	0.8
432	1.15	0.8
433	1.1	0.8
434	1.05	0.8
435	1.03	0.8
436	1.01	0.8
437	1.01	0.8
438	1.01	0.8
439	1.03	0.8
440	1.03	0.8
450	1.1	0
460	1.25	
470	1.75	



(Ring-rigstraler vir satelliet kommunikasie vanaf bladsy 12)

Enkel E ring: 1,72 dBd Z = 150 Ohm

Twee E ring: 6,5 dBd

Min sy en tru straling as spasiëring = 0,2 λ

As spasiëring verminder word na 0.15 λ, word straal smaller en wins verhoog na 7 dBd, sy-lobbe vergroot ook.

Met spasiëring van 0,17 λ, verhoog wins na 8,2 dBd, voorwaartse lob word wyd en daar in byna geen sy- en tru lobbe nie.

So gebruik ek hom tans - 3 ringe op 2 m en 5 ringe op 70 sm.

Antenna ontleding

17 Julie 2017

Frekw: 145 MHz

Toets I / Antenna: 2m Ringe (3)

144·2 | 145·25 | <f | 1·7 | 1·5 | >SWR | 148·7 | 147·6 | >f

f 146·25
SWR 1·3
z 45

	Verandering v vorige
Weerkaatser	2170
Spasie	406
Aangedrewe	2028
Spasie	406
Gids I	1895
Spasie	
Gids II	

Frekw: 435 MHz

Toets II / Antenna: 435 MHz Ringe (5)

431 | <f | 1·2 | >SWR | >f 455

f 437
SWR 1·01
z ?

	Verandering v vorige
Weerkaatser	694
Spasie	180
Aangedrewe	648
Spasie	180
Gids I	536
Spasie	180
Gids II	536
Spasie	180
Gids III	536

Verklaring van simbole:

>swr	Die SWR-skaal net groter as die beste SWR van die antenna. Bv. As min SWR 1.2 IS gebruik 1.5.
<f	Die laer frekwensie wat >SWR gee.
>f	Die hoër frekwensie wat >SWR gee.
f	Die frekwensie van die beste SWR.
swr	Die beste SWR.
z	Die impodansie by die beste SWR.

As jy nou regtig vêr wil probeer praat - 7 ringe

Die omtrek bepaal die frekwensie, maar die oppervlak bepaal die vloeddigtheid, maw hoeveel sein ontvang jy.

'n Ring ontvang dus 66% meer sein as 'n delta!

My kantelaar vir satelliete

54° gekantel

Antenna Ingeslote Oppervlaktes								
	Omtrek	Radius	Lengte	Breedte	Basis	Hoogte	Oppervlak	Naam
Sirkel	10	1,592					7,962253	Ring
Vierkant	10		2,5	2,5			6,25	Quad
Reghoek	10		4	1			4	?
Driehoek	10				3,33	2,888	4,80852	Delta

Tweede konfigurasie - 70 sm aan die buitekant

Uitmekaar gehaal (vroeë model)

Switches, Part 2

Henry Chamberlain, ZS1AAZ

Have you wondered how computers work? Well, they mostly work with switches, not the mechanical types, but using electronic switches. There were mechanical computers of course, the most famous probably the Turing Computer used by the British to break the German's wartime codes. I also saw a mechanical computer at the Proudman Oceanographic Laboratory in Liverpool to predict tides in the days of sailing ships.

The Turing Computer or Bombe

Around 1960 I worked for the CSIR as an electronics technician. There was not a lot of electronics around in those days except for radio stuff and when I studied at a Technical College, the closest thing to electronics was Lines, I think that had to do with telephone transmission lines and that did not interest me.

I was then sent to the CSIR head office in Pretoria to build a piece of equipment that I knew nothing about, but I learnt as I went along. Durban's Municipality decided to dispose of their sewage by pumping it out to sea through a long pipe but before that could be done, a study had to be made of sea conditions to determine where and how long this pipe should be.

The Roberts tide prediction machine

The CSIR was contracted to do this study and it was decided to use modern technology to do this. In Pretoria I had a mentor by name Charles Ramsbottom who had just shortly before, obtained a degree at MIT in the USA. He designed the equipment I had to build which was a digital data collection system.

We used 2 500 OA95 diodes and 750 OC71 transistors and many resistors, capacitors and so on. The components were used to construct bistable multivibrators and gates of various types. For indicators, we used tiny glass tubes which were actually tiny cathode ray tubes. All components were mounted on PC boards made by a company in Pretoria that still exists today.

What I learnt was how two transistors could be used to make a bistable multivibrator, or Flip Flop and if an indicator lamp was attached to one of the transistors, that would indicate whether the FF was reset or set to a Binary One. Either one or the other transistor was conducting or switched on. This is an electronic switch.

A single switch can indicate a number which is either a Zero or a One.

If the FF was followed by another one it could show a Zero or a Two, the next stage can count a Zero or Four, doubling up each time. This is called the Binary code and is what computers use to manipulate numbers.

Early on a set of eight switches were used to indicate any number between Zero and 255 and was called a Byte. How does it work? If you want to indicate a 3, you add 1 plus 2, five is 1 plus 4, 7 is 1 plus 2 plus 3 plus 4 and so on.

Nowadays FFs are in integrated circuits and very compact and also very fast. As computers developed, the number of stages per byte increased from 8 to 16, then 32 and even 64 in our modern PCs. These are huge numbers.

Computers do not use letters, letters are allocated numbers. All the keys on a keyboard and all the special keys can be allocated numbers between 0 and 255 and when you press a key on a keyboard, the computer sees that as a number.

The equipment that we constructed was the first at the CSIR for using computer techniques for recording measurements in the sea. We measured temperature, depth, current speed and direction, weather data, time, and some other parameters as well. The data was punched on paper tape in Baudot code,

(Continued to page 16)

(The Switch from page 15)

and that we amateurs have also heard about because RTTY uses Baudot code. The data was processed by the CSIR's ZEBRA computer which came from Holland and filled up a room! Our modern PCs probably outperform a ZEBRA by miles! ZEBRA translated: Very Simple Binary Automatic Calculator.

In my shack is a small plastic box with an oscillator and binary counter inside, attached to 8 LEDs, powered by a small solar panel. When the sun shines, I am reminded of those exciting days! In computers, the largest digit is on the left. The number indicated in Binary code is 203.

(Mode Usage Evaluation from page 8)

CW and no FT8 has little effect - the trend is gradually adjusted by ongoing activity, and not by shocks."

Last autumn, Taylor expressed some surprise about the "rapid uptake" in the use of FT8 on HF, calling FT8 and the other WSJT-X offerings "special-purpose modes" designed for making reliable, error-free contacts using very weak signals. Taylor pointed out that the level of information exchanged in most FT8 - and other similar digital modes - isn't much more than the bare minimum for a valid contact.

Co-Launched CubeSats Settling into Orbits, Missions

ARRL Letter

Commissioning and testing continue of the L-Band Downshifter and the University of Iowa's High-Energy CubeSat Radiation Instrument (HERCI) on the new Fox-1D (AO-92) CubeSat. AO-92 could be available for general use by week's end, AMSAT said www.amsat.org/ao-92-commissioning-update-herci-experiment-and-l-band-downshifter-tested/. The co-launched French PicSat CubeSat is seeking telemetry reports https://picsat.obspm.fr/. Both were carried into space from India on 12 January.

AMSAT-NA reports the University of Iowa tested the HERCI, while AMSAT put the L-Band Downshifter through its paces in the past week. The L-Band Downshifter converts signals received on 1 267.350 MHz and injects them into the satellite's 435 MHz receiver. AMSAT-NA Executive Vice President Paul Stoetzer, N8HM, said that testing was promising, as the L-Band Downshifter was turned on for its initial outing on 20 January. Stoetzer reports being able to access the transponder with a handheld transceiver running 1 W into a 16-element Yagi.

"Telemetry analysis showed that the Downshifter was functioning normally, and AMSAT announced open testing," Stoetzer said. "Many reported QSOs made with 10 W or less to modest Yagi antennas."

The HERCI experiment was activated for the first time on 18 January. "HERCI is intended to provide a mapping of radiation in a low-Earth orbit," explained Don Kirchner, KD0L, Research Engineer at the University of Iowa. "This is of scientific interest for planning CubeSat test flights for low-energy X-ray detectors."

The Virginia Tech experimental camera payload on AO-92 last week returned some very clear photos

(Continued on page 45)

The Archduke of Austria was a Radio Amateur

Dennis Wells, ZS1AU

How many of you have ever heard of Anton Habsburg, Archduke of Austria with the Double Headed Eagle coat of arms? This famous man was also a radio amateur, who was a keen and very proficient CW operator who held the call signs OE1AH, OE3AH, OE5AH and YR5AH.

I was a young boy and can remember my late Father Len Wells, ZS1AU, telling the story of his CW contact with OE3AH, The Archduke of Austria in 1938. It was the year that the German Reich leader Adolf Hitler was already busy preparing to occupy as much as possible in Europe and many of the adjourning countries were about to be defeated and eventually taken over. It is like it happened yesterday, at the start of WW 2.

It was in February 1938 that my Father Len, was having a CW QSO with OE3AH in Austria. Len was a professional telegraphist and the two of them were going at one another at a rate which only a few could copy in those days! This story which I am about to tell is as authentic as I can clearly remember.

Len Wells, ZS1AU, in 1934

My Father related that while he was in QSO with Anton, OE3AH, there was a sudden gap/break in the OE3AH transmission and a few minutes later OE3AH came back on frequency to tell that he had to go QRT as his Castle was being invaded and he, Anton, intimated that he was about to flee for his life. I can clearly remember how concerned my Father was as it came as a shock to him and it was confidential information which would be contravening radio regulations to divulge it.

Eventually it was heard on news reports that Germany had invaded Austria. It could only have been Anton's last QSO and he was not heard on the air again! It was something which, at the time, was unexpected, strange and yet it made sense that something was really taking place in Austria and there was nothing that could be done to prevent it. It remained a puzzlement and a concern for Len for many years that followed, knowing that Anton was a high-profile person and could be in a dangerous situation.

On looking up "The Archduke of Austria, Anton Habsburg" on the internet, it was most interesting to read the history of this very famous family. It appears from the readings that Anton survived the war and his family are still living in one of the most luxurious Castles in the world, where OE3AH once had his Amateur Radio shack!

Archduke Anton and Princess Ileana of Romania on their wedding day

From the Internet

Archduke Anton of Austria (Anton Maria Franz Leopold Blanka Karl Joseph Ignaz Raphael Michael Margareta Nicetas von Habsburg-Lorraine, born in Vienna on 20 March 1901 and died in Salzburg on 22 October 1987) was an Archduke of Austria and Prince of Tuscany. He was the seventh of ten children born to Archduke Leopold Salvator of Austria, Prince of Tuscany, and Infanta Blanca of Spain, daughter of Carlos, Duke of Madrid.

(Continued on page 18)

YR5AH 1947 Romania. Printed on a Romanian banknote. The operator was Anton Habsburg OE3AH, Archduke of Austria. The picture on the note is of Dracula's Castle". G4UZN Collection

(The Archduke of Austria from page 17)

After being introduced by King Carol II of Romania, he and Princess Ileana of Romania (1909 - 1991) were married in Sinaia on 26 July 1931. They had the following children - Archduke Stefan of Austria, Prince of Tuscany (1932 – 1998), Archduchess Maria Ileana of Austria, Princess of Tuscany (1933 – 1959), Archduchess Alexandra of Austria, Princess of Tuscany (born 1935), Archduke Dominic of Austria, Prince of Tuscany (born 1937), Archduchess Maria Magdalena of Austria, Princess of Tuscany (born 1939) and Archduchess Elisabeth of Austria, Princess of Tuscany (born 1942).

In the Second World War, he served until late 1944 in the German Wehrmacht as a pilot. After leaving the military, he moved to Bran in Romania, where he and his family lived in the Bran Castle After the coup d'état and the end of Romania's alliance with Germany on 23 August 1944, the family and their servants were in danger of being interned or thrown out of the country, as German citizens. It was only when King Michael I abdicated on 30 December 1947 and was forced to leave the country that Archduke Anton's family also went into exile. The family spent some time in Switzerland, then in Argentina, then lived in the early 1950s in the United States.

Because Bran Castle is the only castle in all of Transylvania that fits Bram Stoker's description of Dracula's Castle, it is known worldwide as Dracula's Castle.

The marriage ended in divorce, made official on 29 May 1954. After her second marriage ended in divorce, Ileana became a nun. Archduke Anton moved to Austria, where he lived until his death in Emmerberg (near Vienna) and in St Lorenz am Mondsee (near Salzburg) in the Villa Minola. He died on 22 October 1987 at the age of 86. He was buried at the cemetery on the Mondsee.

VHF, UHF, SHF and EHF News

Mike Bosch, ZS2FM, mikecbosch@gmail.com

The Micro World of Atoms and Sub-Atomic Particles

Our world and everything on it consists of atoms and subatomic particles, which are all invisible to the naked eye. Most people are not aware of this phenomenon or could not care less. Yet our planet Earth and all other planets, stars (suns) or other matter in the Universe are made from the same building blocks. The movement of electrons in a circuit provides us with electricity and when electrons oscillate back and forth in an antenna radio waves are emitted. The atom was regarded for centuries as the smallest part of matter, but the atom was only split during the past hundred years and scientists discovered a new micro world. Before the turn of the 20th century the biggest and most expensive science project was created at CERN, namely the Large Hadron Collider (LHC), which can explore the micro world in depth by circulating particles to almost the speed of light before crashing them into their target.

We are all familiar with atoms comprising several electrons, protons and neutrons depending on their atomic weight, whereas hydrogen, the lightest of all elements, has only one electron and proton and no neutron. Electrons do not orbit the nucleus like planets, instead they form shells around the nucleus at different energy levels. When electrons flow from one atom to another it creates an electrical current, in other words electricity. Electrons also provide us with radio communications, i.e. when electrons oscillate back and forth in an antenna then electromagnetic radio waves are emitted. The electromagnetic spectrum stretches from the lowest radio frequencies up the highest Gamma rays.

For example, on the Extremely Low Frequency radio spectrum very low frequencies are created in Hertz and at very long wavelengths in megametres. The frequency increases from kilohertz to Megahertz all the way up to the top end of the microwave spectrum where it is measured in Gigahertz (GHz) and millimetre wavelengths. As the frequency rises further the microwaves and the three Infrared bands are separated by a narrow Terahertz band, which features unusual characteristics. The Infrared spectrum is measured in Terahertz (THz) and micrometre wavelengths. It is followed by one octave of Terahertz frequencies in the visible light spectrum that is in nanometre wavelengths and then we enter into the dangerous ionization radiation spectra of Ultraviolet, X-ray and Gamma rays, which spread through Petahertz (PHz) and then Exahertz (EHz) frequencies and nanometres and picometre wavelengths, respectively. Gamma rays peak at 300 Exahertz (EHz) and 1 picometre wavelength.

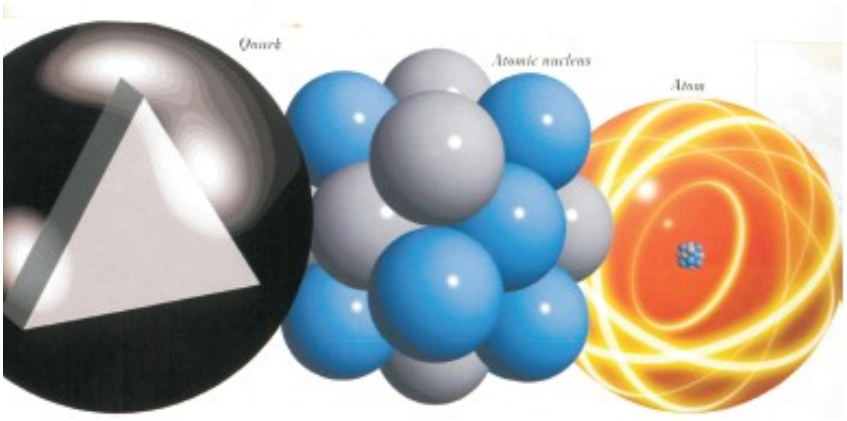
When scientists discovered how to split the atom they came across an invisible micro world of subatomic particles and were fortunate to be able to view it in a cloud chamber and later also in a bubble chamber which were invented.

Brief history of the discovery of subatomic particles

1932: John Crockfort and Ernest Walton, under the guidance of Ernest Rutherford, split the atom at Cambridge University, UK.

1936: Carl Anderson found a new particle in cosmic rays called the muon.

1947: Hideki Yukawa discovered the meson, smaller than the proton but larger than the electron, both negatively and positively charged versions, that would flip back and forth between protons and neutrons and glue them together.



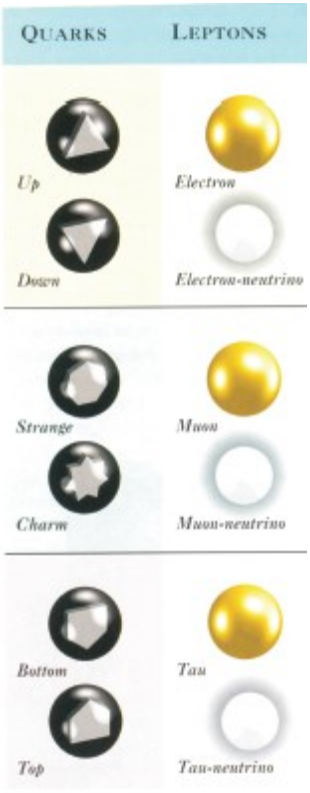
From 1950 until end of the decade, a stream of unstable particles was discovered such as pions, kaons, sigmas, ksis, muons and lambda, which played no role in ordinary matter.

1953: The discovery of the elusive neutrino by Jack Steinberger was a major breakthrough.

1961: Melvin Schwartz detected the first

(Continued on page 20)

(VHF/UHF News from page 19)



muon-neutrinos using the Brookhaven spark chamber, which formed a new group under the Lepton (small) family.

1962: Murray Gell-Mann predicted the omega minus pattern that quarks can be arranged into geometric pattern such as a pyramid comprising up, down and strange quarks that form new layers of matter.

1974: Jerome Friedman, Henry Kendall and Richard Taylor, using the Stanford Linear Accelerator Centre, proved that quarks really existed and had three more flavours charm, top and bottom. Quarks are the building blocks of protons and neutrons and three quarks form baryons.

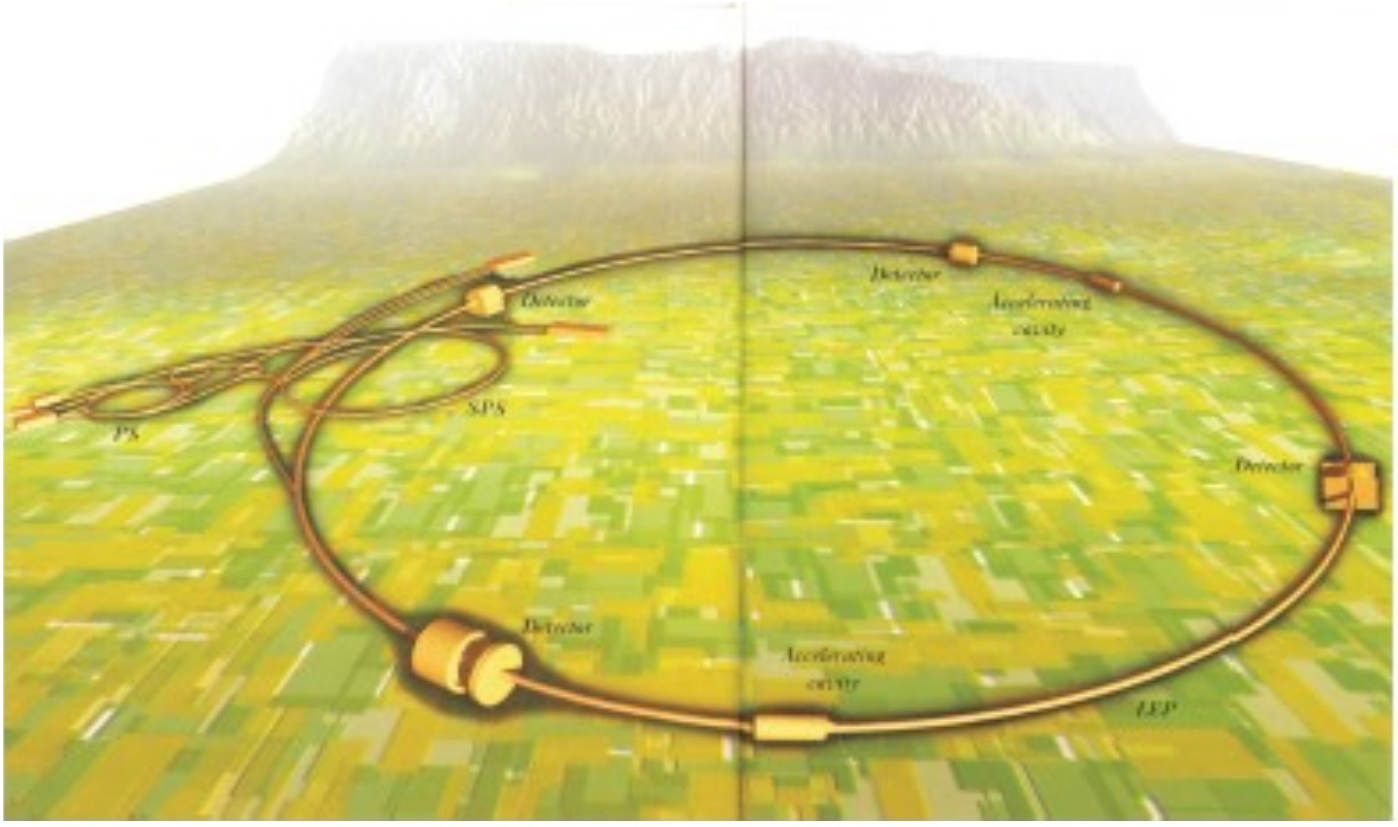
1978: Abdus Salam discovered the weak nuclear force and helped to develop a theory that unified electromagnetism and the weak force.

1979: Sau-Lan Wu was part of the team who discovered gluon phenomena, the strong nuclear force about 1 000 times stronger than electromagnetism.

1983: The heavy W and Z particles predicted by the electroweak theory were discovered at CERN.

1992: Georges Charpak was awarded with the Nobel Prize for his invention of the multi-wire chamber, a totally electronic detector, which now forms the basis of all modern detectors.

2012: Francois Englert discovered the Higgs boson at the CERN LHC, which was predicted 40 years earlier by Peter Higgs. It was detected at an energy level of about 126 Giga-electron-Volts (GeV) and the last missing piece in the physicists' standard model of fundamental particles and forces. A new project is being prepared at CERN for the 21st century, where 7 TeV (7 000 GeV) beams of protons will provide the conditions, where the imprisoned quarks inside protons will "see" each other.



Finally, we come to a new science, Quantum Physics, where everything is in both waveforms or particles and laymen are mystified including some scientists. The normal classic physical laws do not seem to agree with those of quantum physics. This is a rapidly developing science where high speed quantum computers with vast memories are being constructed. Then we come to the entanglement of electron

(Continued on page 21)

(VHF/UHF News from page 20)

pairs where they could be separated over long distances and yet instantly duplicate any change that may occur to the other, such as spin etc. Einstein referred to this as something spooky at a distance. There is no doubt that quantum physics will have a tremendous effect in the future world.

Great Sporadic-E opening in January

Pieter, V51PJ, reports, "Willie, ZS2CC, of George warned us again that he is hearing the div 6 beacons. I turned my antenna to div 6 and div 1 and nil on the beacon side, turned to ZS4/ZS5 direction and heard CW with deep QSB on 50,200 MHz. I gave a call and Deon, ZS5DCF, came back loud and clear with 59+20 dB at times. Justin, ZS5KT, also heard and worked him too. Lee, ZS5LEE, had a problem with his horizontal beam, but I could hear him on his vertical antenna talking to Deon, ZS5DCF. Bernie, ZS4TX, came up and surprised me with a very nice SSB signal, thanks for that one Bernie! We said we will get each other on SSB one day Hi. Nico, ZS4N, thanks also for a very nice QSO."

"I tried again to hear the ZS1 beacon but nil. Then turned the beam to div 6 and worked Mike, ZS6AI, and Ken, ZS6KN, thanks for nice QSO, including Karel, ZS6WN, for the surprise too. Servaas, ZS6SER, thanks for this QSO and for regular reports on signal. Willem, ZS6WAB, had to switch off the beacons and use the beacon antenna for a very nice SSB contact as well. Willem the last time I heard your voice was on 4 m Tropo Scatter - thanks a lot for this one on 6 m Sporadic-E too. As said 6 m surprised us all today with sudden Sporadic-E opening on 6 m. ZS1 had also lots of fun but unfortunately not between V51 and ZS1. To all active thanks again, de V51PJ."

A comment came from Bernie, ZS4TX, who thanked Pieter for his S9 +20 dB signal in Bloemfontein over 930 km that lasted about 30 minutes. He thinks it is the first Sporadic-E signal that he ever heard in Bloemfontein after 27 years of VHF activity. Bernie also listened at the ZS9X station outside Bloemfontein where he heard Mike, ZS6AI, for 30 seconds at S9 over 385 km, which is too close for Sporadic-E and the beam was also 40 degrees off direction. He never heard anybody from ZS1.

Three new VHF/UHF Beacons are now on the air

Carl, ZS6CBQ, says, "A nice Christmas present to the VHF/UHF enthusiasts from Willem, ZS6WAB. Willem got 3 beacons on the air again from Polokwane. 2 Metres - the 144,400 CW beacon runs vertical 25 Watts into a X200. I can hear this beacon in Krugersdorp S2 - 4 the whole time using my 10-element vertical Yagi. The vertical was replaced by a 6-element Yagi beaming south. 70 cm - this beacon is on 432,440 MHz horizontal 25 Watts into a 2M12 Yagi. I copied this beacon S3 - 4 in Krugersdorp. 4 Metres - according to Willem, he has just put another beacon on the air on 4 metres 70,025 MHz with a 7-element LFA running 30 Watts and beaming south. Willem would like to get reports please. Regards Carl, ZS6CBQ."

Uitenhage and Despatch are now on the VHF Digital Map

Andre Botes, ZS2ACP, e-mailed us the following information, "We have a new kid on the block Andrew Prideaux, ZS2PA, at Uitenhage who has shown interest in VHF for some time and with some prompting from me, have him hooked! He built a very nice passively coupled combination 4 and 6 m beam and had his first meteor scatter contact with Pieter, V51PJ, this morning (18 January)."

Pieter Jacobs, V51PJ, comments about his next QSO, "We went to 4 m and Tropo Scatter also very strong at times and thanks again Andre for a fast MS QSO over the 1 076 km path. Andrew, ZS2PA, was noticed on 4 m but he had to go away for a while then I saw Mike Steenkamp, ZS2MIC, on the screen. Well done on a very nice signal Mike, the MS pings are only a few but I got his call in the log for 4 m. We welcome Mike, ZS2MIC, as a new active amateur on 4 m and very soon on 6 m too.

More news about VHF Beacon on St Helena Island

Pieter V51PJ informed us about the posting of the beacon from this side as more donations were received. He also heard from Marcos, PY1MHZ, who said that the aid credits are also from the group JAPY-DX. Pieter says: "We also want to thank the JAPY-DX Group for helping with the funding for posting the beacon this side! It is much appreciated.

(Continued on page 22)

(VHF/UHF News from page 21)

"I have been looking at antenna designs and keeping bad weather also in mind and ease of installation, we would like to follow the same path as D4C. Will forward design data. Very hot temperatures everyday preventing me TXing on 6 m this side. Every day it is between 44 and 51 Celsius and not cooling down at night times either. But once temperature go lower I will start again. Phil, FR5DN, is on daily from Reunion Island on 6 m. No path found yet to ZS, but ducting is there daily on the west coast as hot inland and cool sea air meets regularly forming a duct for radio signals on VHF and up. 73 for now de V51PJ."

Secretive "Numbers Stations" Persist on HF

ARRL Letter

For many years, unidentified radio broadcasts have been transmitting coded messages, using numbers, such as "6-7-9-2-6 or 5-6-9-9-0." Even today, tuning across the HF spectrum typically will yield a "numbers station," a mechanical-sounding voice (male or female) methodically announcing groups of single-digit numbers for minutes on end. According to *Radio World*, you may have tuned into a spy agency's numbers station transmitting coded instructions to their minions worldwide www.radioworld.com/news-and-business/0002/do-shortwave-numbers-stations-really-instruct-spies/341024.

Numbers station transmissions typically consist of a voice "reading out strings of seemingly random numbers," explained Lewis Bush, author of *Shadows of the State*, a new history of numbers stations. "These are sometimes accompanied by music, tones or other sound effects," he said. The *Radio World* article quotes Paul Beaumont, an associate editor of *Eye Spy Intelligence Magazine*, a publication dedicated to espionage and intelligence, "Voice (numbers) stations are known to be spy messages." www.eyespymag.com/

The article said that one of the best-known numbers stations was "The Lincolnshire Poacher," so called due to its use of "The Lincolnshire Poacher" folk song played on a pipe organ as an identifier. Radio amateurs used direction-finding equipment to pin down the station's eventual location to an RAF base on Cyprus, the article said. https://www.youtube.com/watch?v=QnXPgUU6fI0

ARRL member Chris Hays, AB6QK, on the west coast, said this week that he frequently hears a CW station on 7,163 MHz sending random alphanumeric characters, each group terminated by one or more question marks.

The “Largely Plastic" 2 m Antenna

Bert von Rahden, ZS6LP

A rejuvenated version of a quadruple quad antenna designed by DL6DW in 1970

Synopsis

A quadruple quad antenna designed by DL6DW in 1970 has been built, ruggedised for portable and fixed-station use and evaluated. Only readily available plastic electrical conduit components and bare copper wire were used in its construction.

Design and Construction

According to DL6DW[1], this antenna provides horizontal polarization, a gain of 11 dBd, a front-to-back discrimination of 23 dBd at a height of only 2 metres above ground level and an antenna impedance between 200 and 250 ohms. The aperture of this antenna is 50 degrees.

The design and dimensions of the antenna are shown in Figure 1 and illustrated in photographs 1, 2 and 3. The spreaders were constructed from 20 mm diameter plastic electrical conduit and tee pieces, with bare copper earthing wire being threaded through the spreaders. All dimensions in the diagram are in millimetres.

In building this antenna, only simple hand tools were used, to wit, a metric tape measure, a drill with suitable drill bits, side cutters, soldering iron and hacksaw. After measuring, cutting and drilling the relevant pieces of plastic conduit to size, these were then attached to the tee pieces

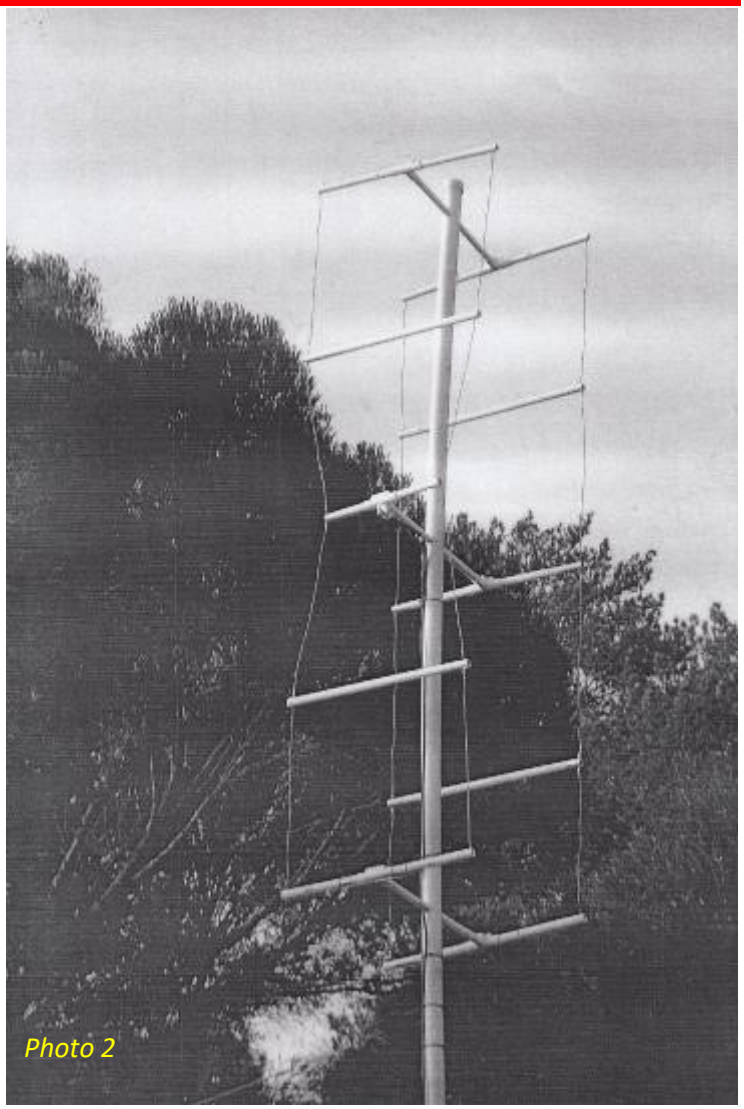
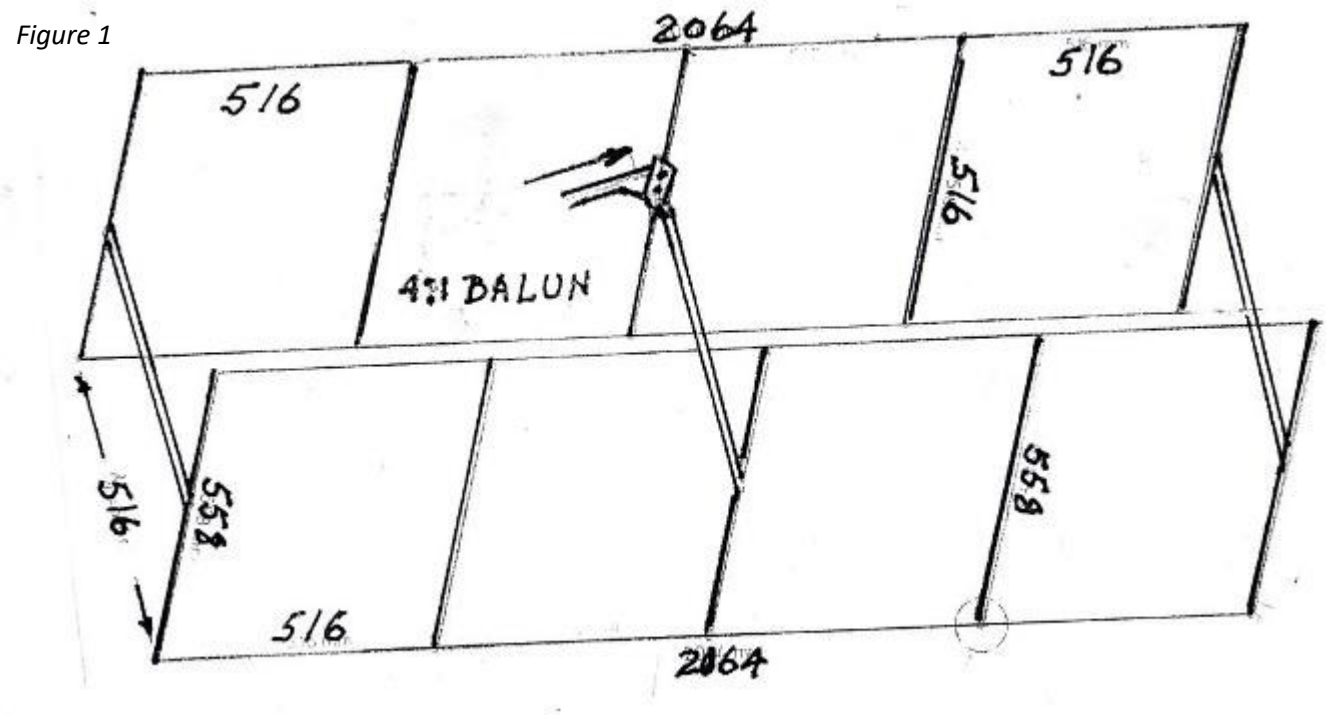


Photo 2

(Continued on page 24)

Figure 1



(The "Largely Plastic" 2 m Antenna from page 23)

using PVC glue and allowed to cure for the next twenty-four hours. The copper wire was then threaded through the conduit spreaders.

The next task was to match the approximately 200 ohm antenna impedance to the 50 ohm RG-213 coaxial feedline. For this purpose, a 4:1 balun was used. This balun is a conventional coaxial balun and used a half-wave (corrected for a velocity factor of 0,67) length of RG-58 coaxial cable measuring 696 mm for a frequency of 144.300 MHz[2].

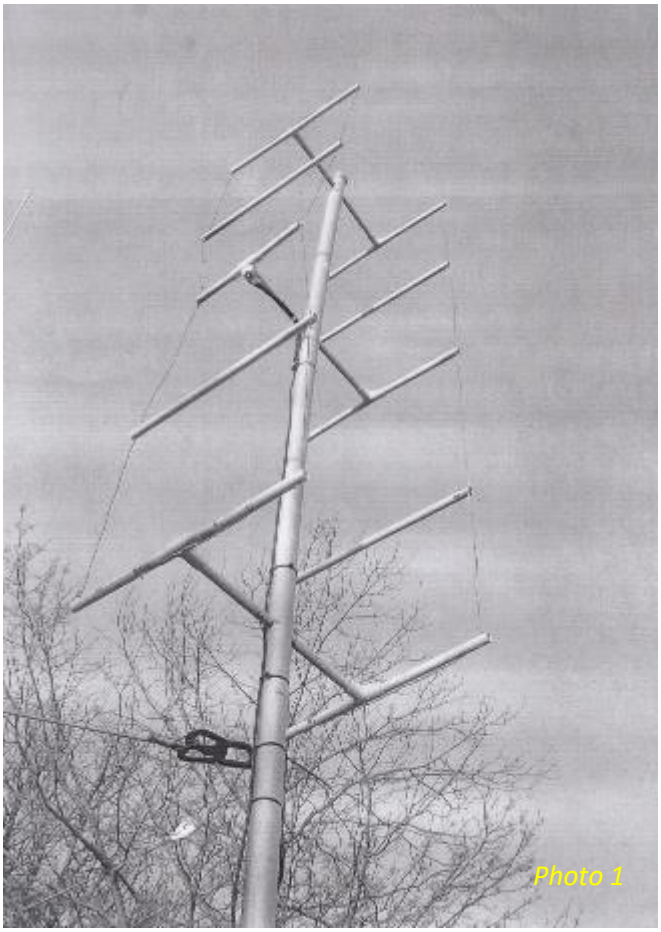


Photo 1

Evaluation

An MFJ 259B antenna analyser was used to analyse the performance of the antenna. The calibration "correctness" of the MFJ was checked using a Hewlett-Packard model 908A 50 ohm coaxial termination and was found to measure 50 ohms plus or minus 0j (called X mode by the MFJ 259B analyser).

A reading of 53 ohms and j or X value of + 7 was realised for the now impedance=matched antenna[2].

An ICOM Model 271H transceiver provided 100 watts of RF into the 30-metre-long feedline attached to the DL6DW antenna. With a calculated 3 dB loss in the feedline, only some 50 watts could be radiated by the antenna itself.

Prior to and during, the recent VHF contest, Rickus, ZS4A located in Bethlehem, Marius, ZS4MK at Senekal and Johannes, ZS4WW at Welkom were contacted using the antenna from the author's location in Quellerina, Johannesburg. The signal reports received were R5 and S5 at distances more than 200 km.

These signal reports were very similar to those obtained from the same stations when they were contacted from the author's location using an 8-element Yagi antenna at a height of 5 metres above ground level.

Conclusion

This light-weight, ruggedized version of the DL6DW antenna is suitable for both portable and fixed-station use.

References

[1] Rothammels DM2ABK Antennenbuch, page 480, 1978

[2] Jessop G6JP, VHF and UHF Manual, 4th edition, section 8.9, 1992

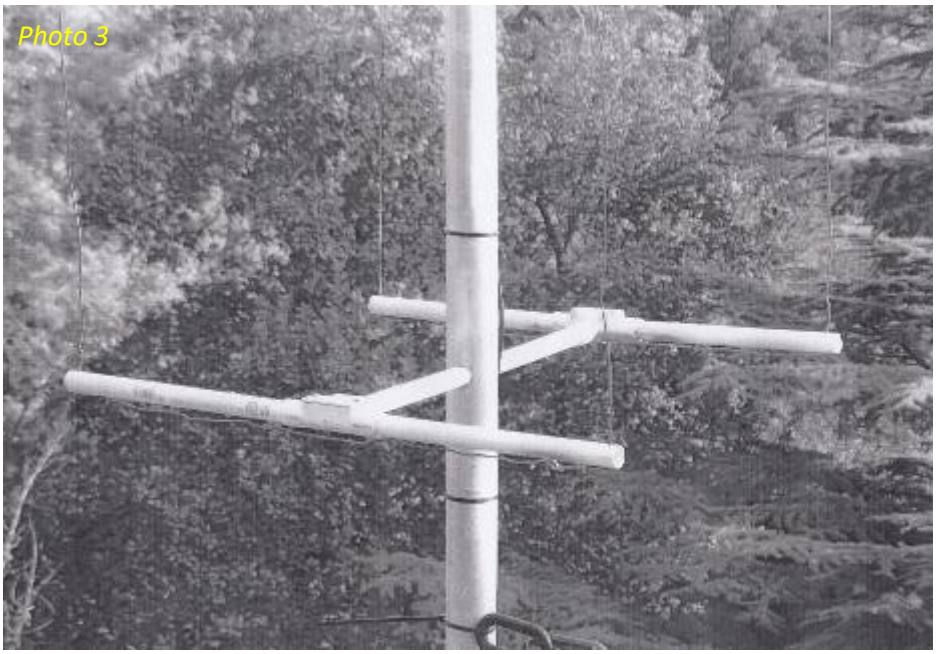


Photo 3

The Museum Piece

Dave Gemmell, ZS6AAW

A chat at the Marconi home, Giovanni Francia, I0KQB

This article appeared in the December 2017 issue of the ERA Magzine "La voce dell'E.R.A. - European Radioamateurs Association" in Italian and English. Giovanni sent me a copy of the magazine as well as a letter of permission from the Editor of the ERA Magazine. The photos were taken by Vanessa Lucrezia Francia.

A long time ago at school, on a 1973 morning during a history lesson, the teacher was telling us an episode that had happened many years before, an episode that at first captured my attention and then with the flowing of the narrative details, it made me empathized with the protagonist. The story was that one about the experiment that Guglielmo Marconi did in the Pontecchio's family estate; do you remember it?

Princess Elettra

Guglielmo gave a rudimentary receiver to his acquaintance and asked from him to go with it down a hill, at a point where it was not visible, with the prayer to shoot a shotgun at the moment preset, when the "gavel" of the receiving device had moved. Well, a long time from that story, even today, the thought of what Guglielmo could have felt when he heard the gun shots that had shaked the air, that tangible sign that the distances between peoples would had no longer exist, it still gives to me a spine tingling. What could have felt in that moment the great Guglielmo Marconi? You know, life is full of unexpected moments and finally one of them has literally projected me back into that story, giving to me a spine tingling again.

The memory of that tale has become much stronger when on a November morning of this year, I talked personally about this topic and even more with Elettra Marconi (also Princess Elettra Giovannelli by marriage) that very kindly agreed to be interviewed by myself.

Elettra is a smiling, nice and extremely kind person and talking with her is truly enjoyable. Since the beginning, the interview turned into an interesting chat. My questions were deliberately a bit different from those that, inevitably had been repeatedly asked from her.

Eletrra Marconi and Giovanni Francia, I0KQB

GF. All interviewers ask more or less the same questions. What did they never ask you and what would you had wanted to hear from asking?

EM. I have not been asked enough about the moral side of my Father, about his humanity, about the real purpose of his invention. Though he had fascinated by the electric waves, the invention of the radio had the primary purpose of saving human lives. He was a person with a sense of profound

(Continued on page 26)

(The Museum Piece from page 25)

rectitude, very believing, very spiritual, bound to my Mother by a deep love, they were very united, they were always together.

GF. Madam, regarding this matter I remember a beautiful picture that I saw where you, a little girl portrayed with your parents, who are looking at each other eye to eye. We can see that they were very united.

EM. Yes, I was 4 years old and I was hugging them in a protective way. They loved one each other a lot.

GF. Your Father chose not casually to patent the Wireless Telegraph in the United Kingdom. Even nowadays, many Italian researchers choose to go abroad for reasons similar to those ones of your Father. What do you think about it and how, in your opinion, could we act in order to contrast this "brain drain"?

EM. From my experiences with the people I have met and also from the experience about how my Father was treated, I want to say that unfortunately, when someone has an idea, or succeeds in something, then he is immediately hindered. When my father presented himself with his wireless telegraph, he was hindered. They even wanted to put "the sticks in the wheels." He had suggested to go to the mental hospital. Luckily, he was a strong person who knew he was on the right side and then, with his mother went to England where he was welcomed with open arms and where he patented his invention. The importance of that invention was soon very clear.

GF. Let me add that, due to some stories I heard meeting some Italian “good brains", this way of doing is still present.

EM. Unluckily yes. It's a matter caused by envy, jealousy, all of them are negative things. When the young have some new ideas, there is this sort of badness that wants to stop the young. You must know that Augusto Righi, which my father used to follow the lessons of and to whom he also confided the idea he wanted to develop, advised him to go to at first the faculty of physics and enrol himself and then only once he graduated, to come back to him. At that point my father left Righi’s lessons, because he felt and understood that something was not so clear.

GF. Always as a personal matter, I want to mention a similar and quite recent case which I dealt with in an article, the story of the astrophysicist Fabrizio Tamburini and his "Vorticity of the Waves." Another brain drain abroad. Madam, according to you, is the figure of your Father and his most extraordinary invention, the radio, remembered with the right attention, especially here in Italy? If you do not think so, what should we do to preserve that?

EM. Recently, the Italian Senate organized a beautiful event where all the Senators were present. There had been a beautiful speech about the value of Marconi and his inventions. The Holy See also is organizing a next event dedicated to Marconi. There is also the dear Professor Spinelli who had organized a beautiful event in Santa Severa, a village on the Roman coastline, where there is an Etruscan tower called Tor Chiaruccia, in which Marconi built his last radio station. Let say that now there is more attention to the value of my Father’s figure.

(Continued on page 27)

(The Museum Piece from page 26)

GF. In several interviews, you have said that you love radio amateurs. Why?

EM. Because they are the people closest to my Father, those who love him most. They talk with distant people and they even make friendships with them, maybe without even meeting one each other personally. I also like to speak with radio amateurs all over the world. When I am travelling around the world for some events and I meet with them, they are excited, I see tears in their eyes, I feel how much they love my Father, so I always want them next to me, in the front rows.

GF. I believe that radio amateurs all over the world are not only grateful to Marconi for the things he has done and left to us, but they also would like to help not forget his name. How can we, the radio amateurs, help to make Marconi's name not forgotten?

EM. Speaking about Marconi and his story with people. To speak about his inspiration, speaking about what he called "the gift received from God," a gift for which he had the idea for his own invention whom, as my father asserted, exploiting the forces of the nature, made sure that many lives were saved. (The story of the Titanic is emblematic.)

Remembering him as an example of courage,

(Continued on page 28)

The Antique Wireless Association of Southern Africa - ZSØAWA

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterday's radios and associated equipment. To encourage all likeminded amateurs to do the same, thus ensuring the maintenance and preservation of our amateur heritage.

Please visit our website: www.awasa.org.za. Sign up for our monthly newsletter or download any backdated issues at www.awasa.org.za/index.php/newsletters. Membership of AWASA is free and by association.

We are on the air every Saturday morning, starting at 04:00 UTC on 3 615 AM, then 06:30 UTC on 7 140 SSB relayed on 14 140 to the Western Cape and 12:00 UTC on 7 020 CW. You can also connect to our Echolink node to listen to the Saturday SSB nets - ZS0AWA-L

The Wednesday evening AM net is held at 17:30 UTC on 3 615

(The Museum Piece from page 27)

will, as well as a stimulus for young people. He was never tired. He really used to work hard. When he had reached a goal, he wanted immediately to reach a new one. He was always thinking about what he wanted to do in the future. On board of the Yacht Elettra, he often thought for hours, even though there were people around him. So, you have to remember and talk about him, in this way.

GF. Is it true that he did not draw the ideas that came to his mind?

EM. Not really. When ideas came to him, he took notes. Often it used to happen that if we were at table for lunch or dinner, table always prepared with a white towel, you could see him drawing some signs on that, using the fork. Those designs were his ideas, transcribed in this way, due to his fear about the possibility that ordinary designs could be stolen from him. Then, the towel was washed, so finally no designs. It used to happen, due to his fear.

His latest invention, of which there are no designs and no equipment, was a device able to isolate and extract gold from sea water. I still remember very well, those yellow filaments of gold that my mother and myself, saw. He did not want to draw that device. Finally, he even broke all the equipment saying that it had well printed in His head. He said that he would have rebuild it in the next season. Unluckily he died earlier. Probably, for the will of God.

GF. At the end of the conversation, Mrs Elettra talked to me about an idea that she has been trying to realize for several years and for which she feels a lot. She told me that her thoughts are for young people, whom her Father loved so much. She said that it would be great to be able to give to them, the young people as well as scientists of all nationalities, the opportunity to meet, discuss, create, carry forward their ideas, in a place that her Father loved so much. Marconi had lived his childhood in a place of which the remains and past, might be of inspiration. This place is the Palazzo Marconi in Bologna, an ancient building, built around the year 1500 and originally owned by the Orsi family, located in the historic centre. Unfortunately, the Palace, with its enormous historical and cultural value for the ancient origins, as well as for being the place of Guglielmo Marconi‘s childhood, does not look in good condition, as it needs urgent interventions, which for many reasons have not still been put in place. It's a pity that this great idea cannot be put into practice.

You can see the conditions of the building, using Google Earth, where in the search string you will need to type the words: Bologna, Marconi palace. Once the program has "centred" it, you can watch in what kind of conditions the roof is. Then, using the "Street View" function, you can also get a look to the conditions of the exterior facades of the building.

We hope that this beautiful Marconi Palace used as a centre of studies for scholars, can be set up. It is a moral and cultural inheritance of Guglielmo Marconi and a heredity, a moral inheritance, must not be ignored.

Thanks Mrs Elettra.

For me, to have met with her and having spoken with Her, meant going back to that lesson of history that a long time ago I listened to. That lesson that gave me a spine tingling, as a steel spring pushed me and all those who understood the importance of the radio, the radio amateurs at first, in such a way to continue this wonderful adventure of experimentation, as well as being further stimulated in believing in our own ideas and trying to realize them.

As we say among the Radio Amateurs, “Hear you again”.

Vanessa Lucrezia Francia, the photographer

The History of Amateur Radio from World War I to World War II

Part 7: 1940 – 1948 (part the last)

Mike Bosch, ZS2FM

V-E Day was the public holiday celebrated on 8 May 1945 to mark the formal acceptance by the Allies of the unconditional surrender of Nazi Germany and its armed forces. V-J Day is the day on which Imperial Japan surrendered in effect ending the war. Japan surrendered on 15 August 1945, in Japan, but the document was only signed on 2 September 1945, which officially ended World War II. Amateur Radio made a slow return to normality. The bands were gradually released for amateur use starting with 10 metres, 5 metres and higher. The rest of the world followed suite. The old 5 metre band (56 MHz) was changed to 6 Metres (50 MHz). Amateur Radio blossomed again from 1946 when many Signal Corps soldiers returned and joined amateur radio, as well as many new radio enthusiasts. The 40 metre band was crowded during peak operating times and 20 metres was packed with DX stations, including DX activity on 10 metres. In 1946, Radio ZS replaced the old QTC magazine and the word Relay was dropped from the official name to become South African Radio League. The period 1946 to 1948 was truly the boom years of Amateur Radio.

We were now in the World War II years with no amateur transmitting activity and the last Conference of the SARRL was scheduled for March 1940. The League at the time existed of about 600 members. The copies of QTC for January, February and March featured three parts of a comprehensive article titled "The Story of the Inception and Pioneer Development of Amateur Radio in South Africa 1904 – 1928" written by W. E. Dixon Bennett, ZS4W (A3V, ZS4F, ZS5EG), who was one of the founders of the SARRL.

The April 1940 QTC magazine was the last issue during the war years and covered the AGM of March 1940. President Arlund Ussher, ZS6Z, welcomed the delegates to Johannesburg and stated that the meeting was really a combination of Conference and AGM. The main discussions dealt with the future of the League in the following sections:

1. Suspension of activities.
2. The Council to continue for the duration of the war.
3. Headquarters Staff to be replaced by the secretary who will act in an honorary capacity.
4. Subscriptions to be brought up to date until 30 June 1940.
5. Finance, all liabilities will be paid and the balance banked.
6. QTC, it was decided that this issue will be the last until cessation of hostilities.
7. Divisions and Sections. They will be encouraged to continue and keep their members as there is no reason why social and radio experiments should not continue.
8. Division and Section Committees. The decision to elect annual committees is left entirely to them.
9. Correspondence. As the secretary of HQ only operates on an honorary basis correspondence should be first directed to their respective committees.
10. Divisional and Sectional Notices and Bulletins. Apparently, some committees will run monthly newsletters and could exchange it with other committees. 1
11. QSL Cards. After 30 April 1940 the PMG will no longer accept QSL cards for transmission to other countries.
12. Annual General Meetings. It has been decided that Annual General Meetings will not be held until after the cessation of hostilities.
13. Divisions and Sections will be required to lodge their annual reports and balance sheets.
14. Divisional Correspondence and Membership Lists. The Headquarters Secretary must be updated about membership lists and addresses.
15. Sales Department. There are several books lying at Headquarters. Members are requested to order books that they may need, such as Jones Radio Handbook 1940.

Summary

From the foregoing you will appreciate that the future of the League is not to be retarded in any way, except for the purpose of conserving funds, which will be utilised for the development of the amateur cause when the time is ripe. All members are earnestly requested to not only continue their support of

(Continued on page 30)

(The History of Amateur Radio from page 29)

their divisions and sections, but to increase their efforts to hold membership of the League together at all costs. The South African motto is "Union is Strength", so bear it in mind.

The War Years

Although Amateur radio came to an abrupt halt during the war, radio science developed leaps and bounds. Grote Reber, W9GFZ, of Wheaton, Ohio, USA, continued his solitary research of radio emission from space throughout the war years and mapped the radio sky and hot spots on 160 MHz in our galaxy, the Milky Way. He did all this at his own cost, this laid the foundation of a new science after the war, namely radio astronomy and he later became a professional radio astronomer. The military improved the quality and sensitivity of their radio equipment and introduced two-way communications on VHF. But the biggest development occurred in radar systems that could now operate on microwaves.

When the war broke out Great Britain had a chain of large HF radar antennas along their east and south coasts operating between 20 – 30 MHz.


THE OFFICIAL ORGAN OF THE
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Headquarters: 8, Unity House, 100, Fox Street, Johannesburg. P.O. Box 7028. Phone 33-8243.
No. 4 APRIL, 1940 Vol. 12.

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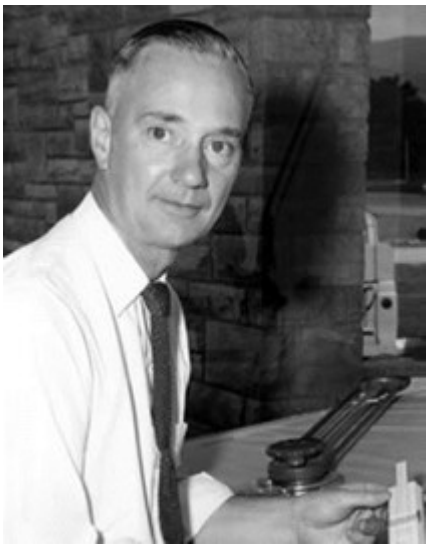
QTC April 1940, Volume 12 number 4, the last issue of QTC


Grote Reber, W9GFZ

The cavity magnetron was invented in Britain, but Churchill offered it to the US for further development that they shared. The new radar systems covered bands such as S-band 2 – 4 GHz and X-band 8 – 12 GHz, etc. A radar engineer, J. Stanley Hey in Britain discovered microwave radiation from the Sun, which was first thought to be radar jamming from Germany and he also detected the meteor bursts from the radar pulses. Radio science benefited a great deal from the war discoveries and development.

The Boom Years of Amateur Radio

The war officially ended on 2 September 1945 and amateur radio science woke up to a new dawn. In 1946 amateur bands were slowly released starting with 10 metres (28 – 29 MHz) and the new VHF bands. The old 5-metre (56 – 60 MHz) band was replaced with the new 6-metre (50 – 54 MHz) band in Region 2 including South Africa. Region 1 and 3 (Europe, Australia and New Zealand) used the bands from 41 MHz – 88 MHz for their band 1 Television Service. Eventually all the HF bands were released.

When World War I ended, the radio amateurs were allocated the useless bands below 200 metres (1,5 MHz). But their experimental attitudes forced them to explore these new frequencies and in the process, discover worldwide communications on shortwaves (later called HF), all contrary to the belief of the radio experts. During World War II, the roles were reversed and the Military made many new discoveries and innovations to move radio communications into a new VHF world and radar into microwaves, but amateur radio now had to play catch up.

The period between 1946 and 1948 turned out to be the boom years of amateur radio. Thousands of soldiers returned from the war including many who were involved with the Signal Corps and became radio amateurs, as well as radio enthusiasts who were waiting out in the wings for years. The QTC magazine

(Continued on page 31)

(The History of Amateur Radio from page 30)

was replaced with Radio ZS, Volume 1 No 1 appeared in July 1947 and the word '*Relay*' was dropped from the official name and became South Africa Radio League (SARL). The 40 metre band became solidly packed with radio amateur stations during peak operating hours using both AM phone and CW, while 20 metres was crowded with worldwide DX stations, including some on 10 metres.

Colonel Bert Howes, ZS6HS, presenting a medal to Lieutenant Colonel (Commandant) Jack de Klerk, ZS6CD.

The new 6 metre band (50 MHz)

Although the HF bands were extremely active only a few amateurs in Cape Town and Johannesburg ventured to experiment on VHF especially on the new 6 metre band. The main reason being that this field was more difficult with many challenges, while the equipment required more effort to construct. When the 6-metre band opened on F2 propagation it produced superior DX signals than those on 10 metres.

Each of the Cape Town VHF gang was hoping to make the first 6-metre DX contact, but were glad that the honour went to Henry Rieder, ZS1P, when he made history on Saturday 4 October 1947, by having a cross-band QSO with Hilton O'Hefferman, G5BY, at Croydon, Surrey, England on 10 metres and Henry on 6 metres. Charles missed the opportunity by only a few minutes under the impression that the MUF had gone down and Guy Swart, ZS1AX, was QRT for his daughter's wedding.

But the first-ever two-way DX contact occurred on 5 October 1947, when Major Bert Howes, ZS6HS, of Johannesburg worked Major Ken Ellis, MD5KW, in Port Said. On Saturday 11 October the MUF was rising steadily between 1:45 p.m. and 2:00 p.m. and it suddenly went up to 56 MHz. ZS1T and ZS1P succeeded in making a two-way QSO with David Saayer, PA0UN, in Eindhoven, after hearing his automatic CW signal (beacon). This was a world record of 10 400 km for a while. (Years later another Capetonian Denis Richardson, ZS1B, who was one of the early pioneers on 5 metres, also established a world record on 50 MHz with JA1AXE over 14 730 km that lasted 21 years).

In November 1947 Major Guy Swart, ZS1AX, in Cape Town made the first two-way 6-metre contacts on Sporadic-E with Major Ted Cooke, ZS6BT, followed by Major Bert Howes, ZS6HS, at Johannesburg on AM phone and CW.

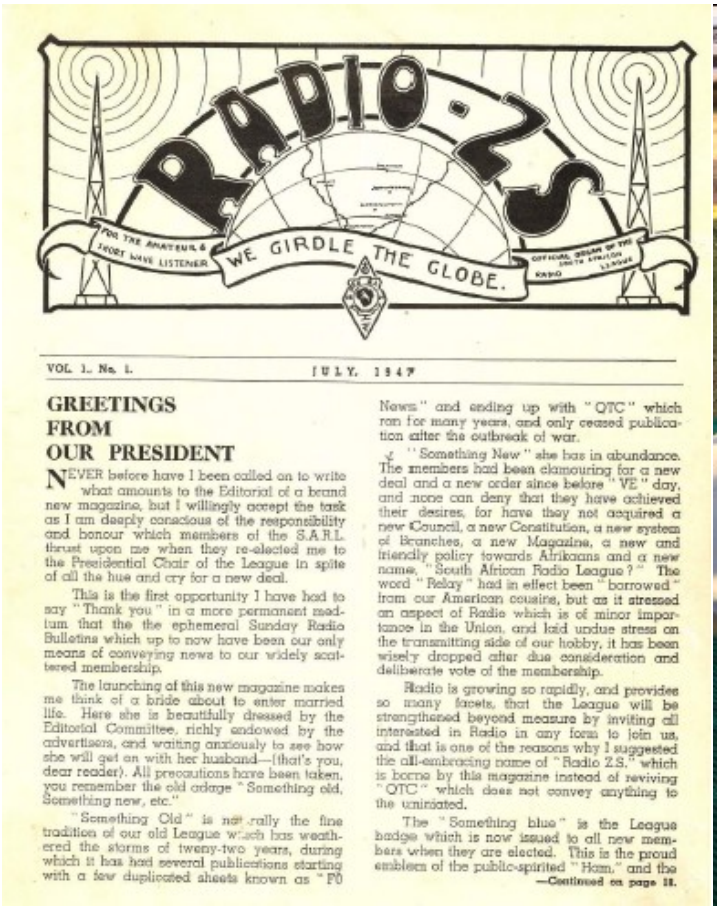
Solar Cycle 18 peaked in 1947

About six months later things started to happen on Tuesday 29 March 1948, when Henry ZS1P noticed that very high frequency signals were coming In. Though no DX contact was made that day he felt that it was a good indication of better things to come.

The next day brought its reward in what is possibly the longest intercontinental QSO on record. At 14:40, Henry ZS1P transmitting on 6 metres, contacted G6DH, Denis Heightman, at Clacton, Essex, England, who was transmitting on 10 metres. A cross-band contact was carried on until 15:00, when Guy ZS1AX came in and taking over from ZS1P and continued the QSO until 16:30. Guy was unable to stay on after this time, so Henry took over again and the QSO carried on until 18:30 when the band packed up. Transmission during this 4-hour period was made on CW and AM phone and signal strengths varied from S1 to S8. Unfortunately, G stations at the time were not permitted to work on 6 and that was the only thing that prevented the whole QSO from being a 6-metre official record.

In October 1948 Henry Rieder, ZS1P, made headlines when he picked up the television video

(Continued on page 32)



RADIO ZS

FOR THE AMATEUR & SHORT WAVE LISTENER — WE GIRDLE THE GLOBE. — OFFICIAL ORGAN OF THE SOUTH AFRICAN RADIO LEAGUE

VOL. 1. No. 1. JULY, 1947

GREETINGS FROM OUR PRESIDENT

NEVER before have I been called on to write what amounts to the Editorial of a brand new magazine, but I willingly accept the task as I am deeply conscious of the responsibility and honour which members of the S.A.R.L. thrust upon me when they re-elected me to the Presidential Chair of the League in spite of all the hue and cry for a new deal.

This is the first opportunity I have had to say "Thank you" in a more permanent medium that the the ephemeral Sunday Radio Bulletins which up to now have been our only means of conveying news to our widely scattered membership.

The launching of this new magazine makes me think of a bride about to enter married life. Here she is beautifully dressed by the Editorial Committee, richly endowed by the advertisers, and waiting anxiously to see how she will get on with her husband—(that's you, dear reader). All precautions have been taken, you remember the old adage "Something old, Something new, etc."

"Something Old" is naturally the fine tradition of our old League which has weathered the storms of twenty-two years, during which it has had several publications starting with a few duplicated sheets known as "Fö News" and ending up with "QTC" which ran for many years, and only ceased publication after the outbreak of war.

"Something New" she has in abundance. The members had been clamouring for a new deal and a new order since before "VE" day, and none can deny that they have achieved their desires, for have they not acquired a new Council, a new Constitution, a new system of Branches, a new Magazine, a new and friendly policy towards Afrikaans and a new name, "South African Radio League?" The word "Relay" had in effect been "borrowed" from our American cousins, but as it stressed an aspect of Radio which is of minor importance in the Union, and laid undue stress on the transmitting side of our hobby, it has been wisely dropped after due consideration and deliberate vote of the membership.

Radio is growing so rapidly, and provides so many facets, that the League will be strengthened beyond measure by inviting all interested in Radio in any form to join us, and that is one of the reasons why I suggested the all-embracing name of "Radio Z.S." which is borne by this magazine instead of reviving "QTC" which does not convey anything to the uninitiated.

The "Something blue" is the League badge which is now issued to all new members when they are elected. This is the proud emblem of the public-spirited "Ham," and the

—Continued on page 18.

Radio ZS July 1947, Volume 1 number 1 and Radio ZS July 2017, Volume 70 number 7 - 70 years of Radio ZS (both are available for download from the Radio ZS page on www.sarl.org.za)

(The History of Amateur Radio from page 31)

on 45 MHz as well as the AM sound from Alexandra Palace, London, UK, on a Pye TV receiver. During the next year Henry also received the entire Oxford/Cambridge boat race on television in Cape Town. This was an excellent reward for an amateur who spent many of his pre-war years experimenting with the Baird mechanical scanning television system. All the above-mentioned radio amateurs are now silent Keys.

(Conclusion)

References:
QTC – January 1940 to April 1940
Radio ZS – 1947 to 1949

Two Band Quad Loop Antenna

Al Akers, ZS2U

Originally published in the February 1992 issue of Radio ZS

For the past eight years I have been actively interested in portable operation, mainly on HF from the Ciskei. I have tried a variety of antennas, partly because I am an inveterate experimenter when it comes to antennas and partly to find an effective portable one. Essentially, I wanted one that worked well on 20 metres, 15 metres and 10 metres and required a minimum of trouble to change bands. It should also be easy to erect, dismantle and transport. Of course, the first antenna that would come to mind is a trap antenna, but have you ever tried to erect one among the bushes and trees? Traps are cumbersome and can easily be damaged, during both erecting and transporting.

Quad Loop

An antenna I saw in an article which I thought would be ideal was a quad loop which was one wavelength on 15 metres, but had various inductors and capacitors which resonated and matched it on the three bands I required, or so the author claimed. I copied the specifications as faithfully as possible, but it only functioned effectively on 20 metres. Yes 20 metres, not 15 metres as I would have thought. After much experimenting and no worthwhile improvement in performance, I scrapped the antenna.

I was not keen to give up altogether on the loop idea and decided that I would try two loops for a two-band antenna, but how would I feed it with a single feedline?

What about acceptor-rejector circuits? To the drawing board and include two L matching networks to match the 120-ohm loops to the 50-ohm feedline. Next, construct it and then the acid test. After some minor adjustments and to my relief and satisfaction, the antenna loaded up well and performed well too.

The End Product

Figure 1 shows the antenna. L1 is the 10-metre loop and is 10,9 metres long. L2 is the 15 metre loop and is 14,52 metres long. The antenna is mounted on an aluminium mast as described on page 20 and 21 of the September 1989 issue of Radio ZS. The centre plate A is shown in more detail in fig. 2. U clamps are used to fasten it to the mast. Not shown are four saddles which fasten the pipes to the plate, as also a centre piece which serves to hold these pipes and to block off their ends. The support arms are canes sold for use in gardens and come in two metre lengths. These were epoxied onto lengths of 16 millimetre outside diameter aluminium tubing which made up the extra length needed. These aluminium pipes plugged into the pipes on the mounting plate.

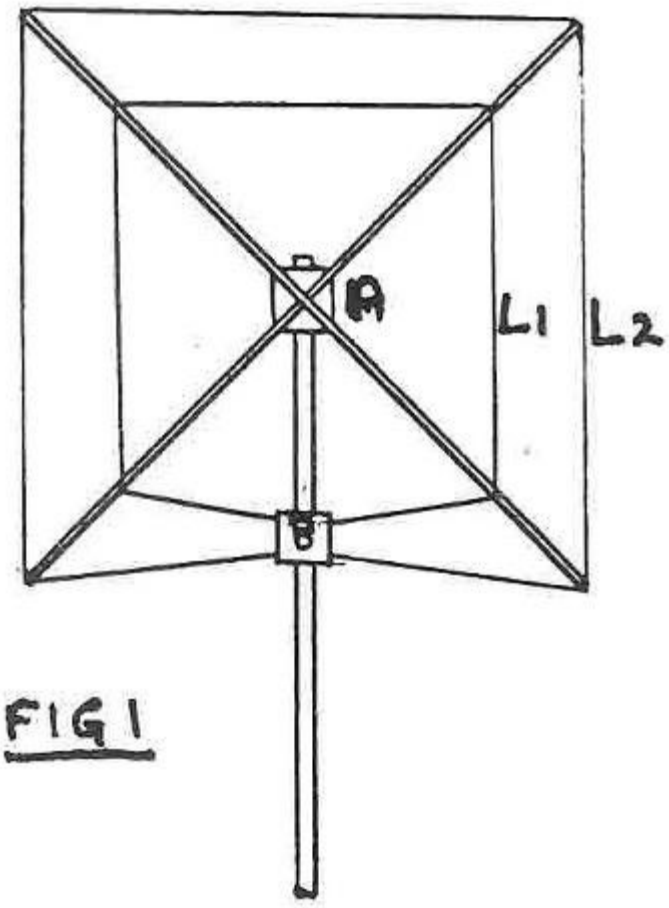
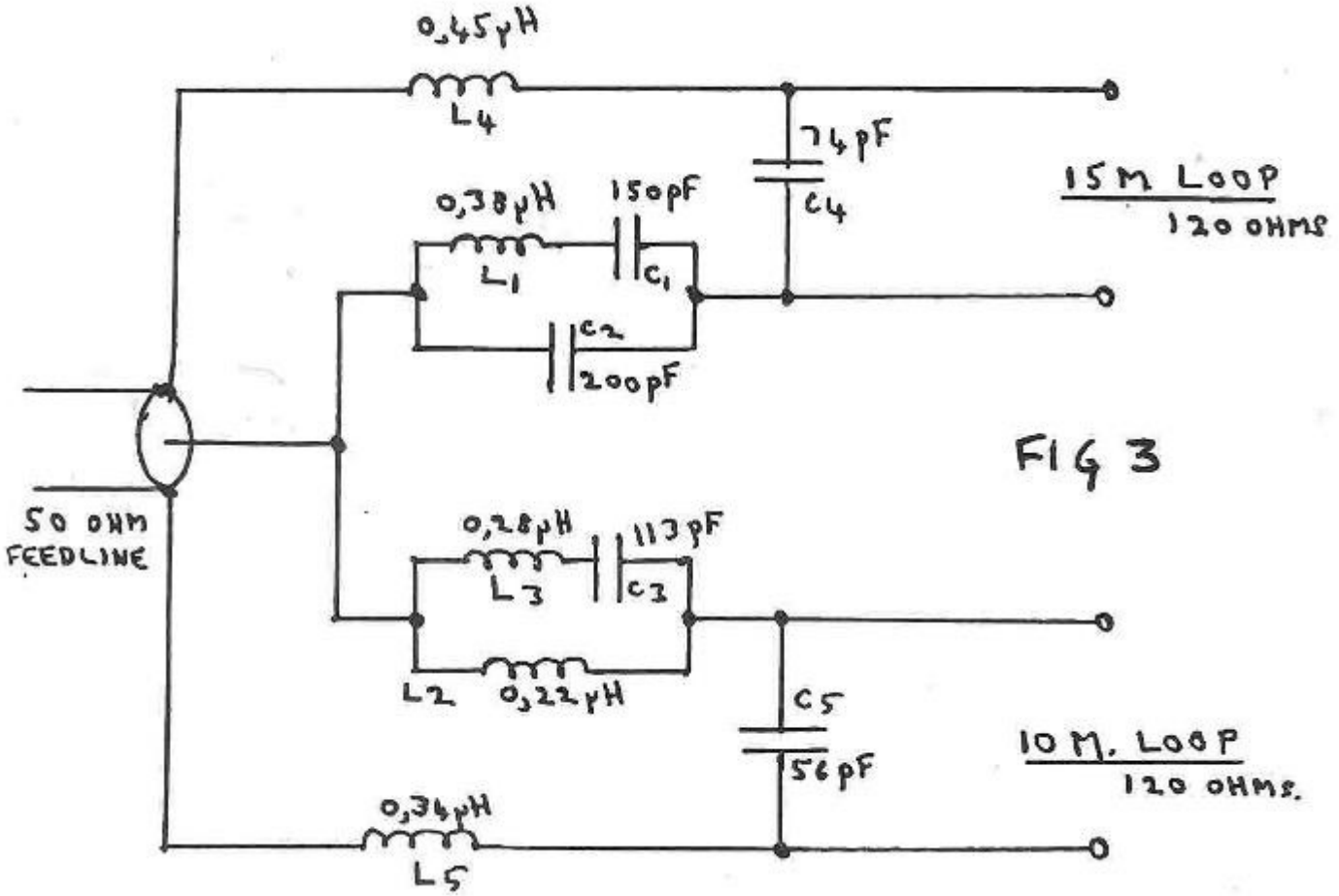


FIG 1

B is an ABS box, 15 cm x 8 cm x 5 cm, which should be available from one of your local electrical emporiums. It is used to house the acceptor-rejector circuits and L matching networks to match the 120-ohm loops to a 50-ohm feedline. The box is fastened to a 32 mm diameter PVC waterpipe about 80 mm longer than the box and slotted for about 50 mm. The pipe slides onto the mast and a hose clamp round the slotted section serves to clamp it to the mast.

(Continued on page 34)



(Two Band Quad Loop Antenna from page 33)

In fig. 3, L1, C1, C2 and L2, L3, C3 form the two acceptor-rejector circuits. L4 and C4 is the L matching network for the 15 metre loop and C5 and L5 is the L matching network for the 10 metre loop. The upper acceptor-rejector circuit forms a series resonant circuit on 15 metres (very low impedance) and a parallel resonant circuit on 10 metres (very high impedance). The lower circuit functions in a similar fashion, i.e. very low impedance on 10 metres and very high impedance on 15 metres.

The capacitors used were silver mica, two in parallel in each case to make up the required value. They are standing up well to the 50 watts output from my FT-7B. Coils were air-wound with 14 S.W.G. copper wire, 22 millimetres diameter and 4 millimetres per turn spacing. I used 3 turns for L2 and L3, 4 turns for L1 and L5 and 5 turns for L4. Adjustments were made by varying the coil lengths. Most of my coils needed spreading a bit. Orientate the coils to minimise inductive coupling between them. Start with L1 and C1 only. Resonate on 15 m, then connect C2 and resonate on 10 m. C3 and L3 is resonated on 10 m, connect L2 and adjust it to resonate on 15 m. Wire up the whole unit and test. Probably minor adjustments will need to be made to the L matches. I used an SO-239 socket at the bottom of the box for feedline attachment.

You may think, as I did, that this antenna will be difficult to make and adjust and, with all the coils, etc., would be rather inefficient. I found that it was not difficult to adjust, it has proved itself in operation. It is a useful antenna where space is limited and has the advantage that it is directional.

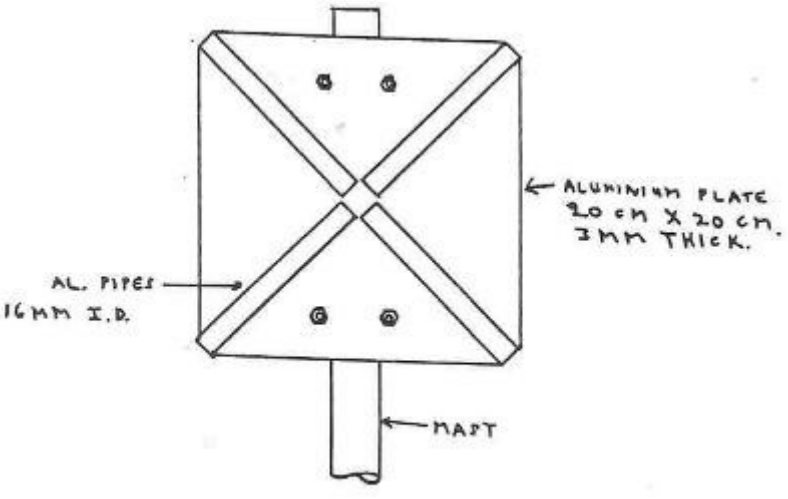


FIG 2.

Bill Brown, WB8ELK: Master of High-Altitude Balloon Projects

Jen Glifort

This amateur estimates that he has launched more than 500 high-altitude balloon projects over the course of 3 decades

After watching a documentary about Joseph Kittinger's 1960 record-setting parachute jump from the research balloon Excelsior 103 000 feet (31,39 km) in the air, Bill Brown, WB8ELK, felt the need to reach for the highest heights himself. Bill said, "Kittinger's description of viewing the curve of the Earth and the blackness of space from his stratospheric perch inspired me to find a way to see this incredible view for myself." This led to more than 500 launches of high-altitude balloon projects over the span of 30 years.

The Edge of Space

Bill's first flight took place from Findlay, Ohio, on 15 August 1987. For his first flight, Bill designed a remote viewing platform, using a P.C. Electronics amateur TV transmitter on 434 MHZ and a 50 mW, 2 metre PM beacon to track and direction-find the payload (this was, of course, before GPS). The balloon was a latex weather balloon, able to carry up to 12 pounds (5 kg) of amateur radio equipment (at 6 pounds (2,7 kg) per payload) up to about 100 000 feet (30,48 km) without needing an FAA waiver. "Amateur TV stations across the mid-west had beautiful reception from this tiny, 1 W amateur TV transmitter as far as 250 miles (420 km) away," Bill explained. "The 2 metre beacon was heard over 400 miles (643 km) away."

The payload was found by a farmer in a soybean field 6 weeks later, roughly 1 mile (1,6 km) from Bill's estimated landing zone. A few months later, Bill was at it again, this time with the smallest TV camera available at the time, weighing 8 ounces (226 g) and able to take live, black and white video footage from the stratosphere. "The view was incredible," Bill said. The Amateur Radio community took an interest in this new endeavour and a large foxhunting effort took place during the launch - including a chase helicopter. The payload landed in the Mojave Desert, allowing the helicopter to land right beside a sand dune to recover the equipment. Since his first flight, Bill has launched high-altitude balloon projects in 21 states (see Figure 1).

Figure 1. A balloon project from Bill Brown, WB8ELK, Paul Verhage, KD4STH, and Ann Boes, KDQIQCA, carrying a 4-H Lab Revolution student experiment at 16 154 m. This photo was taken by a balloon launched by Jeff Ducklow, NZNQN, of the Mayberry Galactic balloon group. [Jeff Ducklow, NQNQN, photo]

Skytracker

Small balloons designed for high-altitude projects are known as "pico balloons." The goal in a pico balloon project is to make everything very light. Bill's most recent pico project involved the design of an Amateur Radio tracker weighing less than half an ounce (14 g). "The goal was to create a tracker transmitter - called the Skytracker - that is small enough to be flown on such a small balloon for days or weeks at a time," Bill said. The tracker ran entirely on solar power, sent down position reports every 2 minutes via the low-power APRS transmitter's GPS receiver and flew on a Mylar foil party balloon (see Figure 2).

Bill's latest Skytracker project used a larger balloon, from Scientific Balloon Solutions (http://www.scientificballoonsolutions.com/). The payload used a 34-gauge magnet wire dipole and weighed 17 grams. It stayed in the air for over 75 days, floating at 40,000 feet (12,19 km) and circled the world more than six times before coming down in the Ivory

(Continued on page 36)

Jen Glifort is an Assistant Editor for QST. She can be reached at jglifort@arrl.org.

(Master of High-Altitude Balloon Projects rom page 35)

Coast, in Africa. This flight used the WSPR mode to operate on the 20 metre band. Bill said, "The weak-signal capability of the WSPR mode, combined with a distributed network of worldwide receive stations, makes it possible to use a 20 mW HF transmitter to send position reports and telemetry thousands of miles away. And, in fact, it was heard several times during its flight from the other side of the world."

To track the flight nearly in real time, Bill wrote a Python script, which took reception reports from www.wsprnet.org/drupal, reformatted the data and sent it to the https://aprs.fi/ website.

There is also https://tracker.habhub.org/ for tracking these balloons, which has a map display of the https://aprs.fi/ data, showing all Amateur Radio high-altitude balloons flying at any given time (see Figure 3).

Figure 2. Bill Brown, WB8ELK, and his Mylar party balloon carrying a 12 gram Skytracker APRS tracker. [Bev Teter, WB4ELK, photo.]

Student Launches

Bill has mentored many school and University high-altitude balloon projects over the years. Bill said these projects are "A great way to teach students about space and science and lead to more students getting their Amateur Radio licenses. There are frequent student launches of high-altitude balloon projects, sometimes involving photography. Some students have even taken part in launches to the stratosphere using GoPro cameras, often with a toy in the background. A Spaceport Indiana summer science camp Bill mentored sent up an Angry Bird (see Figure 4). He also recalled a senior class design project at the University of Alabama in Huntsville's College of Engineering that involved students designing, building, launching and recovering a payload that flew on a balloon

(Continued on page 37)

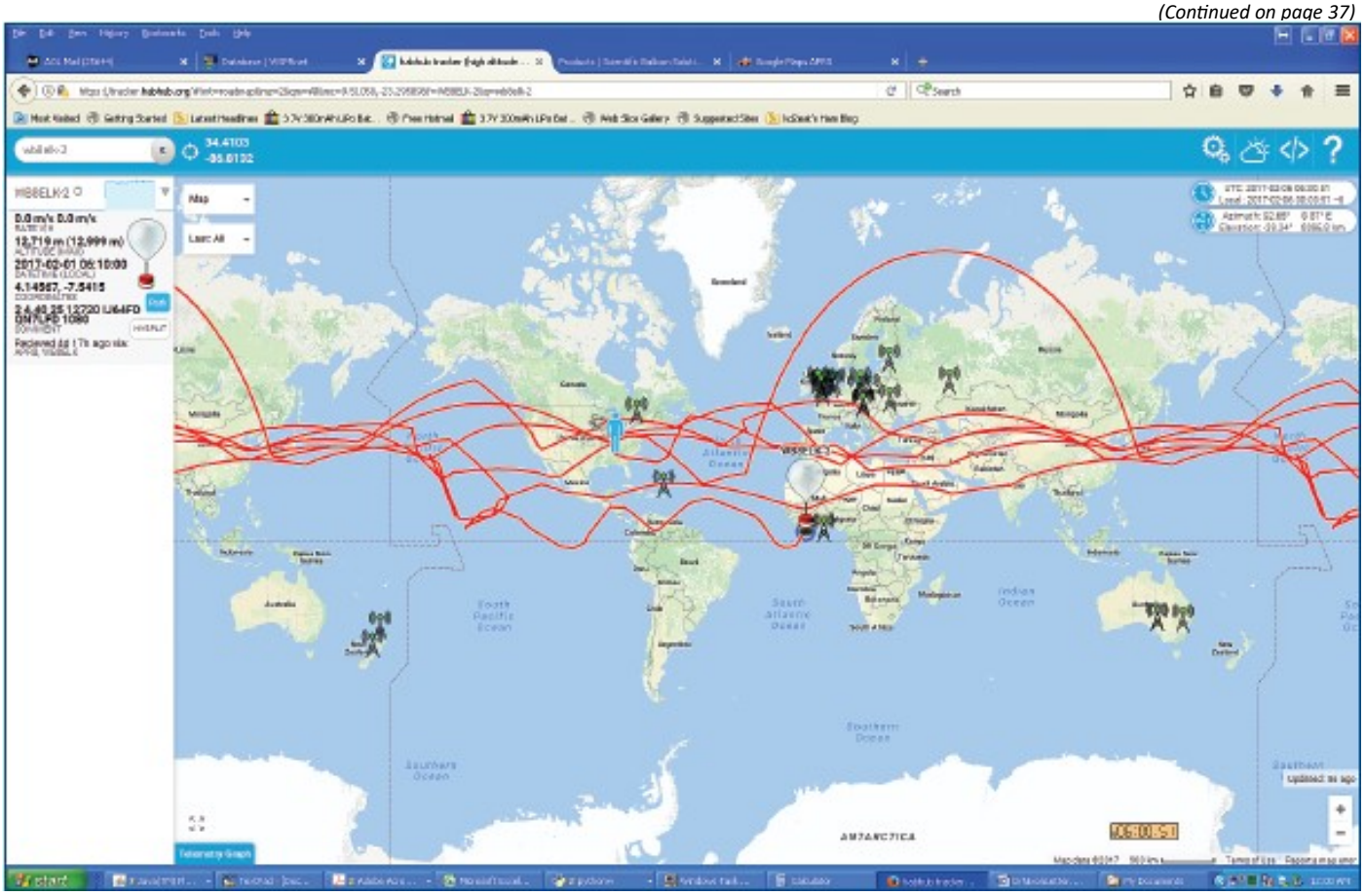


Figure 3. The map from iracker.habhub.org showing which high-altitude balloon launches are taking place at any given time. The WBBELK-2 Skytracker balloon went around the world six times in 75 days.
[Bill Brown, WBBELK, photo]

(Master of High-Altitude Balloon Projects from page 36)

up to over 100 000 feet (30 480 m). Many of the students went on to earn their Amateur Radio licenses as a result.

Small trackers use less than 4 cubic feet (0,1132674 cubic m) of helium and, as Bill said, "can be inflated right in the classroom as a great way to learn about Amateur Radio and inspire STEM [science, technology, engineering, and math] activities with students." Students can even find ways of tracking balloon projects from their smartphones. These accessible and economic projects inspire students to get involved with Amateur Radio and to become engaged in hands-on science experiments. "Over the course of 10 years," Bill explained, "the BalloonSat class has launched 63 balloons and exposed hundreds of students to high-altitude ballooning and Amateur Radio."

Figure 4. An Angry Bird, scowling from near-space orbit. [Bill Brown, WBBELK, photo]

High-Altitude Balloon Resources

You can find more information about Bill's latest projects on his websites at http://wb8elk.com/ and http://elktronics.com/. More resources related to high-altitude balloon projects can be found on sites such as https://arhab.org/, http://www.superlaunch.org/, http://eoss.org/, https://www.kaymont.com/ and http://spherachutes.com/. Bill can be reached at wb8elk@gmail.com.

This article is used with acknowledgement to QST, the Journal of the ARRL (May 2017 issue). Thanks also to the QRSS WSPR Beaconeers WhatsApp group for the hint.

Joseph William Kittinger II (born 27 July 1928) is a retired colonel in the United States Air Force and a USAF Command Pilot . Following his initial operational assignment in fighter aircraft, he participated in Project Manhigh and Project Excelsior in 1960, setting a world record for the highest skydive from a height greater than 31 kilometres (19 miles). He was also the first man to make a solo crossing of the Atlantic Ocean in a gas balloon.

Serving as a fighter pilot during the Vietnam War, he achieved an aerial kill of a North Vietnamese MiG-21 jet fighter and was later shot down himself, spending 11 months as a prisoner of war in a North Vietnamese prison.

In 2012, at the age of 84, he participated in the Red Bull Stratos project as capsule communicator, directing Felix Baumgartner on his record-breaking 39 kilometre freefall from Earth's stratosphere, exceeding Kittinger's earlier freefall in 1960 ,

https://en.wikipedia.org/wiki/Joseph_Kittinger
https://en.wikipedia.org/wiki/Project_Manhigh
http://stratocat.com.ar/fichas-e/1957/FMN-19570602.htm
https://en.wikipedia.org/wiki/Project_Excelsior
www.youtube.com/watch?v=iKRqNu23yUo
https://en.wikipedia.org/wiki/Red_Bull_Stratos
https://en.wikipedia.org/wiki/Felix_Baumgartner
www.youtube.com/watch?v=FHtvDA0W34I

CQ Contest … Februarie/February

Dennis Green, ZS4BS

Helpful FT8 Operating Guide

Gary, ZL2IFB has published his "FT8 Operating Guide", described as "a collection of pragmatic tips that takes over where the WSJT-X help and installation notes leave off." It is "specifically aimed at HF DXers" www.g4ifb.com/FT8_Hinson_tips_for_HF_DXers.pdf.

It started out as my rough notes as I fumbled around with the new mode", he says. "Those grew steadily over the past few months, absorbing information, advice and helpful hints from many sources including plenty of encouraging comments on the web version. I've peppered it with screen shots, quotes, comments and ideas, and given it a little structure. It's still not entirely 'finished' (partly because the operating techniques and software are still evolving) but I wanted to get it out there ahead of Bouvet, so those who intend to have a go at working 3Y0Z on FT8 have a chance to read and practice their skills, honing their techniques before the Main Event.

Feedback welcome, especially corrections and further tips... such as how we are going to cope with 3Y0Z's extra wide splits, and wall-to-wall continuous callers".

New HF Operators - Things to Do

What are the top three achievable things that you can do in one hour, one day, one week, one month, or one year to improve your HF station? Here are a few ideas to get you started:

- ✓ Add some radials to any vertical antennas you may have.
- ✓ Use an HF receiver (borrow one if you have to) that works on batteries to look for RFI sources in your operating location by turning off circuit breakers and noting the change in band noise.
- ✓ Inspect and repair any outdoor feedline, rotator or ground connections.
- ✓ De-clutter your operating position.
- ✓ Improve your operating ergonomics. Invite someone else over to operate for an hour and see how easily they can perform common contest operations like band changes.
- ✓ Choose which contests you will focus on this year, circle them on the calendar and start planning for them. Start negotiating with others in your household who will be impacted by your participation.
- ✓ Evaluate the strengths and weaknesses of your station. If you really enjoy 160 metre contests and want to score well, but you are on a small city lot, you might want to plan to operate from somewhere else that has fewer potential RFI sources and can accommodate big transmitting antennas and receiving antennas that make big contest scores possible on that band. Do not wait until the second week in June to start calling around.

Antieke Draadloos Vereniging Gelykgolf Aktiwiteitdag

Die doel van die Gelykgolf Aktiwiteitdag is dat deelnemers soveel amateurs as moontlik op die 20, 40 en 80 m-amateur bande kan kontak. Die Dag vind plaas tussen 13:00 en 15:00 UTC op Sondag 4 Februarie 2018 met aktiwiteit tussen 14 000 tot 14 060 kHz; 7 000 tot 7 040 kHz en 3 510 tot 3 560 kHz

Jy kan deelneem as ‘n enkel operateur, alle band, lae krag (maksimum 100 W) of ‘n enkel operateur, alle band, QRP (maksimum 5 W) of ‘n enkel operateur, enkel band, lae krag (maksimum 100 W) of dan ‘n enkel operateur, enkel band, QRP (maksimum 5 W). Die uitruiling is ‘n RST verslag, jou naam en jou ruit vierkant

Kontakte tel 1 punt vir lae krag en 2 punte vir QRP. Sertifikate word toegeken aan die eerste plekke en die hoogste enkel band telling. Logstate moet ingedien word teen Maandag 19 Februarie 2018 na

(Continued on page 39)

(Continued from page 38)

andyzs6ady@vodamail.co.za

South African Radio League National Field Day

The aim of the National Field Day is to work as many stations as possible on all the HF amateur bands (excluding the 2 200, 630, 60, 30, 17 and 12 m bands). 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 public with the capabilities of Amateur Radio.

The first leg of the NFD takes place from 10:00 UTC on Saturday 10 February to 10:00 UTC on Sunday 11 February 2018 with phone, CW, PSK and RTTY activity on the HF amateur bands, excluding the 2 200, 630, 60, 30, 17 and 12 metre bands. Phone, CW and digital modes on a band are considered as separate bands and a station may be worked only once per band under this rule.

You can participate as Class A – Field Station, Multi operator. Such stations must be located in places that are not regular station locations and must comply with the requirements of a field station as defined in the general section of rules. A single licensee or trustee for the entry is responsible for the group entry. All equipment (including antennas) must lie within a circle whose diameter does not exceed 500 metres. All contacts must be made with transmitter(s) and receiver(s) operating independent of commercial mains power.

Or Class B – Field Station, Multi operator, QRP. All contacts must be made using an output power of 5 Watts or less. Other provisions are the same as Class A.

Or Class C – Field Station, Single Operator. Such stations must be located in places that are not regular station locations and must comply with the requirements of a field station as defined in the general section of rules. All equipment (including antennas) must lie within a circle whose diameter does not exceed 500 metres. All contacts must be made with transmitter(s) and receiver(s) operating independent of commercial mains power.

Or Class D – Field Station, Single Operator, QRP. All contacts must be made using an output power of 5 Watts or less. Other provisions are the same as Class C.

Or Class E – Ultra Light Portable. Light weight self-contained stations, operating QRP or low power such as RaDAR, Summits on the Air, Parks on the Air (game and nature reserves), Islands on the Air, Heritage sites, etc. The operator must carry the entire station, antenna included, to the operating site. The distance carried must not be less than 1 km.

Or Class F - General Stations. Stations operating from permanent or licensed station locations using commercial power.

To encourage more individuals and groups to participate in the National Field Day events, a 6-hour section has been introduced. It need not be for one continuous 6-hour period, but once operation has commenced in the contest, off periods must be a minimum of 60 minutes.

Only one call sign per station is permitted. In the case of multi-operator stations using more than one transmitter, all operators shall use the same call sign.

Equipment for Field Stations may only be set up in the 24 hours prior to the starting time of the contest. This restriction applies to antennas, masts, towers and transmitting equipment, but excludes accommodation such as a caravan, tent, etc. Once a Field Station has been established at a site, it may not move to an alternative site after the contest starts, excluding Class E stations.

(Continued on page 40)

(CQ Contest from page 39)

The exchange is the number of transmitters, the Field Day operating class and the Provincial abbreviation. The sending of a RS or RST report is optional – it has nothing to do with the scoring. Scores are based on the total number of QSO points x the power multiplier x the number of provinces worked X the class multiplier. Each contact with a station from one of the South African provinces counts for five points and each DX contact counts for one point. Power multipliers are x 6 for 5 watts or less, x 4 for 50 watts or less, x 2 for 100 watts or less and x 1 for power greater than 100 watts. The power multiplier for an entry is determined by the maximum output power used by any transmitter used to complete any contact during the event.

A multiplier of one for each one of the 9 South African provinces worked (regardless of band) and one extra for working any station outside of the 9 provinces in other words - DX. EC – the Eastern Cape (including Marion Island); FS – the Free State; GP – Gauteng; KN – KwaZulu-Natal; LP – Limpopo; MP – Mpumalanga; NC – the Northern Cape; NW – North West; WC – The Western Cape (including Sanae Base and Gough island) and DX – used for all others that does not fall in the above groups. The class multiplier is 1 for General stations and 3 for Field stations single and multi

A person may not contact for QSO credit any station from which they also participate. A transmitter/receiver/transceiver used to contact one or more Field Day stations may not subsequently be used under any other call sign to participate in Field Day. Batteries may be charged while in use. The batteries must be charged from a power source other than commercial mains power. All stations for a single entry must be operated under one call sign. There is no limitation to the number of transmitters or receivers that may be deployed. The use of more than one transmitter at the same time on a single band or mode is prohibited.

Logs in ADIF, Cabrillo or MS Excel format with a summary sheet labelled “my call sign NFD,” must be sent by e-mail to contest@sarl.org.za by 18 February 2018. Refer to General Rules 3.6 and 5.1 to 5.6 for detail about logs and summary sheets. A photo(s) of the station in operation (JPG format) MUST accompany every log entry.

South African Radio League Youth Sprint

This is a fun activity to celebrate the Youth and to promote contacts between young radio amateurs in Southern African countries. Call “CQ Youth Sprint” from 08:00 to 10:00 UTC on

(Continued on page 41)

(CQ Contest from page 40)

Saturday 17 February 2018. The exchange is a RS report and the operator's age.

It is a phone sprint on the 40-metre band with activity between 7 063 to 7 100 and 7 130 to 7 200 kHz. Contacts between stations in the age group 25 and younger are worth 5 points, contacts between stations in the under 25 group and over 26 group is worth 2 points and contacts between stations in the age group 26 and older are worth 1 point.

Logs in ADIF, Cabrillo or MS Excel format with a summary sheet labelled "my call sign Youth Sprint," must be submitted by 24 February 2018 by e-mail to contest@sarl.org.za. Refer to General Rules 3.6 and 5.1 to 5.6 for detail about logs and summary sheets. The age of the operator must be shown on the summary sheet.

All the logs received will be entered for a draw for a Student membership of the South African Radio League. Certificates will be awarded for all logs that are submitted correctly and prizes will be awarded to the 1st, 2nd and 3rd place in the competition. All logs with more than 10 contacts will entered for a lucky draw.

Suid-Afrikaanse Radioliga Digitale Kompetisie

Die doel is om soveel moontlik kontakte tussen radio amateurs in Suider-Afrika te maak met die FT8 en/of RTD modusse te gebruik. Die kompetisie is oop vir alle radio amateurs in Suider-Afrika. Die kompetisie vind plaas tussen 14:00 en 17:00 UTC op Sondag 25 Februarie 2018. Neem kennis dat die Digitale kompetisie op 19 Augustus volgens die reëls van die Suid-Afrikaanse Radioliga HF Kompetisie gehou word.

Aktiwiteit vind plaas op 80 meter (3 580 tot 3 600 kHz); 40 meter (7 040 tot 7 060 kHz) en 20 meter (14 070 tot 14 099 kHz). Vir FT8 word die standaard frekwensies gebruik terwyl RTD aan die bokant van die gespesifiseerde frekwensies gestuur en ontvang word. Let asseblief daarop dat HSB te alle tye gebruik moet word.

'n Stasie kan twee keer op elke band gekontak word, een keer op RTD en een keer op FT8. Die uitruiling is 'n RSQ-verslag en jou ruit vierkant (eerste 4 syfers) bv. KG30. Kontakte met stasies gelys in ZS1 tot ZS6 as ook 3DA, 7P, 7Q, 9J, C9, A2, D2, V5, Z2, ZD7, ZD9, ZS7, ZS8, FR, 3B8, 5R, FH en D6 is 3 punte werd terwyl kontakte met stasies buite hierdie areas 1 punt werd is. Die eerste kontak met elke gebied sal as 'n band vermenigvuldiger gebruik word. Die Band totaal = QSO punte x die aantal roep areas per band gewerk en die finale telling = som van die totale.

Logstate in die ADIF-, Cabrillo- of MS Excel-formaat met 'n opsommingsblad en gemerk "My roepsein Digitale Kompetisie" moet ingedien word teen 4 Maart 2018 per e-pos aan contest@sarl.org.za. Verwys na Algemene Reël 3.6 en 5.1 tot 5.6 vir besonderhede oor logstate en opsommingsblaaie.

ARRL International Grid Chase

ARRL International Grid Chase (IGC www.arrl.org/international-grid-chase-2018) participants are encouraged to make sure that that each Logbook of The World (LoTW www.arrl.org/logbook-of-the-world) station location in *TQSL* includes their grid square. To check, open *TQSL*, click on "Station Locations," then on "Display Station Location Properties." If no grid square is indicated, click on "Edit a Station Location" and insert the grid square for that location. If *TQSL* does not contain your grid square, other stations will not receive IGC credit when they contact you. Check *your* IGC position on the Leader Board https://igc.arrl.org/leader-board.php.

So, you want to build a magnetic loop?

Henry Chamberlain, ZS1AAZ

Magnetic loops can be constructed in many ways and Youtube has many videos showing how amateurs have constructed them, some with very good ideas. I saw one where a USA amateur made a hole in the roof of his expensive car and has a hula hoop wrapped in aluminium foil on top. Through the hole he has a lever with which he can raise and lower the antenna!

An early antenna made by AEA used a metal hoop that could be bent so that it could go through a hatch in a ceiling and bent back into shape once inside the ceiling. I know that an amateur once won the sweepstakes contest using such an antenna, but I must admit his location was excellent.

To avoid losses, the loop part must be constructed of material that conducts well, so copper and aluminium are popular choices. MFJ say that they weld their aluminium loop to the stationary plates of a butterfly capacitor to avoid resistive losses. I live in a retirement centre where unsightly antennas are not permitted, so my HF antennas are two magnetic loops, an MFJ that works from 10 to 30 MHz and a home constructed loop that works from 3 to 10 MHz. With these antennas, both out of sight as far as my neighbours are concerned, I can work the whole HF band except for 160 m.

I am not keen on talking on the radio, so I mostly listen or work digital modes and using JT65 I have received signals from South Korea, for all practical purposes on the other side of the world. I think that digital modes are ideal for amateurs who have antenna restrictions.

The best form for a magnetic loop is a circle but a square loop or octagonal shaped one, works well. Copper is the easiest to obtain and the easiest to solder the joints but in my local hardware store I see they have 2,5 metre lengths of aluminium strip, from about 13 to 50 mm wide. It immediately sparked my interest because I already have a spare vacuum capacitor just right for a magnetic loop. It is easy to bend aluminium strip into a circle and it is also easy to overlap the ends to adjust the diameter of the loop and just bolt the ends together with enough bolts and nuts. In this way I can probably throw together a magnetic loop in a very short time.

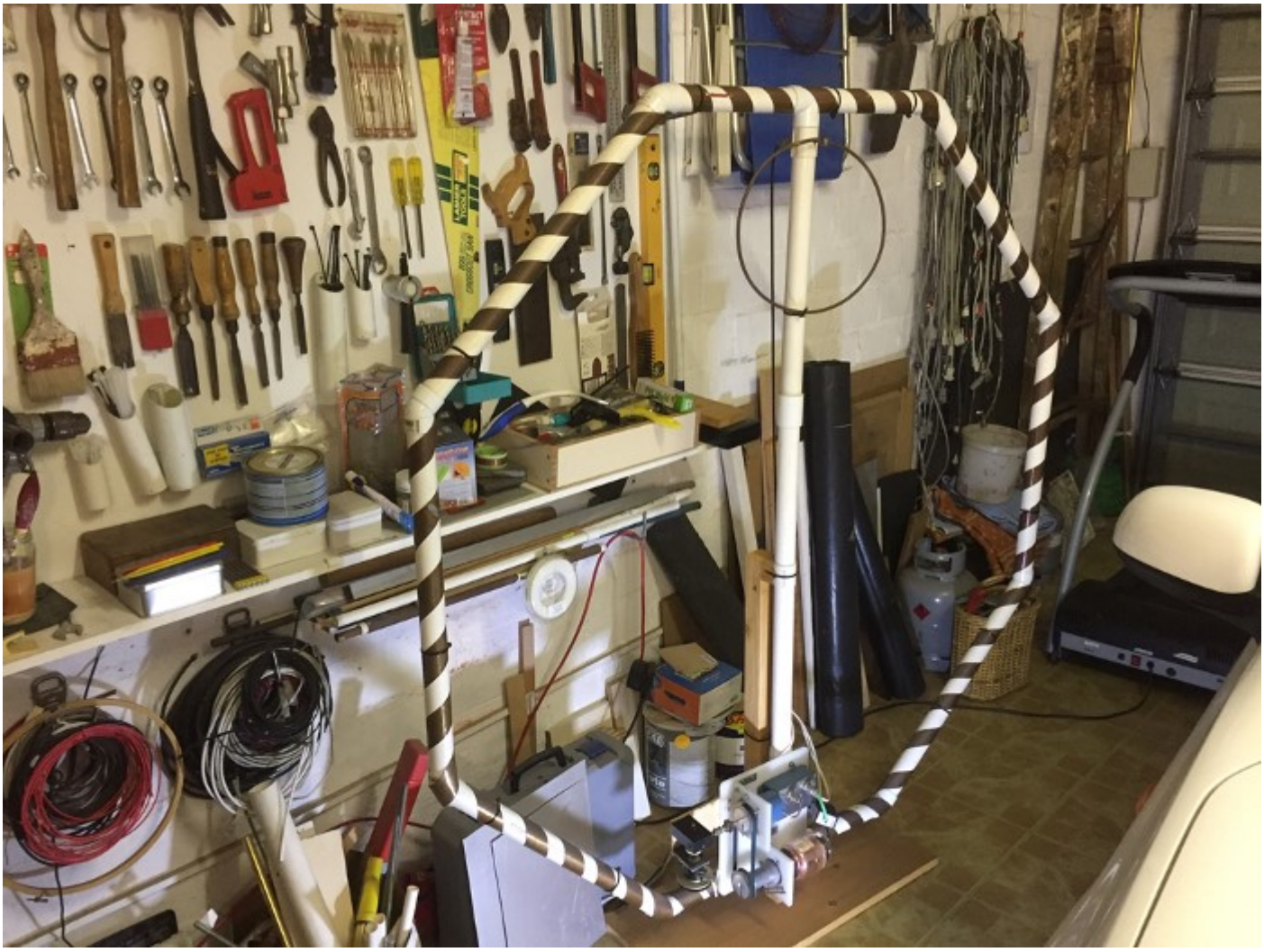
It crossed my mind that by overlapping the strips I can make a capacitor and so tune the loop. Look at this cunning idea that you can see on Youtube www.youtube.com/watch?v=hWbfuF6ti2I. It is obviously made of welded tubing with one half hinged at the bottom with the box-like structure at the top being the tuning capacitor. In the middle is a motor that turns a lead screw and the two halves of the loop move apart to tune the loop.

Richard, K8NDS posted videos of his helically loaded magnetic loops at www.youtube.com/watch?v=2YpyLAULKqg. I used this design for my low frequency loop because the helical winding adds inductance to the loop, enabling it to tune lower in frequency than a loop made of copper tubing or metal strip. My loop that tunes from 3 to 10 MHz, is about 1,6 M diameter but behaves like a loop of about 3 m in diameter. It is so easy to get some PVC tubing and elbows that enables one to make an octagonal loop. You just have to cut the straight pieces to length, lay it on a flat surface and glue them together using PVC cement. Here is a picture of my loop *(page 41)*.

Getting the copper strip is a problem. I was fortunate that a friend had some copper strip from transformer windings that he gave me. It took an eight-metre length to wind my loop. One can buy slug tape on eBay that will work, but it is a bit thin and skin effect may come into play. But one could use two layers to increase thickness.

The tuning capacitor: Wherever possible I would recommend using a butterfly capacitor. These can be

(Continued on page 43)



(So, you want to build a magnetic loop from page 42)

rotated through 360 degrees avoiding the necessity of end stops. But the voltage across such a capacitor is quite a lot, depending on how much power one runs. For receiving only, a capacitor with close plate spacing is sufficient. I see there is a video on Youtube where an amateur uses ceramic tiles with aluminium foil in between to make a fixed capacitor with high voltage specifications. I have also seen a capacitor with glass between the plates to increase capacitance. The dielectric constant of window pane glass is around eight, giving eight times the capacitance as for one with air between the plates.

Many people go for vacuum variable capacitors for magnetic loop antennas. They have the advantage that they have a lot of capacitance together with high voltage ratings. But they have one disadvantage, the shaft for tuning the capacitor has to be rotated many times to go from minimum to maximum capacitance. The one on my magnetic loop needs 23 turns. One has to be careful not to damage the capacitor by turning the shaft too much.

I solved this problem by attaching a 10:1 gearbox to the shaft and a three-turn potentiometer and then designing a circuit that indicates on a panel meter what the position of the vacuum capacitor is. The meter needed a nonlinear scale and I had to purchase a small program for printing meter scales to solve this problem.

One needs a motor to rotate the capacitor shaft and in the beginning, I used a small 12 V DC motor and gearbox that was intended for remote control of window curtains and similar installations. It was easy to implement because I only had to vary the voltage to vary the speed and a switch to change the direction of rotation. Later I replaced the DC motor with a stepper motor and this was for this reason. I found a posting on the Internet by Loftur Jonasson https://sites.google.com/site/lofturj/to-automatically-tune-a-magnetic-loop-antenna.

My idea was to implement his design later. In my opinion, the greatest disadvantage of the magnetic loop antenna, is the narrow bandwidth of the antenna, necessitating the retuning of the loop every time

(Continued on page 44)

((So, you want to build a magnetic loop from page 43)

the radio's frequency is changed. But on the other hand, what other kind of antenna is there that can cover such a wide frequency band with such good SWR as a magnetic loop antenna!

There is another posting on Youtube by Tim, G4WIM, www.youtube.com/watch?v=lMzEijSj6G0 that is interesting . Tim also tunes his loop automatically, but he also rotates the coupling loop to obtain perfect SWR and he illustrates this in his video. I found this interesting because I had struggled to get the SWR of my loop below 3:1. Until I came across another video by K9RLW on improving the efficiency and SWR of a loop considerably www.youtube.com/watch?v=2RDtm6qXjuI.

The new coupling loop

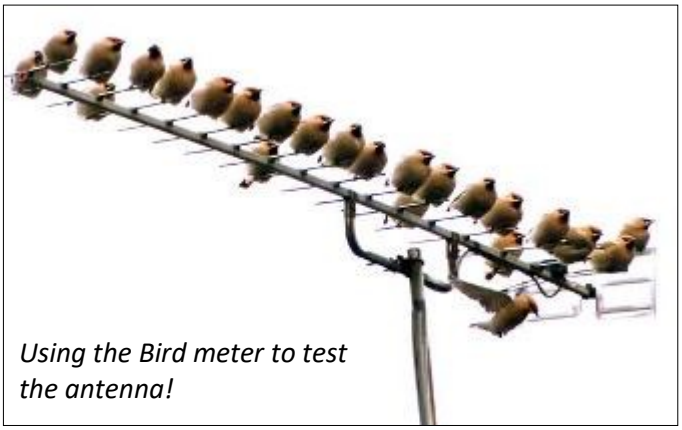
It turns out that the position of the coupling loop is critical, not the other way round as many people state. Michael, K9RLW found that when he places the coupling loop close to the main loop and deforms it so that a greater part of the coupling loop is closer to the main loop, it improves efficiency considerably. I promptly made a new coupling loop for my antenna, using 50 mm wide aluminium strip instead of 6 mm copper tubing and I get more signal from the antenna than before and the SWR is now 1:1 on the 80 and 40 m bands, 1:1 on 9 MHz and 3,2 on 10 MHz, a great improvement.

Whenever one designs a magnetic loop antenna, one needs to calculate some things. Use this program www.66pacific.com/calculators/small-transmitting-loop-antenna-calculator.aspx

Fill in the minimum and maximum frequency that you would like, other details and the program will tell you what is possible. It is not possible to have too wide a frequency range on one antenna, in my case I have to use two antennas to cover the complete HF band except 160 m.

My MFJ antenna is inside a small back yard behind my house. The DIY low frequency loop stands inside my garage. I tried moving it outside but there was no noticeable change in signal strength. The MFJ's control signal goes through the same coax as the signal, but when one uses a stepper motor, more conductors are needed.

If one has enough space, I would choose conventional wire dipoles and Yagis above magnetic loop antennas but when you are in a restricted space or where antenna restrictions are in place, the magnetic loop antenna is a good compromise. I tried using the metal gutter and a loop antenna in my garage roof, but the magnetic loop outperforms them any day. My next loop will probably be mounted horizontally just under the garage ceiling. That way it will not take up any useful space at all! On page 43 is a photo of such a loop courtesy Curt, WR5J.



Using the Bird meter to test the antenna!

"Antenna, my dear? What antenna?"
Curt W Black, WR5J, and his magnetic loop on the ceiling

(CubeSats from page 16)

of our planet as seen from low-Earth orbit www.amsat.org/tlm/fox1d/images/index.html.

Meanwhile, the French PicSat CubeSat, which launched on the same flight as AO-92, is aimed at observing the transit of the young exoplanet Beta Pictoris b in front of its bright and equally young star Beta Pictoris, both some 63 light years away and at demonstrating an innovative technological concept to use optical fibre for astronomical observations from space.

Artist's conception of the PicSat CubeSat in orbit

The CubeSat's embedded Amateur Radio FM transponder will be available when possible during the mission. The uplink is 145,910 MHz (1 750 Hz tone in amateur mode), and the downlink is 435,525 MHz 9,6 kb BPSK AX.25 data and FM voice when in amateur mode. The PicSat website includes a description of the telemetry and related information https://picsat.obspm.fr/data/telemetries?locale=en.

The PicSat team has requested Amateur Radio assistance to capture and upload telemetry packets from the satellite https://picsat.obspm.fr/contributing/send-packets?locale=en. "Beacons received from all over the world are especially useful to monitor the status of satellite along its orbit," the PicSat team said.

SA Maritime Net

The South African Maritime Net operates 7 days a week, and provides weather reports from around the coast and maintains contact with boats off the coast of South Africa and up into the Mozambique channel. There are two regular schedule times as follows:
06:30 UTC - starts on 14 316 kHz for 5 to 10 minutes and then moves to 7 120 kHz.
11:30 UTC - starts on 14 316 kHz for approximately 30 minutes and then moves to 7 120 kHz.

Homebrew APRS – Arduino Uno KISS TNC

Daniel L. Phillips, VK3DAN

So, what's all this about?

Last week I was looking on eBay at what rigs and equipment was around and found some transceivers with APRS http://aprs.fi/ and thought "I do not have anything that can do APRS, that could be handy when I go out to the bush and there are no mobile phone towers in range, say if I got stuck. These prices are a bit high for something I would not use much though."

So, then I looked at APRSdroid https://aprsdroid.org/ and saw that it can be connected to a radio, either directly (but you have to use Vox) or via a TNC. I looked at TNCs online and saw not only that they can be expensive but that there is not much to them and went looking for some ideas on building one.

I have several Arduinos http://arduino.cc/ here and figured this would be a good starting point. But figuring out how to not only generate the 1 200 baud AFSK signal but also receive it and process it looked pretty hard. Luckily some people have done this work for us… So, let us not waste any more time figuring that out.

Among various projects the MicroModem http://unsigned.io/projects/micromodem/ and MicroAPRS http://unsigned.io/projects/microaprs/ projects stood out and I went shopping for a shield proto board and a couple components I was short of.

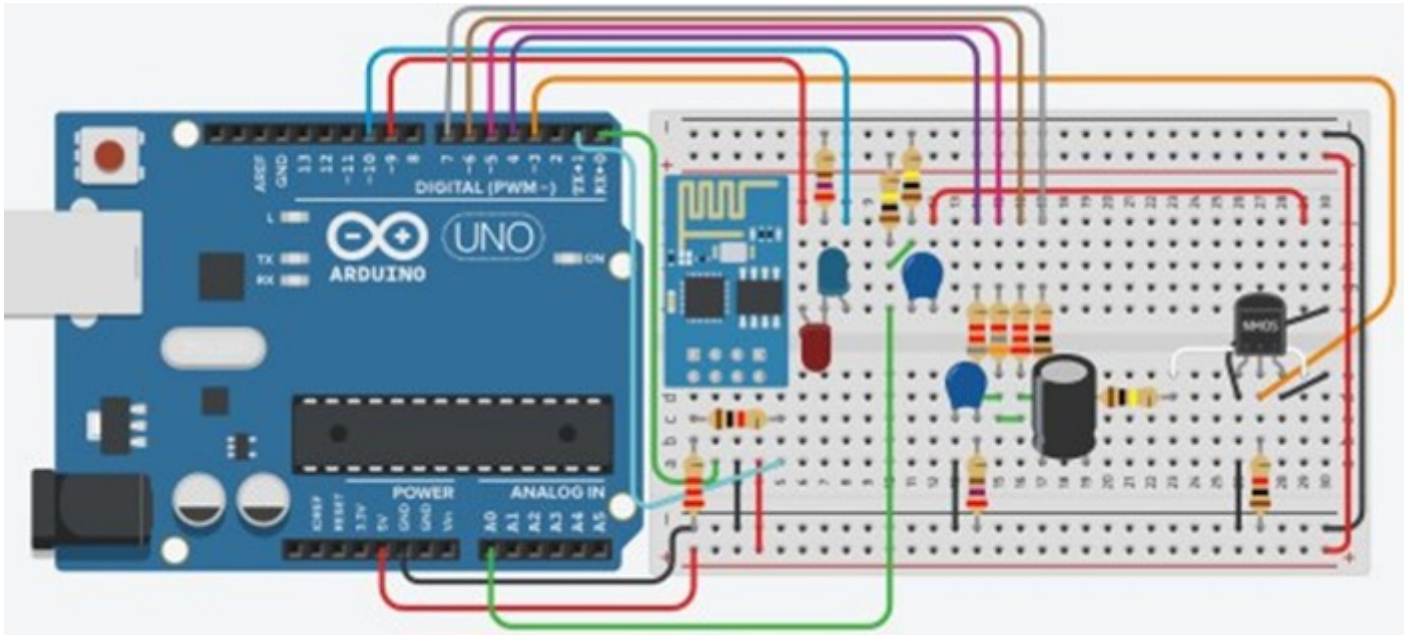
What do I need if I want to do this?

- Amateur radio licence (in Australia, Standard or Advanced ONLY)
- A 2 m FM Transceiver (I used a cheap Baofeng GT-3TP)
- Arduino. This can be any 16 MHz (Important) Atmega328p based board like the UNO, SparkFun RedBoard etc.
- A protoboard/protoshield/breadboard/whatever… somewhere to build the components. I would suggest a shield format as it allows you to disconnect the board in 1 hit from the Arduino
- 1 x Bluetooth module (HC06)
- Some wire
- Soldering iron
- Solder
- 1 x 2N7000 MOSFET
- 2 x 270 Ω resistors
- 3 x 1 kΩ resistors
- 2 x 2.2 kΩ resistor
- 1 x 3.9 kΩ resistor
- 1 x 8.2 kΩ resistor
- 1 x 10 kΩ resistor
- 3 x 100 kΩ resistor
- 1 x 100 nF ceramic capacitor
- 1 x 1 µF ceramic capacitor
- 1 x 4.7 µF electrolytic capacitor
- 1 x LED for TX and 1 x LED for RX or 1 x RGB LED (I used an RGB led with blue RX, red TX)
- 1 x 2.5 mm and 1 x 3.5 mm TRS plugs and some nice headphone lead or a pre-wired Speakermic lead (this is for Baofeng, Kenwood handheld radios, etc. other radios will have different connectors)
- 1 x 3.5 mm TRRS plug and socket (Optional but nice, I have not done this yet, but I probably will)

Okay, I have all that, now what?

If you can follow it, I have made a circuit on Tinkercad www.tinkercad.com/things/e3Oyrllile1-micromodemmicroaprs-for-arduino-uno

(Continued on page 47)



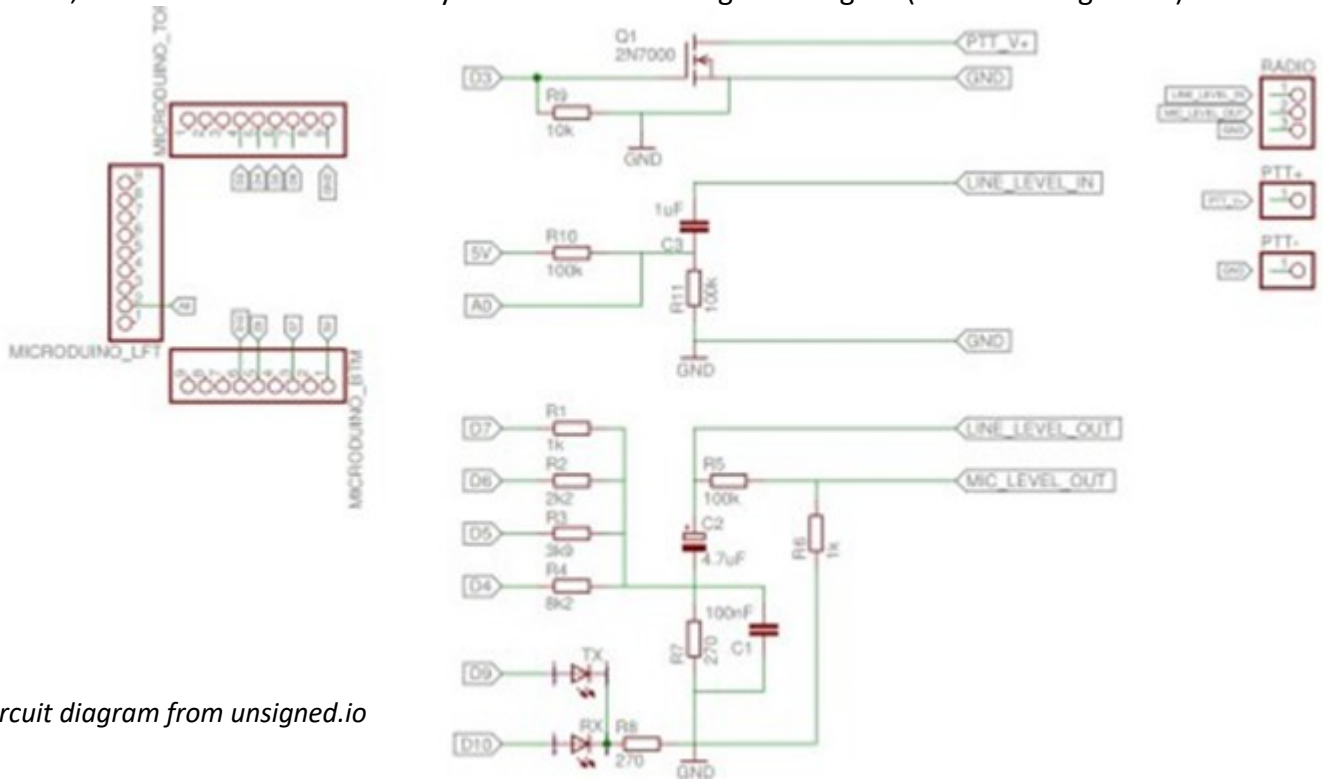
MicroModem breadboard on Tinkercad

(Homebrew APRS – Arduino Uno KISS TNC from page 46)

On the breadboard shown above, 29 h is the audio input and so goes to the speaker pin of the radio (for the Baofeng this is the Tip of the 2.5 mm TRS plug) and 30 h is the ground (and the PTT GND) and it goes to the shield (GND) of the same plug.

29 b is the audio output and so goes to the mic pin of the radio (For the Baofeng this is Ring of the 3.5 mm TRS plug) and 3 0b is the Ground (and the PTT+, so do not ground this wire in the circuit, as it will trigger PTT, that's what the MOSFET is for, it will ground this line when we are transmitting, causing the radio to go into transmit mode and also providing the ground for the TX signal.)

Also, here is the circuit it basically follows from the original designer (Mark at unsigned.io):



Circuit diagram from unsigned.io

After you have built it, in whatever form you choose to, you will need to remove your circuit from the Arduino (This is why the shield configuration is easiest). You cannot upload reliably to the Arduino with the Bluetooth module connected as it interferes with the USB serial data, they are parallel to each other.

Now, download the hex file and load it into your Arduino

https://github.com/markqvist/MicroAPRS/raw/master/precompiled/microaprs-5v-kiss-latest.hex

(Continued on page 48)

(Homebrew APRS – Arduino Uno KISS TNC from page 47)

How the hell do I do that?

If you are on Windows and have the Arduino IDE installed, open a Windows Command Prompt. You will have to change the Arduino folder to wherever you installed it, the COM port to match the one your Arduino shows up as and Download folder to wherever you saved the hex file C:\Arduino\hardware\tools\avr\bin\avrdude -v -v -v -v -patmega328p -carduino -P\\.\COM3 -b115200 -D -Uflash:w:C:\Downloadfolder\microaprs-5v-kiss-latest.hex:I

If this works, you can unplug the Arduino from the computer, put your shield back on, plug it into power, and your radio and if you did everything right… Nothing happens.

Oh yeah, you have to download and set up APRSdroid https://aprsdroid.org/ on your phone. Then in your phone's settings, pair with HC-06, or whichever Bluetooth name appears when you turn on your new device.

Go into preferences in APRSdroid and set it up with your call sign and which picture you want and your other details and then go to "Connection Preferences". Select "Connection Protocol" and choose "TNC (KISS)", Connection Type should be "Bluetooth SPP". Client Mode should be checked, now select "TNC Bluetooth Device" Pick your new device from the list and APRSdroid is ready to roll (it will automatically connect from now on).

Turn your radio on and tune it to your region's APRS frequency (Australia is 145.175 MHz), and hit "Start Tracking" on the main screen in APRSdroid.

You should now be able to find yourself on aprs.fi shortly after your signal is transmitted. You may have to play with the radio's volume knob to get a level the TNC likes for successful decoding of other people's signals.

Screenshot of what I received from others on my way home from work

Okay, your instructions suck

Where can I find more information from someone I can understand? unsigned.io at http://unsigned.io/ is the place to go to find more information.

However, the circuit diagram above is lifted direct from Mark's website or the linked Github (cannot remember which) and it was the closest I could find to instructions. Between the two circuit pictures above there should be enough information for most people who are interested in building radio gear to make it work.

Note I did not design the TNC, all I did was build it and add Bluetooth and write up this blog post. Credit to Mark from unsigned.io for doing all the hard work.

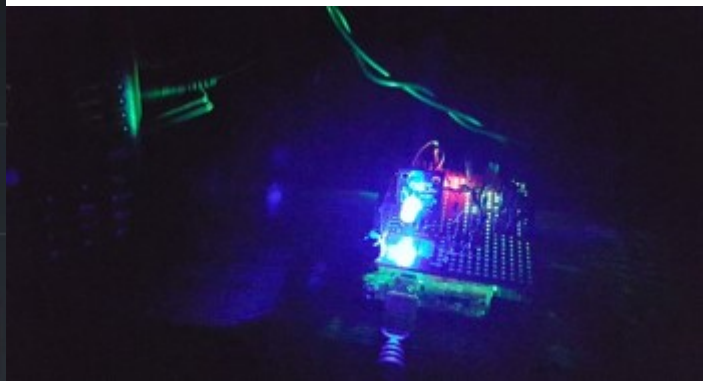


Photo of my TNC in the dark

Five Band Indoor Magnetic Loop Aerial

Pete Robinson, G4IZH

Thank you to Harold Krause, ZS6CAR for this article.

This aerial covers the 20, 17, 15, 12 and 10 metre bands and is made from a single 3 metre length of 22 mm copper tube cut into 4 pieces of equal length and joined in the corners with 90-degree elbows. Some plumbing skills are required here as you will need to use a blow torch with plumber's solder paste and solder so do not attempt this part if you do not have the required confidence and equipment. The pictures below show the full story at each stage of construction.

The wide spaced tuning capacitor being used is a very old 200 pF + 200 pF type, but the fixed vanes are connected in series, the moving vanes will not be connected at all therefore the capacitance can be varied from about 7 pF min to 100 pF max. The minimum capacitance is important as it is this that determines the highest frequency that the loop can be resonated at. The tube at the opposite side to the gamma match is marked in the middle and then the tuning capacitor positioned; an equal amount cut off to exactly accommodate the tuning capacitor used so that direct connections can be made. The dimensions of the gamma match are quite critical to achieve a good match on each of the bands covered, it is made from 8 mm micro bore heating pipe. The tuning capacitor is driven by a geared down motor which produces 2 rpm at 12 volts. There is a wire wound 10 k ohm pot employed which is inserted between the motor and the tuning capacitor isolating coupler which sends the required information back to the shack to drive a moving coil meter which can be calibrated in frequency. The loop covers from 14 to 29,7 Mc/s and presents a one to one SWR throughout.

I believe MFJ are the only commercial manufacturers of these, but they are VERY expensive!

The main problem with mag loops is that they are very high Q and need to be re tuned even for a relatively small change in frequency, so a motorised tuning capacitor arrangement is most definitely required.

The big advantages are that they can be used indoors, are small and it is possible to cover quite a few bands with the same loop, they also tend to pick up less locally generated noise. The loop does have directional properties and can be used in the vertical or horizontal mode.

This mag loop will of course work well outside but quite a bit of thought will need to be put into its

(Continued on page 50)

These are the 4 pieces of tube and 90-degree elbows ready to be soldered together. The SO-239 socket is fitted in the centre of one of the tubes, you will notice that the tube needs to be "crushed" enough to accommodate the socket.

This is the loop soldered together.

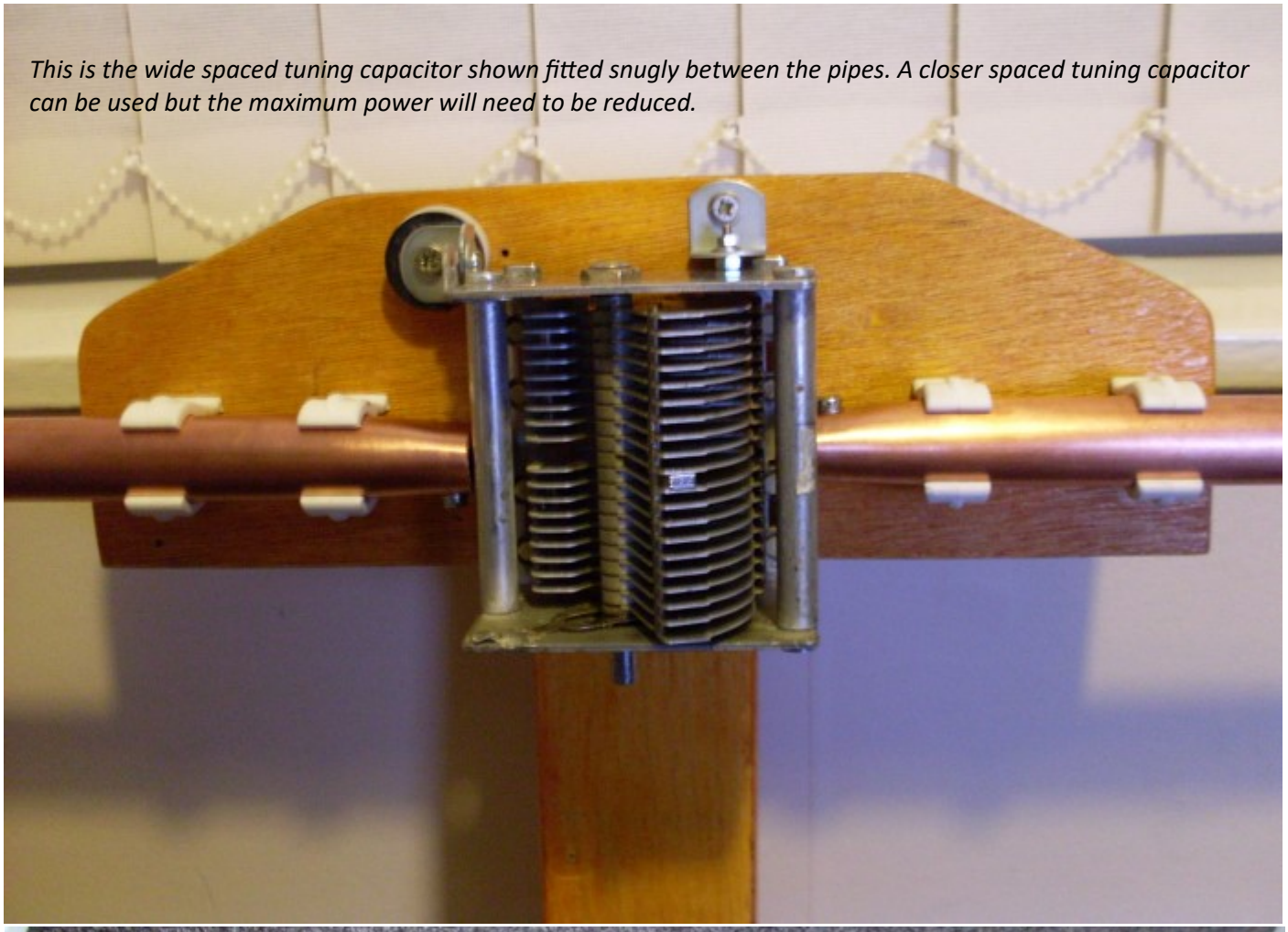
(Five Band Indoor Magnetic Loop Aerial from page 49)

weather proofing.

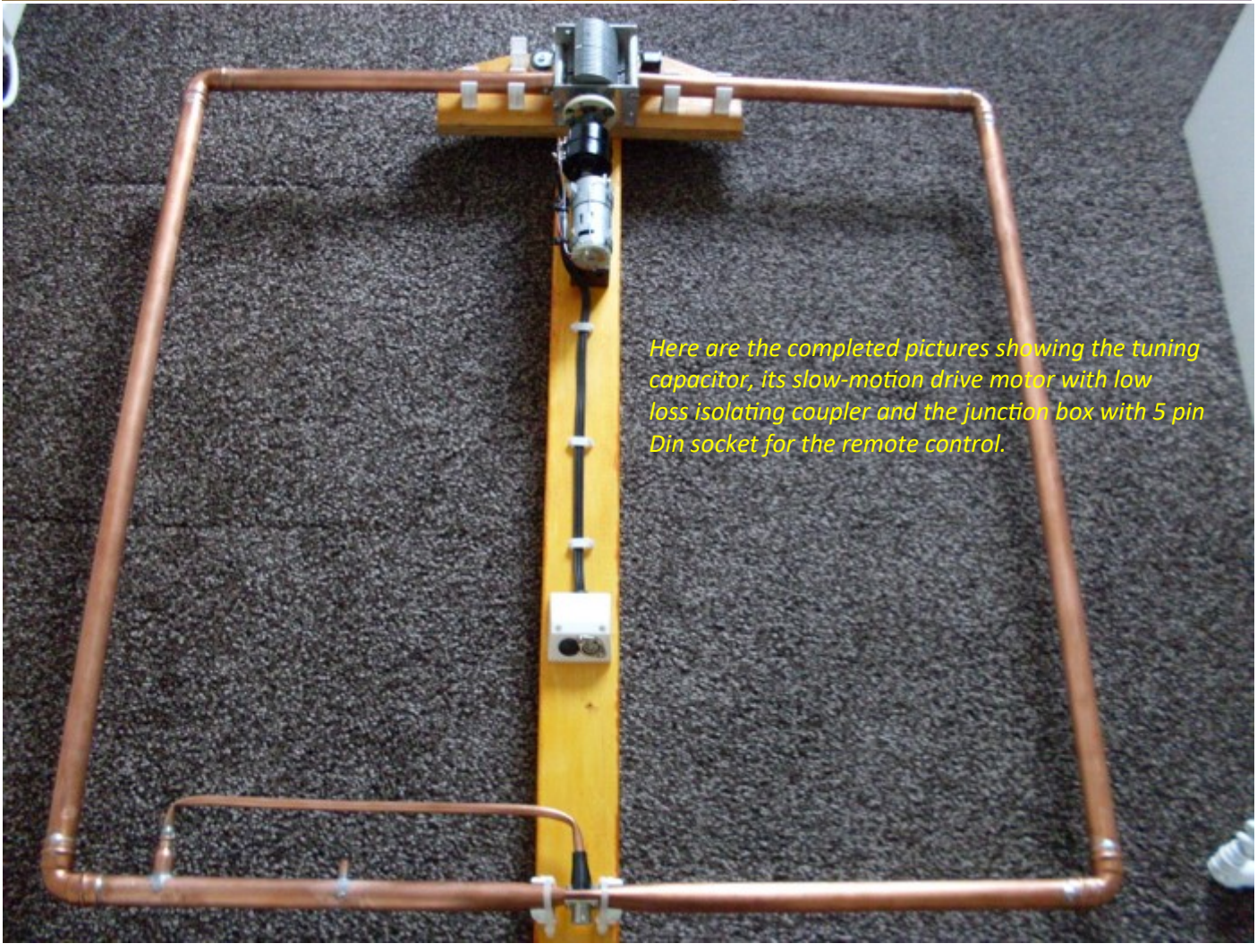
Here is the finished feed arrangement showing the SO-239 socket and the gamma match the dimensions of which are 300 mm long (horizontal portion) with a spacing from the 22 mm tube of 55 mm, the gamma match tube is 8 or 10 mm micro bore pipe. It has been wisely pointed out to me that the kink in the micro bore tubing can be avoided by filling the tube with sand before bending, it makes no difference to the operation of the gamma match, but it will certainly look better.

(Continued on page 53)

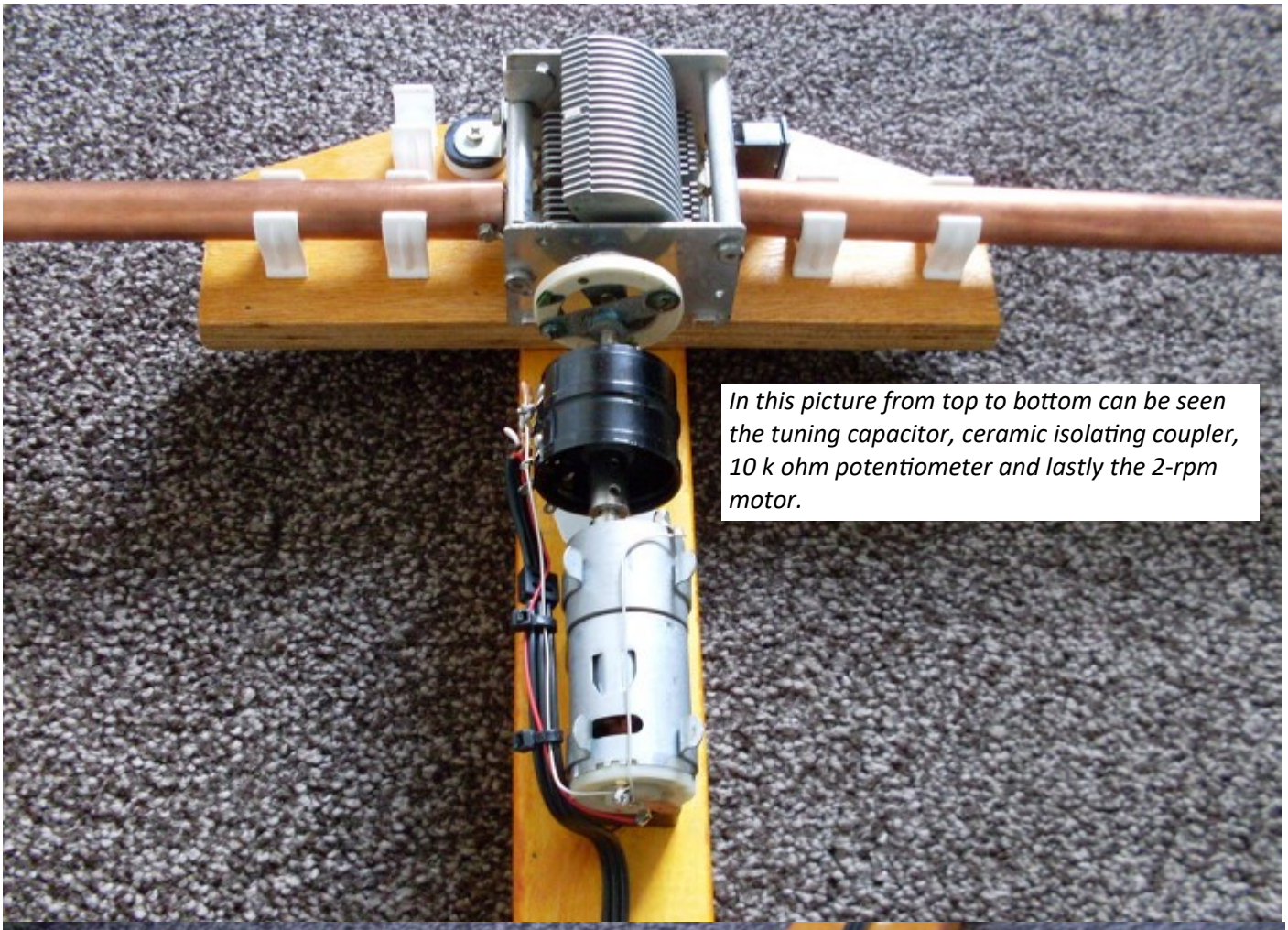
The finished feed arrangement



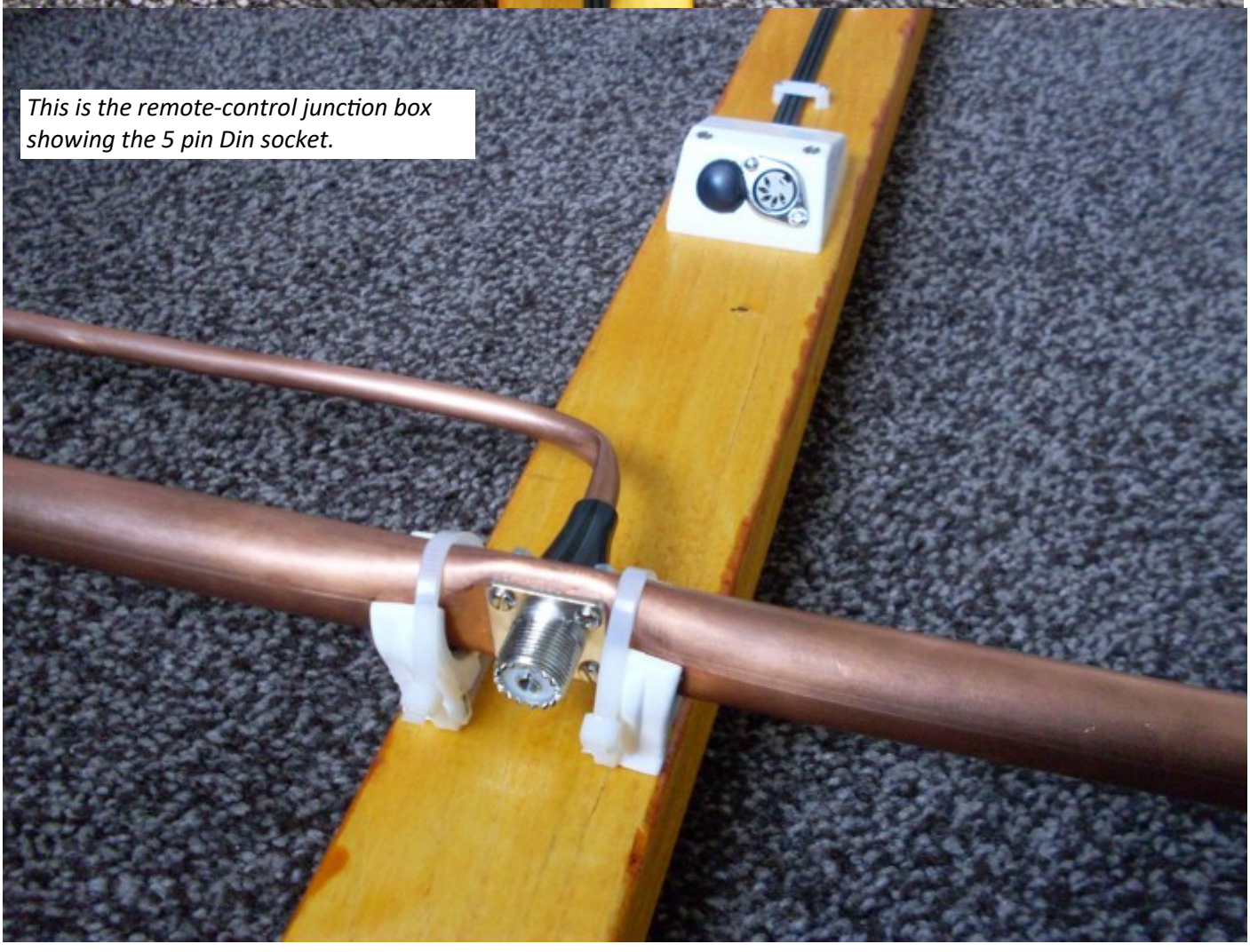
This is the wide spaced tuning capacitor shown fitted snugly between the pipes. A closer spaced tuning capacitor can be used but the maximum power will need to be reduced.



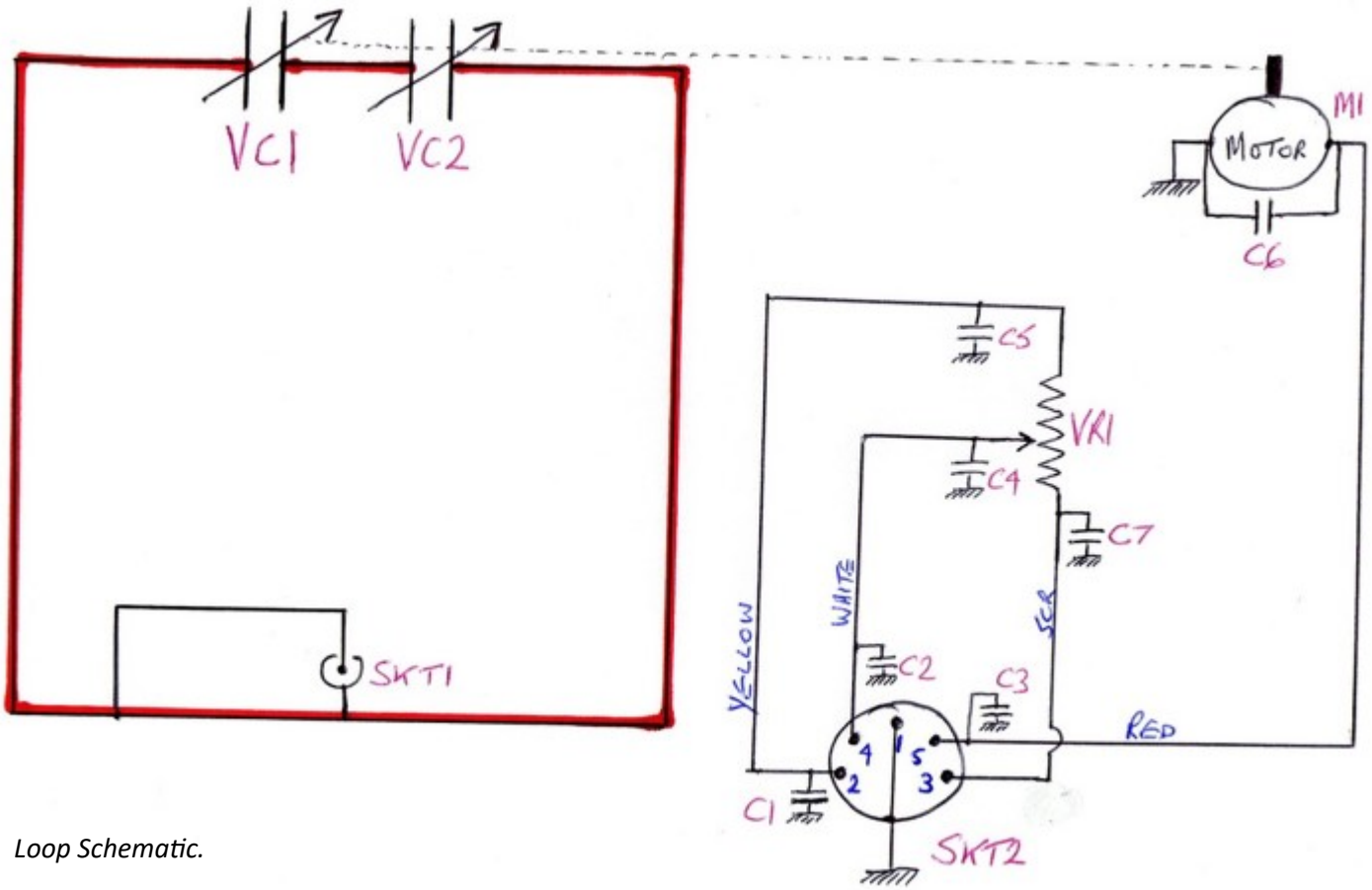
Here are the completed pictures showing the tuning capacitor, its slow-motion drive motor with low loss isolating coupler and the junction box with 5 pin Din socket for the remote control.



In this picture from top to bottom can be seen the tuning capacitor, ceramic isolating coupler, 10 k ohm potentiometer and lastly the 2-rpm motor.



This is the remote-control junction box showing the 5 pin Din socket.



Loop Schematic.

(Five Band Indoor Magnetic Loop Aerial from page 50)

Parts List

VC1/VC2 - 200 + 200 pF Wide spaced tuning capacitor
C1 to C7 - 1n 1kv wkg disc ceramic
SKT1 - SO-239 Socket
SKT2 - 5 pin DIN 180 deg socket
VR1 - 10 k-ohm linear w/w pot
M1 - 2 rpm at 12 v motor (from China)

See text for loop and gamma match details. The motor as obtained from a Chinese supplier on E Bay and was under £10 including delivery. The motor produces very high torque with no backlash and is ideal for this purpose. Just as an illustration here are the motor parameters at 3 and 6 volts.

This is the simple remote control without any frequency indicator. The UP/DOWN buttons can be seen below their associated LED indicators. The batteries for the motor are enclosed within the control.

Minimum to Maximum tuning time at 6 v is 30 seconds @ 33 mA

Minimum to Maximum tuning time at 3 v is 65 seconds @ 30 mA

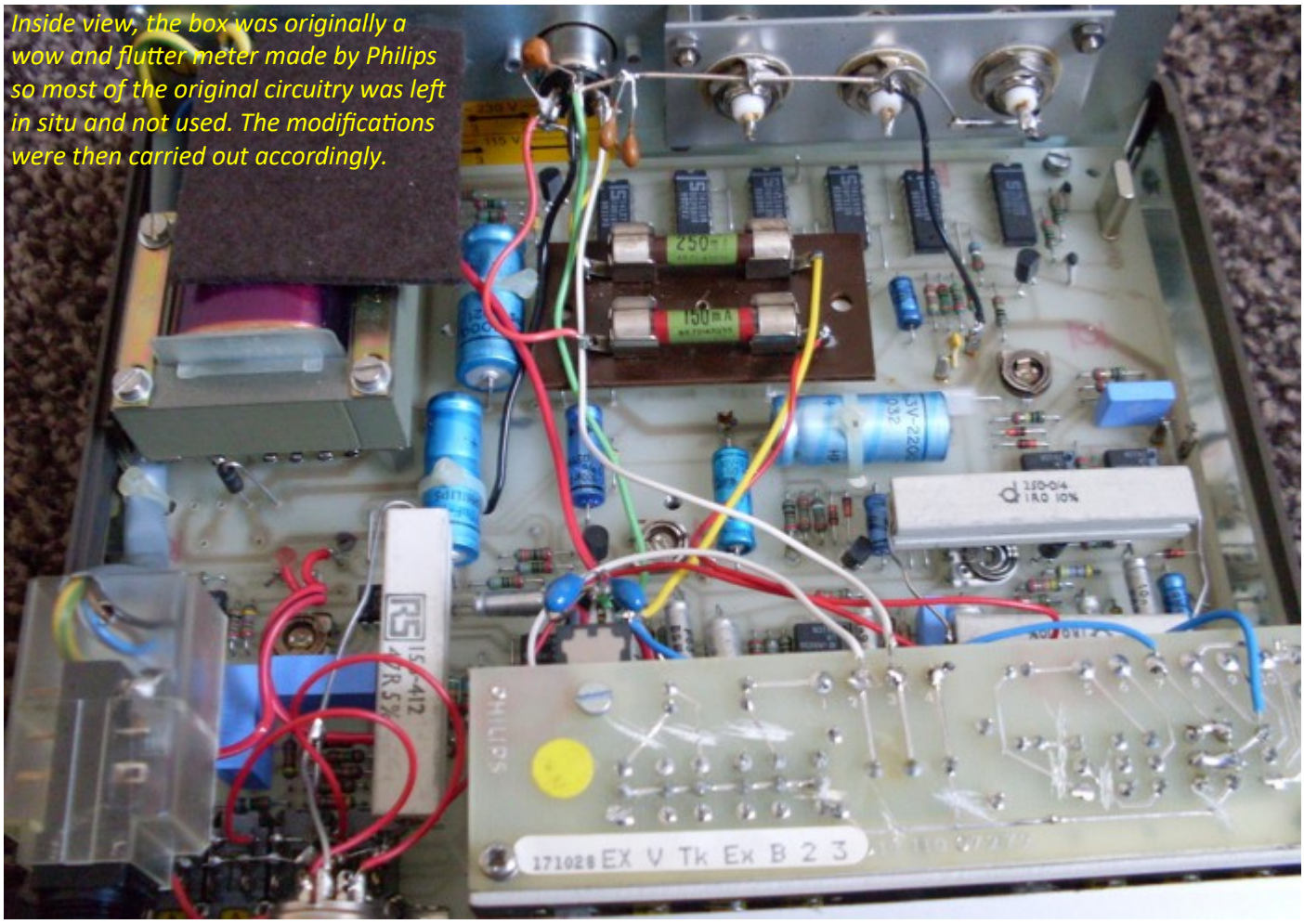
When the motor is stalled, i.e. Min or Max travel the current increases to 48 mA at 6 v and 40 mA at 3 v

Control Unit

The schematic diagram of the control unit appears on page 39. Note that the values of the M2 meter shunt resistors R3 and R4 are determined by the type of meter being used.

(Continued on page 55)

This is the control unit front panel view. The centre zero meter on the left reads motor current and the one on the right is for tuning capacitor position which with the aid of a small conversion chart indicates frequency. The four buttons to the right of the meters are for fast and slow tuning and the DIN socket below is where the mouse is connected to enable easy fine tuning when the unit is shelf mounted.



Inside view, the box was originally a wow and flutter meter made by Philips so most of the original circuitry was left in situ and not used. The modifications were then carried out accordingly.

(Five Band Indoor Magnetic Loop Aerial from page 53)

Ensure that the pre-set pot VR2 is initially set to MAXIMUM resistance or you will end up with a bent pointer. A digital voltmeter can be used in place of M3, VR2 and VR3 and this will provide a more accurate positional guide for the operating frequency.

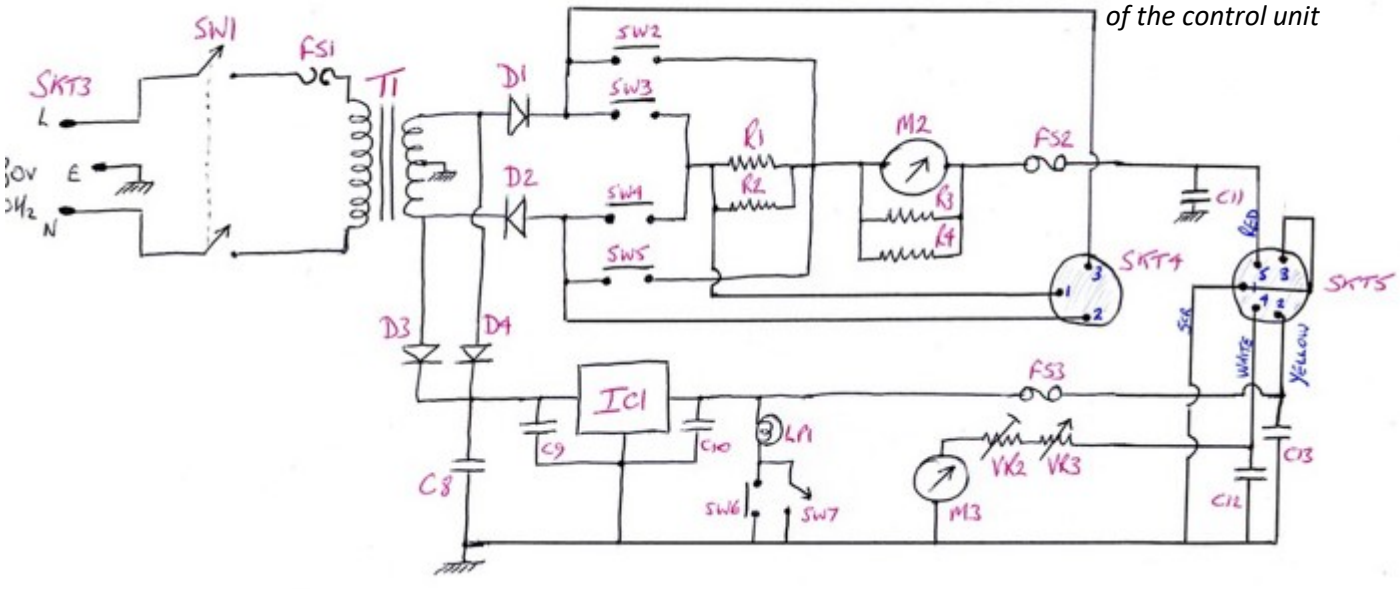
Here are the connecting leads required from left to right, mouse with 5 pin Din plug fitted, IEC mains lead and 5 metre long Din lead.

Control Unit Parts List

T1 - Mains transformer, pri 230 v 50c/s, sec 15-0-15 v at 500 mA
LP1 - 16 v tube lamp (meter illumination)
SKT3 - IEC chassis mounting mains plug
SKT4 - 3 pin 180 deg Din socket (mouse socket)
SKT5 - 5 pin 180 deg Din socket (control lead socket)
SW1 - 2 pole push button power mains switch
SW2 - Mom push switch (FAST c/w)
SW3 - Mom push switch (SLOW c/w)
SW4 - Mom push switch (SLOW c/cw)
SW5 - Mom push switch (FAST c/cw)
SW6 - Mom push switch (meter lamp)
SW7 - Latch push switch (meter lamp)
FS1 - Thermal fuse (part of T1)
FS2 - 250 mA fuse a/s
FS3 - 250 mA fuse a/s
D1 - 1N4001 diode
D2 - 1N4001 diode
D3 - 1N4001 diode
D4 - 1N4001 diode
M2 - Centre zero m/c meter (approx 1 mA fsd)
M3 - m/c meter (approx 1 mA fsd)
R1 - 47 ohm 5 watt w/w
R2 - 220 ohm 5 watt w/w
R3 - 1 ohm * (sot for meter type being used)
R4 - 1 ohm * (sot for meter type being used)
VR2 - 500 k ohm lin pre set pot (meter sensitivity)

(Continued on page 56)

The schematic diagram of the control unit



(Five Band Indoor Magnetic Loop Aerial from page 55)

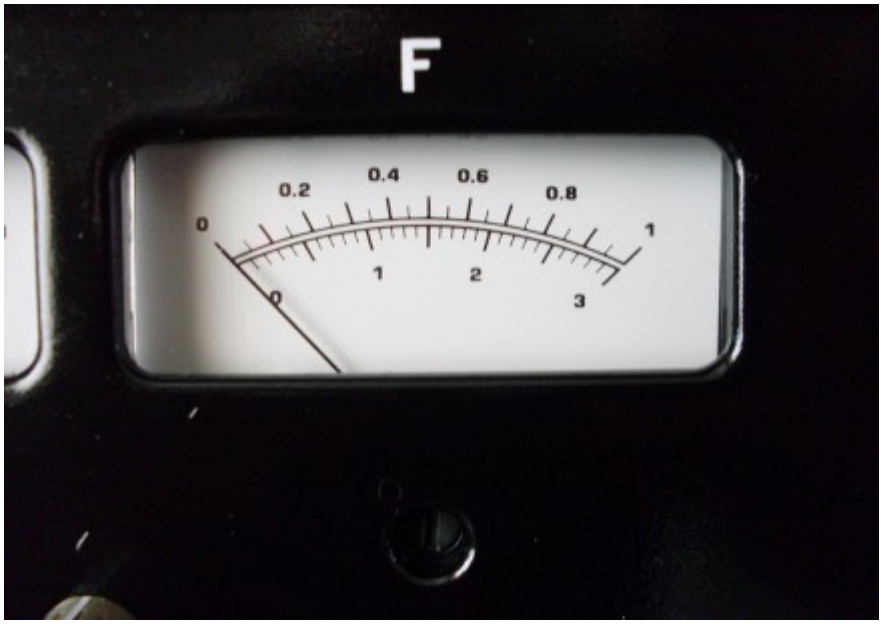
VR3 - 10 k ohm lin pot (fsd calibration)
C8 - 1 000 micro farad elec cap 35v wkg
C9 - 4.7 micro farad elec cap 35v wkg
C10 - 4.7 micro farad elec cap 16v wkg
C11 - 1n disc cer cap 1kV wkg
C12 - 1n disc cer cap 1kV wkg
C13 - 1n disc cer cap 1kV wkg
IC1 - UA7812 regulator ic (no h/s req)
5 pin Din to 5 pin Din control connecting lead at required length
IEC mains power lead (fused at 2 amps max)
PL-259 to PL-259 coax aerial connecting lead at required length

Control Unit Specifications

As can be seen from the schematic diagram the control unit is mains operated. The front panel contains four momentary push buttons to the right side of the meters, these are for tuning HF and LF at two speeds, the fast mode is for changing band rapidly and the slow mode is for precise tuning. In the fast mode it only takes 10 seconds to move from 14 to 29,7 Mc/s, or vice versa of course. Additionally, the slow mode is available using the external mouse which sits on your operating desk, this plugs into the Din socket on the front panel which makes quick QSY very easy.

The left meter reads motor current and is therefore a centre zero type. The meter on the right is calibrated 0 to 100 and with the use of a simple conversion chart reads frequency, the meter can of course be calibrated to read frequency directly, the meter is reference calibrated at 14 Mc/s (“50" on my meter) using the small pot (VR3) seen between the meters.

The loop can be made to operate well on the 30, 40 and 60 metre bands also by fitting an additional capacitor across the VC1/VC2 combination, the value of this capacitor needs to be about 140 pF for 40 metres which of course must be removed when using the 20 to 10 metre bands. Because the voltage is very high at this point even when running only about 10 watts I found that the use of a coaxial capacitor to be the simplest option. No problems were found running 100 watts which is all I have ever used on the HF bands. The coaxial capacitor is simply a 56-inch length of UR67 coax cable with suitable tails and crocodile clips to fit across the variable tuning capacitor, at the other end of the cable the outer screen should be cut back about an inch to prevent any flash over. Do not be tempted to wrap this coax into a coil because that would of course introduce inductance and would affect the overall loop efficiency and increase the SWR. Fine tuning on 30, 40 and 60 metres is performed by tuning VC1/VC2 in the same manner as for the other bands, a one to one SWR was obtained.



This is a close-up of the meter which indicates the position of the tuning capacitor and with the conversion chart shown below gives frequency.

If the value of VC1/VC2 was increased to say 500 + 500 pF then the 30 and 40 metre bands would be covered without any additional capacitor. The problems with this are, a) its physical size of the capacitor would be very large and much more difficult to accommodate, b) it would be even more expensive and c) the fine tuning on each band would be much more critical which is not at all desirable.

(Continued on page 57)

The Mag Loop's final resting place, in the loft, it is supported by just two plastic clips

(Five Band Indoor Magnetic Loop Aerial from page 56)

I have now modified the loop to also operate on the 30,40 and 60 metre bands using a solenoid controlled swinging arm which brings in the additional tuning capacitors. It may seem odd having to use a swinging arm in this manner, but switches and relays cannot be used here as the additional capacitance would upset the 10 to 20 metre operation. Its overall efficiency is of course reduced on the three lower frequency bands but at least it is now a 9-band loop. I am not going to show the detailed constructional details as this is down to the builder's preferences but below are two pictures which show how the additional capacitors are introduced to the loop by the swinging arm arrangement.

This picture shows the "MF adaption" disengaged

There are of course many changes that could be made to the shape of this loop, it can

(Continued on page 58)

This is with the "MF adaption" engaged

(Five Band Indoor Magnetic Loop Aerial from page 57)

be given eight sides instead of four or it could be formed into a circle which should increase its efficiency by about 10%.

Best of luck building this loop but do not forget that VERY high voltages exist in the area of the tuning capacitor even when only running a few watts so take great care in the loops positioning keeping it away from humans and pets.

Advertising in Radio ZS and on the SARL web site

Radio ZS welcomes advertising. It is a source of information for readers. To place an strip advertisement in Radio ZS, contact the Editor at radi-ozs@sarl.org.za. To advertise on the League web site, contact Hans, ZS6AKV at artoday@sarl.org.za.

Terms and conditions

All contract advertisements content may be changed monthly on 5 working day notice

The rates are based on the complete supply of material in Jpeg unless otherwise negotiated. For artwork additional charges may apply as agreed

The content of the advertisements must comply with regulations and norms acceptable in South Africa

All advertisements are playable in advance by EFT to SA Radio League, ABSA, account no 4071 588 849 branch code 632 005.

All correspondence and material must be sent to admin@sarl.org.za with a copy to artoday@sarl.org.za for web adverts or radi-ozs@sarl.org.za for strip adverts

Advertising Rates	Per Month	Per Six Months	Per Annum
Display (cameo) on the home page (www.sarl.org.za) and a Radio ZS Strip advert	R500	R2 500	R4 500
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What is Amateur Radio?

From John Cunningham, W1AI, and changed for the local scene

Amateur radio is a fun and exciting hobby including a vast array of activities:

- Talking around the world without wires.
- Talking locally through repeaters.
- Emergency communications.
- Public service communications.
- Contests and awards.
- Legacy communication modes like Morse code and Radioteletype (RTTY).
- New communication modes like digital packet, Automatic Position Reporting System (APRS) and spread spectrum.
- Amateur radio satellites in space.
- Foxhunting (using "radio direction finding" techniques to find a hidden transmitter).
- Moonbounce (talking by bouncing radio waves off the moon).
- And much, much more...

Amateur radio operators are allowed to use to every mode of communication: AM, FM, CW, SSB, RTTY, SSTV, ATV, Packet and a hundred others you've probably never heard of. We have privileges all across the radio spectrum, from shortwave to microwave. We routinely talk to other amateurs across the globe, from Antarctica to Greenland, from Afghanistan to Zimbabwe, all without breaking a single law.

Licensing requirements

To use amateur radio, you must pass a written examination and practical assessment before being assigned a call sign from the Independent Communications Authority of South Africa (ICASA). ICASA currently issues two different classes of amateur radio license: Class B (Novice) with a ZU prefix and Class A with a ZR or ZS prefix. For example, my call sign is "ZS4BS", I am the only licensed radio operator in the world with that unique call sign. Until recently you also had to pass a Morse code exam to get an amateur license, however, the International Telecommunications Union (ITU) did away with that requirement a few years ago. There are no more Morse code tests! But Morse code is still a popular mode.

What can I do with it?

Amateur radio is basically a social hobby — whether you are talking around town, around the world, at club meetings or conventions, you'll be getting to know some pretty darn nice people!

Some amateurs enjoy collecting QSL cards, postcards from other amateurs confirming contacts around the world. Some go for awards, like the DX Century Club (DXCC), which means you have confirmed contacts with amateurs in 100 different countries, or the Worked All ZS showing that you have made confirmed contacts with 100 amateurs in the 6 call areas of South Africa.

Some go on DXpeditions, traveling and operating in obscure and remote locations, helping other amateurs get contacts with rare locations like Bouvet Island and Scarborough Reef. There's nothing like the excitement of being on the "pointy end" of a pileup! Or not so rare places like Lesotho or Swaziland.

Some amateurs like to experiment, designing their own radios or building them from a kit. Some experiment with radical new designs for antennas.

Some amateurs enjoy public service, providing communications support for events like the Cape Town Cycle Race or the Comrades Marathon. When large crowds of people try to use their mobile phones all at the same time, the cellular systems are swamped and unreliable, but amateur radio gets the message through.

Many amateurs are involved with emergency communications - when the primary communications networks go out, amateur radio operators are trained, equipped, ready and able to provide emergency communications. When all else fails, there is amateur radio!

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Swop Shop: Johan van Vuuren, ZS6JVV
Youth/Jeug: Koos Fick, ZR6KF

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 or mailed to The Editor, Radio ZS, PO Box 12104, Brandhof, 9324. The League cannot be responsible for loss or damage to any material. http://www.sarl.org.za/public/RadioZS.asp

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.

Policy on Club Advertising in the Radio ZS magazine

1. Each SARL affiliated club and Hamnet is eligible to place an advertisement of 1/4 page in Radio ZS.
2. The content of all advertisements shall be restricted to Club activities and shall not include any material of a commercial or personal nature.
3. The magazine covers (inside or outside) are not available for Club advertising
4. The location of advertisements inside the magazine is decided during the final layout process and no particular page, or position on a page, can be guaranteed.
5. The publication of the advertisement is always subject to the availability of suitable space, to be decided at the discretion of the Editor.
6. Where two or more affiliated Clubs are acting jointly in organising an event, one larger advertisement may be placed within Radio ZS, by combining the individual club concessions, up to a maximum of half-a-page. This concession is subject to space availability, but early booking can avoid that problem.
7. Clubs seeking to take advantage of this concession are advised to first discuss their requirements with the Editor of Radio ZS at radiozs@sarl.org.za.
8. It is strongly preferred that all advertising copy be delivered electronically by e-mail. All text material should be sent in Microsoft Word and diagrams/photos in tif or jpg format, to ensure that the original is faithfully reproduced during publication.
9. The Editor shall always have the right to reject, or require changes to, any advertising for any reason.