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WATTS

09-2010

Year 80 + 9m

Monthly newsletter of the Pretoria Amateur Radio Club
Maandelikse nuusbrieff van die Pretoria Amateur Radio Klub.



PARC, PO Box 73696 Lynnwood Ridge 0040, RSA



<http://www.parc.org.za> mail: zs6pta@zs6pta.org.za

Bulletins: 145,725 MHz 08:45 Sundays/Sondae
Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
Activated frequencies are announced prior to bulletins

Swapshop: 2m and 7.066 MHz Live on-air after bulletins
Bulletin repeats Mondays | herhalings : Maandae 2m 19:45



PARC 80th AGM

see report on p2



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Next Meeting

Date: 8 Sept 2010
Time: 19:30 for 20:00
PARC Clubhouse,
South Campus,
University of Pretoria.
SE cnr University and
Lynnwood roads.

PARC Management team / Bestuurspan Aug. 2010 - Aug. 2011 (provisional)

Committee members

Chairman, SARL liaison	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Viice-Chairman, Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za	012-567-3722	083-938-8955
Secretary, Rallies	Johan de Bruyn	ZS6JHB	chairman@parc.org.za	012-803-7385	082-492-3689
Treasurer,	Richard Peer	ZS6UK	treasurer@parc.org.za	012-333-0612	082-651-6556
Repeaters, Technical	Craig Symington	ZS6RH	craigsym@global.co.za		083-259-3233
Contests	Chairman & Pieter Human	ZS6PA	qsobox@gmail.com	012-800-2888	082-565-6081
Web Co-ordinator	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
Social	Doréen de Bruyn	ZR6DDB		012-803-7385	082-857-9691
	Willie Greyling	ZR6WGR	willie@up.ac.za		082-940-2490

Co-opted / Geko-opteer:

Auditor	Elma Basson				
Newsletter/Kits	Hans Kappetijn	ZS6KR	editor@parc.org.za	012-333-2612	072-204-3991
Asset control	Andre van Tonder	ZS6BRC	andre.vtonder@absamail.co.za	361-3292	082-467-0287
Klubfasiliteite, vlooiemark	Willie Greyling	ZR6WGR	willie@up.ac.za		082-940-2490
Rallies	Johann de Beer	ZR6YV		011-918-1060	082-857-1561
Rallies, Hamnet, Projects	Roy Newton	ZS6XN	newtonr@telkomsa.net	012-547-0280	083-575-7332
Training Co-ordinators	Fritz Sutherland	ZS6ASF	fritzs@icon.co.za	012-811-3875	083-304-0028
	Sander Wissing	ZS6SSW	sanderw@osisa.org		082-613-5498
Historian/Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Public relations	Willie Greyling	ZR6WGR	willie@up.ac.za		082-940-2490
	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za	012-567-3722	083-938-8955

80th AGM 2010

(this report is that of the editor as much as he could note = not the official minutes)

After preliminaries including Club matters pertaining to the past month the 79th AGM minutes were displayed, read and approved.



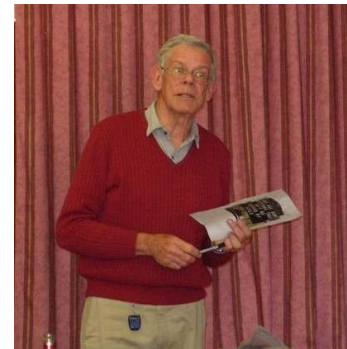
The Chairmans' report followed and Johan ZS6JHB reported no growth but satisfactory stability and thanked the Committee for their hard work.

Praiseworthy mention also went to Craig ZS6RH for his repeater work and maintenance, Hans ZS6KR for WATTS production, all the Rally members for their dedication, Almero ZS6LDP for fleamarkets, Pierre ZS6PJH and the four dedicated members of his Contest Team and Doreen ZR6DDB, Molly ZR6MOL, Richard ZS6UK who had contributed to the Club's social activities.

A minute of silence was requested for one Silent Key Gert ZS6ZB who had very recently passed on.

Congratulations were extended to Pine ZS6OB, Craig ZS6RH and Vincent ZS6BTY with their SARL Awards.

Johan then also conveyed his personal thanks to his wife Doreen ZR6DDB.



Derryck ZS6KQ was persuaded to make a short speech and he expressed his appreciation for being a Club member and the advantages it brought him in his hobby by gaining many friendships and various assistance and access in- and to matters technical. His only wish was to see the resurrection of DF hunts especially on 80m and daytime Club meetings. He concluded to wish the Club all the best towards its 81st year.

During the item Financial Richard ZS6UK presented members with an overview of the last 3 years and detail of the past year. This was approved after some in-depth questioning and discussion as well fixing the FY end at 30 June and accepting E.Basson as next year's auditor.

Furthermore the subject of increased subscriptions to cover known expenses that were looming in the year ahead had to justify an increase. Everyone saw the necessity of this but some members contested this on technical matters such the need for more transparency as well as the fact that no motion was put forward for this well ahead of time.

A vote was taken as to whether a special decision could be made at this meeting and met a majority approval. It was then decided and voted on with approval to increase subscription of ordinary members to R150 and that all other categories of membership remain at R50.

The next item was Awards but this was deferred to the next Cub meeting.

Finally the question of Saturday and Wednesday evening meetings was decided as to remain as is - due to insufficient response.

New Committee nominations were handled by Tjerk ZS6P who took the floor and nine members were approved (see above). One nomination for Chairman was received and also approved. Congratulations to the new Chairman Pierre ZS6PJH who accepted the post.



Birthdays

Sept
Verjaarsdae



Sept

Anniversaries Herdenkings

02 Charrel ZR6GN
02 Lizette ZS6LZT, dogter van Magda ZS6MVW en Pieter ZS6PVW
04 Carl Hein, seun van Hein ZS6Q
09 Brendan, son of Merylyn and Deryck ZS6KQ
11 Johan ZS6JPL
15 Pamela, sw of Harry ZS6HRD
17 Caroline, dogter van Hein ZS6Q
21 Johan ZS6JHB
24 Estie ZS6CC
25 Susan, lv van Freddie ZS6JC

02 Lily and Harry ZS6AMP (54)
07 Gerda and Roger ZS6RJ (8)
28 Retha and Roy ZS6XN (25)
29 Karin en Sarel ZS6EK (31)
30 Elma en Chris ZS6LOG (?)

27 Lodewyk, seun van Elmarie ZR6AXF en Johan ZS6JPL
29 Grant ZR6AAT, son of Merylyn and Deryck ZS6KQ

Joys and Sorrows | Lief en Leed

Bill ZS6KO was ill again but apparently escaped going in for an operation

Diary | Dagboek (UTC times)

Sept. 04-05 ARRL EME Contest 00:00-23:59
All Asian DX Contest Phone
IARU region 1 Field Day SSB 13:00-12:59
RSGB SSB Field Day 13:00-13:00
11-12 WAE DX Contest SSB 00:00-23:59
18-19 SARL VHF/UHF Contest 10:00-10:00
25-26 CQWW DX Contest RTTY 00:00-24:00

Oct. 02-03 ARRL EME Contest 00:00-23:59
03 UBA ON SSB Contest 06:00-10:00
03 RSGB 21/28 MHz Contest 07:00-19:00
07 SARL QSO Party 17:00-20:00
09-10 Oceana DX Contest CW 08:00-08:00
10 UBA ON CW Contest 06:00-10:00
16-17 WA Germany Contest 15:00-14:59

PARC SUBS / LEDEGELD 2010-2011

Please remit your subs in
time to our treasurer or
by transfer to:

Betaal asb. u ledegeld
betyds aan ons tesourier
of per oorplasing aan:

Bank : FNB Ordinary members/ gewone lede R150
Branch : 25 20 45 Spouses, pensioners R50
Account : 546 000 426 73
Your call sign must appear as statement text!

So far ±81/105 members have renewed

SARL subs were due 30 June

R360 and R225 for over 65's to:
South African Radio League
ABSA 632005
Account 407 158 8849

Snippets | Brokkies

PARC Fleamarket dates have been set for 9 October and 27 November

DX: Press Release: 10-10-2010, **New DXCC activation of PJ4, Bonaire.** Date: 11 August, 2010

The end of a country - The Netherlands Antilles With a 99% certainty, many things are about to change for the people and all radio amateurs in the Netherlands Antilles. On October 10, 2010 the Netherlands Antilles will cease to exist as a country within the Kingdom of the Netherlands and the islands will emerge with several new statuses:

* St.Maarten and Curaçao will become independent within the Kingdom and be granted the same status that Aruba attained in 1986.
* Bonaire, Saba and Sint Eustatius (also called BES islands) will be given the status of a public body (a kind of special municipality) in the Netherlands and will therefore fall directly under Dutch rule.

What does this mean for radio amateurs? The two current DXCC entities of PJ2/PJ4 (Leeward Islands) and PJ5/PJ6/PJ7 (Windward Islands) are expected to be deleted. However, several new entities are likely to emerge on 10-10-2010.

* Both St. Maarten (PJ7) and Curacao (PJ2) will become a new DXCC entity.

* Bonaire (PJ4) will become a new DXCC entity.

* Saba (PJ6) along with St. Eustatius (PJ5) will become a single DXCC entity due to their proximity to each other.

In short, 2 entities will be disappearing, but 4 will come back.

Activities from Bonaire: A group of hams from Bonaire, Germany, The Netherlands and the United States have joined forces to successfully activate Bonaire.

From six locations around the island, a group of between 15 and 20 amateurs will activate Bonaire between October 0-24, 2010.

The primary focus will be all HF bands from 160 to 10 meters including the WARC bands.

Due to the time of year, 6 m will only be a consideration. The team will focus on all modes including SSB, CW and various digitals.

Callsigns: Callsigns will be announced prior to the activation. However, we expect the prefix to continue to be PJ4 even after October 10th. Further information about the callsigns to be used will be published on our website - <http://www.bonaire2010.com>

Some more elbows.

(brand "EIE" from Mantech)



Compared to last month's exposure of a really poor elbow contact using a spring in a Brand X, this one is probably acceptable up to 100W. The fingers are quite broad and, depending on pressure can give acceptable contact but at high power the losses can cause damage (heat and eventual burn).

Unless you have X-ray eyes you don't know what you are buying. WATTS will appreciate more picture contributions of sacrificed elbows accompanied by the source and/or brand name for publication so we all know what not to buy.

BHF / UHF Kompetisie – September 2010 (Versoek tot deelname)

Dis weer tyd om antennas te versien, voerlyne te toets en die naweek planne vir die BHF / UHF kompetisie agtermekaar te kry. Oor 'n paar weke is dit weer kompetisie! Dit gaan plaasvind gedurende die naweek van 18-19 September 2010. Tydsduur is 24 uur vir die volle kompetisie, van 12h00 -12h00 die volgende dag SAST (lokale) tyd.

Eerstens wil ek ieder en elk vra om die woord te versprei aan almal wat 'n roepsein het dat die kompetisie gaan plaasvind onder 'n **nuwe stel reëls!** Met die nuwe reëls is daar baie ruimte vir elkeen om te kan deel in die pret. Elke stasie, hoe klein ookal sal kan deelneem. Kom ons probeer soveel moontlik klubstasies en tuisstasies te aktiveer as moontlik. Slegs jou deelname kan van hierdie kompetisie 'n groot sukses maak. Die nuwe "Rovers" en " Limited" katagoriee (slegs 4 ure aaneenlopende deelname, jy kies jou eie tydgleuf!), belooft dit om baie opwindend te verskaf.

Deur jou deelname katagorie korrek te kies word die speelveld gelyk gemaak, elke katagorie kry individuele erkenning!

Jy sal verbaas wees hoeveel kontakte jy binne 4 ure kan maak op 2m FM van uit 'n mobiel. Soek net 'n lekker hoë plek, koppie of 'n berg in jou omgewing en roep "CQ kompetisie", die res sal vanself gebeur. Wat ook al jy doen tydens die kompetisie, onthou ook om 'n foto te neem, ons wil graag sien wat jy gedoen het. Plaas dit op die SARL forum of stuur dit aan die kompetisie komitee vir plasing (ons wil sien hoe julle stasie gelyk het) en baie belangrik, **stuur daardie logstaat in!**

Tweedens wil ek graag vra dat inligting vooraf gedeel word oor enige beplande deelname, veral veldstasies. So-ook waar die groter tuis stasies hul mag bevind en wat hul vermoëns is om meer as een frekwensie te kan werk. Hierdie inligting is veral belangrik vir veldstasies en stel hulle in staat om uit te luister vir daardie bekende stasies. Dit bly egter 'n kompetisie en deeglike beplanning is belangrik om die besmoontlike posisie vir 'n veldstasie vooraf te kan bepaal. Hoe hoër, hoe beter natuurlik. Die eind doel natuurlik om die maksimale aantal kontakte, met so groot afstand as moontlik te kan maak en so ook ander stasies die geleentheid te gee om hulle vermoëns as stasie te kan toets. Na weke se beplanning en voorbereiding vir 'n kompetisie is daar seker niks so teleurstellend om na 2 ure in die kompetisie te besef, deelname is maar uiters swak nie.

ZS6PTA gaan weer met mening deelneem en beplan 'n heel nuwe strategie. Vir die gene wat graag hulle persoonlike langste afstand wil verbeter, hier is julle kans. Ons gaan weggroep, verweg (KG 43 RN) maar nie buite bereik van 'n yagi antenna en 'n paar watte RF nie. Die presiese plek sal later bekend gemaak word sodra die onderhandelings met die plaas eienaar afgehandel is. Vanaf die OTL klub in Middelburg is daar aanduiding dat hulle 'n veldstasie wil opsit by Steenkampsberg (KG 54 BS).

Ongelukkig is die nuwe reëls nog nie op die SARL forum beskikbaar nie, maar dit is reeds in 'n finale stadium. Maak 'n punt daarvan om dit gereeld die SARL forum te besoek en laat ook per forum weet van julle planne en deelname.

Die nuwe reëls en "score sheets" sal ook eersdaags beskikbaar wees op die SARL webblad.

Aangeheg vind ook 'n voelopige samestelling van die nuwe reëls, daar mag dalk nog klein veranderings kom voor die kompetisie naweek.

Indie jy enige vrae het of hulp benodig met voorbereiding vir die kompetisie kontak my gerus, ek probeer altyd help waar ek kan.

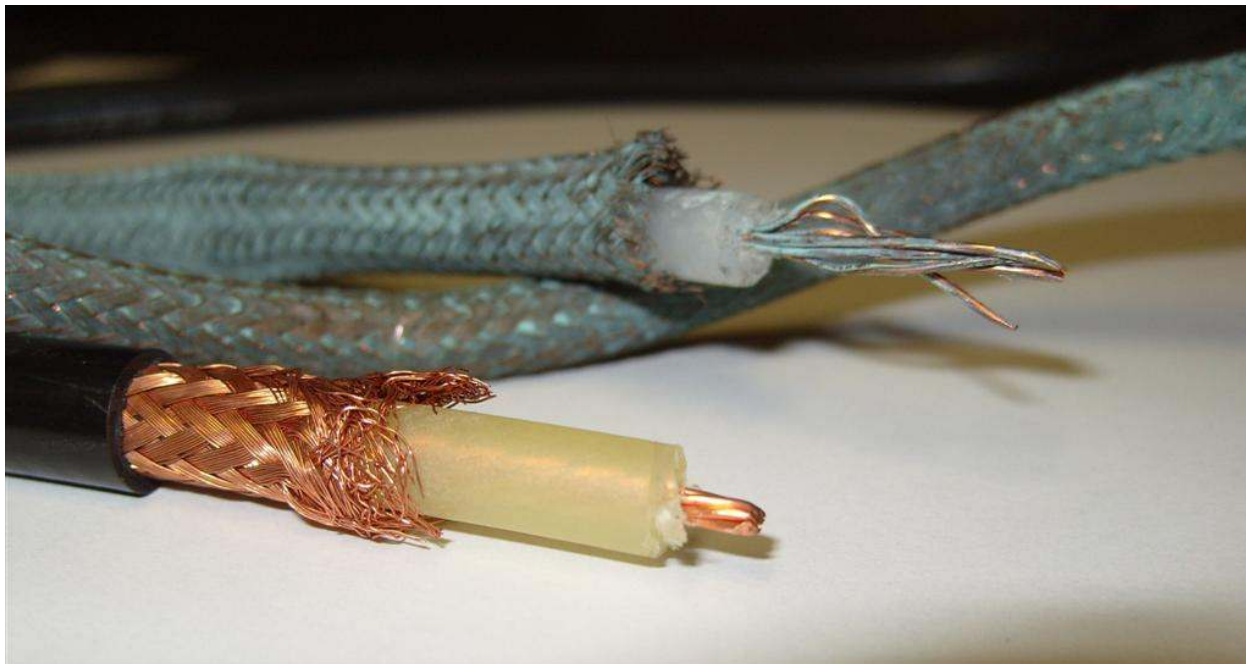
qsobox@gmail.com

Groetnis, Pieter H. ZS6PA

ETHICS AND OPERATING PROCEDURES FOR THE RADIO AMATEUR

Over the past decades the behaviour of the radio amateurs on the bands has significantly deteriorated. In 2008 John Devoldere (ON4UN) and Marc Demeuleneere (ON4WW) wrote a comprehensive document entitled "Ethics and Operating Procedures for the Radio Amateur", document aiming to become a universal guide for newcomers and old-timers alike on the subject of operating ethics and operating procedures. In 2008 this document was accepted by the IARU AC (Administrative Council, the highest body of the IARU) as representing the point of view of the IARU on the subject. Two years later the manual has been translated in more than 25 languages, with more coming. To achieve easier access to all of the existing versions, the authors have set up a website (www.ham-operating-ethics.org). You can download PDF files directly from the site or via the National Societies' websites in the different countries.

Is RG213 cable impervious?



Tjerk ZS6P experienced feeder problems and on further investigation assisted by Hein ZS6Q found that in places where water could collect such as in a portion where it was 'protected' by a piece of hosepipe. Water collecting in the hosepipe had found its way through the PVC and into the screen and even the inner conductor. The sample in front is a new piece of similar cable to show contrast.

Screwdriver antenna

This is a US Ham's version of this well-known popular antenna. Check next month's WATTS for Hein ZS6Q's home-brew version!



Bulletin readers for 2010-2011

August	Pierre	ZS6PJH
September	Johan	ZS6JDB
October	Almero	ZS6LDP
November	Richard	ZS6UK
December	Doreen	ZR6DDB
January	Willie	ZR6WGR
February	Craig	ZS6RH
March		
April		
May		
June		
July		

Controlled feeder radiation

B. Sykes, G2HCG, shows how an antenna's polar diagram can be improved by controlling the radiation from its feeder.

The use of a balun to feed balanced antennas with coaxial feeder has always been a controversial point, the usual comment being — "it works all right without one, so why should I bother". The two vital uses of a balun are to ensure that the polar diagram of the antenna is as planned, and to prevent interference pick-up on the feeder, or radiation from it.

INTERFERENCE PICK-UP

The advent of the computer in the shack with its high hash level makes the latter point even more important, and here the difference in hash pick up on the feeder is very noticeable when a coaxial antenna feeder is properly terminated with a balun.

POLAR DIAGRAM

Control of the polar diagram of the antenna is not perhaps so noticeable, but it is very important to know the areas of the world covered by the antenna system and perhaps even more important to know the areas rejected by nulls in the polar diagram. A dipole erected reasonably in the clear and properly fed with balun and coaxial feeder to the rig will have little or no pick-up from the ends, and if orientated in a North-South direction will provide a useful reduction in QRM from the powerful southern European HF stations. Omit the balun and those nulls will not be in evidence due to uncontrolled radiation and pick-up from the feeder. Without a balun, one half of the dipole is connected to the outer of the coaxial feeder which will radiate in an uncontrolled manner depending on its length.

It may be, however, that you want to have an omnidirectional radiation pattern or that physical limitations mean the antenna must be erected North-South although you want to work into Europe to the South. Consider the effect of deliberately controlling the feeder radiation and making use of it. This can easily be achieved by simply moving the balun down the feeder from the antenna feedpoint by a quarter wave, allowing radiation from the top part of the feeder and using the balun to stop the radiation (and interference pick-up) from the lower part of the feeder.

I have called this technique *controlled feeder radiation* (CFR). It should be noted that CFR depends on radiation from the outer shield of a coaxial cable which is not applicable to balanced feeders.

BALUN TYPES

There are many different types of balun available (1). The simplest and the one applicable here uses the RF choke principle to stop radiation from the outer of the coaxial feeder by simply winding it into a coil or on to a ferrite ring, weight and size limitations usually dictating the use of the ferrite. Since high impedance with minimum number of turns is required, the use of a high-permeability ferrite core is mandatory. Standard black ferrite cores as used for interference suppression are ideal, and since the balun may need to be suspended from the antenna, the use of small coaxial feeder (URM76) is advantageous in the interests of weight reduction. The standard 4 cm

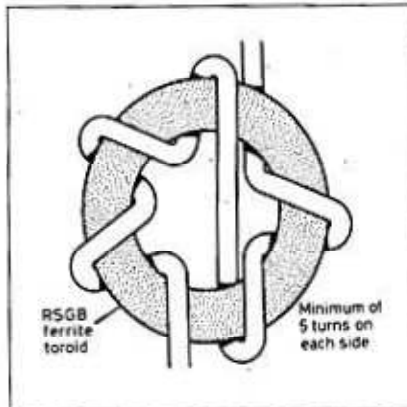


Fig 1. Method of winding choke balun

O/D core as supplied by RSGB will take 11 turns of URM76 and should be wound as shown in Fig 1 in order to reduce self capacitance. A single core will provide sufficient impedance for 28 to 14 MHz and two cores taped together will cover 7 MHz also. If long feeder runs are necessary the small diameter coax need only be used for the balun and radiating portion, a weatherproof coaxial plug and socket being fitted below the balun to connect to a larger feeder with lower losses. If very high RF voltages are expected the balun may be wound onto an antenna rod from an old transistor radio, thus physically separating the input and output.

CHOICE OF CORE

The choke balun operates at high impedance and a relatively low flux in the core, which allows high-permeability materials to be used without fear of core saturation. The transformer balun, usually trifilar wound, operates at low impedance and higher flux densities, often requiring the use of lower permeability ferrites to avoid core saturation and self-resonance effects. The CFR antenna choke core should have a relative permeability of at least 50 at the frequency of use.

IMPEDANCE MATCHING AND CFR LENGTH

A useful advantage of CFR is that the normal 75 ohm impedance of a dipole is reduced to nearer 50 ohms, thus providing a lower VSWR in standard 50

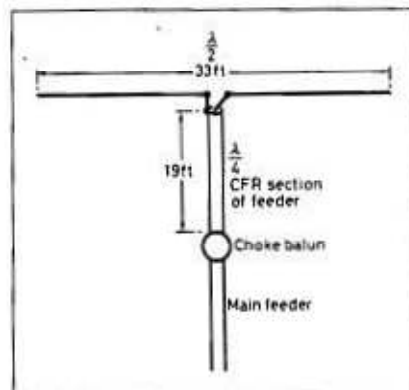


Fig 2. A 14.2MHz CFR half-wave dipole

ohm feeder. The physical length of the CFR section will vary with the design of the choke balun. The design shown in Fig 1 will result in a CFR section length of 0.275 of a wavelength, eg. 19 feet at 14.2MHz, and this, if added to an existing installation will not alter the resonant frequency of the system. If a different choke design is used the CFR section length should be adjusted until the antenna resonant frequency is the same as that of a dipole without the CFR section.

DIPOLE WITH CFR

Fig 2 shows a dipole fed with coaxial feeder with the balun placed 0.275 of a wavelength below the feed point, thus providing an omnidirectional vertical quarter-wave radiator in addition to the standard figure-of-eight pattern of the dipole. The low-angle vertically polarised radiation is a considerable bonus, being achieved without the need for an expensive and complicated system of ground radials. This application of CFR has been used by the author this year when operating from southern France back to UK on 7MHz, and has proved very effective indeed. Two days of deliberate operation without CFR without announcing the fact resulted in many comments on reduced signal strength.

MULTIBAND CFR

If multiband operation is desired a trap dipole may be used. A typical example has traps for 28, 14 and 7MHz and an overall length for 3.5MHz. The CFR principle can be applied in various ways to this type of antenna, depending on the performance required on the various bands covered.

Placing the choke balun 0.275 wavelength at 28MHz below the feed point will give optimum all-round DX capability on that band with little or no effect on the other bands, retaining for example the QRM-reducing properties of the dipole pattern on 14 and 7MHz.

Placing the choke balun 0.275 wavelength at 14MHz below the feed point will give all round DX coverage on that band with no effect on 3.5 and 7MHz. The CFR section in this case is a half wave on 28MHz and, being high impedance, will not accept power from a low-impedance feed.

Similarly a CFR section having a length of 0.275 wavelength on 7MHz will give all-round DX coverage on that band with no effect on 14, 28, and 3.5MHz. The CFR section is high impedance on 14 and 28MHz.

It is quite feasible to replace the CFR choke balun with a section of feeder wound into a coil and tuned to the required resonant frequency with a capacitor. A number of these resonant traps could be spaced at optimum points along the feeder, thus allowing every possible combination of CFR on the various bands covered.

CFR SPECIALS

The concept of controlled feeder radiation means that it is perfectly feasible to have no apparent connection to the outer of the coaxial feeder. The connection exists nevertheless, namely from the inner to the outer surface of the coaxial shield at the antenna end of the feeder. This leads to considerable simplification in the design of a number of antennas and Fig 3 is perhaps just the beginning of the family of antennas using the CFR principle of making the top section of the feeder into a radiator.

All these antennas when suitably dimensioned have been shown to produce a good match to 50 ohm feeder.

The simplest is Fig 3a which consists of a simple quarter-wave end fed element combining with the CFR section to produce a right-angled dipole. The antenna will radiate vertically and horizontally polarised signals, or a mixture of both polarisations dependent on the direction from the antenna.

With the variable polarisations reflected from the ionosphere, the antenna can be considered to be virtually omnidirectional. Straightening out this antenna results in a very useful low-impedance end-fed dipole which may be conveniently strung from the window of an upstairs shack to a suitable point in the garden.

Fig 3b could variously be described as a "half square" or a "2/3rd bobtail" and consists of two vertical radiators, fed in phase with equal power. The polar diagram is figure-of-eight at right angles to the wire with a free space theoretical gain of 3dBd and vertically polarised low-angle radiation. The low angle radiation is particularly useful for DX work, and the gain achieved in practice on a DX signal is considerably more than the theoretical free space 3dBd.

Fig 3c is a half square with an extra quarter-wave horizontal section which results in the addition of horizontally polarised radiation to the original vertical radiation. DX signals after reflection from the ionosphere are of varying polarisation and the ability to handle all polarisations may well be an advantage.

Fig 3d can only be described as a modified "bobtail". The standard bobtail is end-fed at the high-impedance point at the end of the centre radiator. This necessitates a resonant feed system, either a link-coupled tuned circuit or a tapped quarter-wave stub. The CFR system is low-impedance feed with the centre radiator consisting of the CFR section of the feeder. Current distribution in the three verticals is 50% in the centre and 25% in each of the verticals. This is identical to the standard bobtail and results in a free space theoretical gain of 3dBd with an exceptionally clean figure-of-eight polar diagram. Comparison tests between this antenna and the two-element version of Fig 3b showed identical performance on stations within the beam, and the exceptionally clean pattern of the three-element was a noticeable

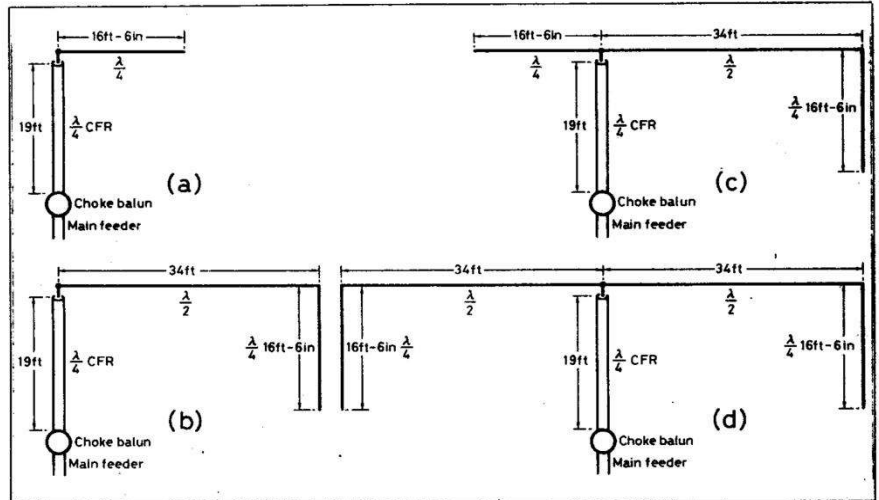


Fig 3. CFR antennas: (a) isotropic; (b) half-square; (c) half-square; (d) bobtail

advantage in reducing QRM but conversely disadvantageous if the wanted station was out of the main beam. Basically the third element was not worth the extra space required unless the antenna could be accurately orientated onto the wanted station, when the reduction in QRM from the sharp clean polar diagram could be appreciated.

FEEDER VOLTAGES

It is interesting to consider the voltages on the feeder at the antenna side of the balun. The outside shield of the coaxial cable is behaving as a low-impedance fed quarter-wave radiator with an end impedance of some 3000ohms, which at a power level of 50W into that element means some 400V at the end furthest from the feed point. The inside of that same shield is at zero potential,

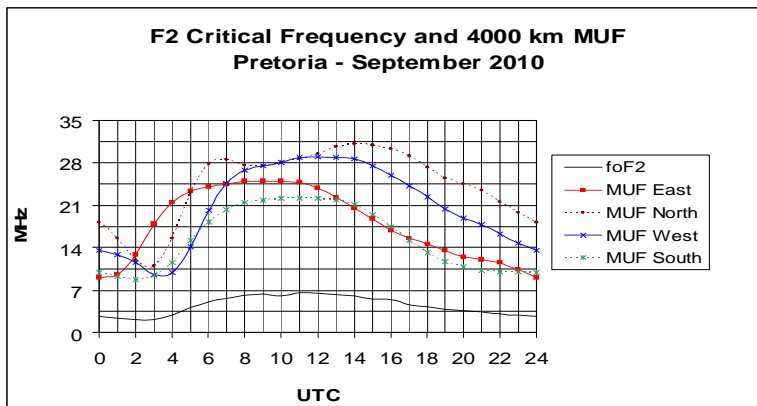
being the outer of a coaxial feed line at an impedance of 50ohms. There is thus a potential difference of 400V across less than 1mm of copper at the choke. A dramatic example of skin effect in practice.

ACKNOWLEDGEMENT

Initial testing of the CFR principle was conducted at 435MHz on the author's "antenna range" but the final full-size tests with much DX operation were carried out by a near neighbour, Bill Wheeler, G3BFC whose co-operation, patience and encouragement is gratefully acknowledged.

REFERENCE

(1) Ian White G3SEK "Baluns-more than a match" RadCom December 1989.



Long Term HF Propagation Prediction for Sept. 2010
courtesy ZS6BTY
(see also our website propagation tab)

DX Operating

The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum frequency that will reflect when you transmit straight up. E-layer reflection is not shown.

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Legendary Spy Radio Donated Back to Rockwell Collins



This Collins R-390 HF receiver has been donated to the Rockwell Collins museum by Sentinel Chapter of the 101st Airborne Division Association, whose members used the radio to intercept enemy transmissions while serving with US Army's 265th Radio Research of the 101st Airborne Division in Vietnam from 1967 until 1972. The radio was designed by Collins and began

production in 1950 and continued being used by the military in the 1980s. The radio was classified as Top Secret for over a decade after its introduction and is currently prized by amateur radio operators.

CEDAR RAPIDS – An unheralded group of Vietnam War-era Army signals intelligence officers took a step into the daylight Friday to donate one of their favorite radios back to its manufacturer.

The 265th Radio Research Company used many radios in their service in Vietnam from 1967 to 1972, but the R-390A HF (high-frequency) receiver they donated to the Rockwell Collins museum was something special, they said.

"This has been a workhorse," said Doug Bonnot of Jonesboro, Tenn., the president of the Radio Research Company Veteran Group .

Bonnot said he doubted that there was anyone who worked in uniform for the Army Security Agency, Air Force Security Service, Naval Security group or Marine Radio Battalion who doesn't remember the R-390 HF receiver fondly.

The receiver was so capable that it was considered top secret, the veterans said. It is now a favorite of amateur radio operators, who sometimes pay to buy and restore them.

Bonnot said members of his unit worked long hours at the radios day-in and day-out monitoring communications. Potentially valuable radio intelligence was recorded and passed off to other specialists who could decode and translate them, Bonnot said.

"You were in a battle every day," Bonnot said. "Your weapon is a radio, and your stock and trade is information the enemy put out over the radio."

Lawrence Robinson, who oversees Rockwell Collins' corporate museum, said almost everything in the museum has been donated to the company. He thanked the group for the 1952-vintage radio, one of the earlier models produced.

The radios were designed by Collins Radio, now Rockwell Collins, and many were manufactured by the company in Cedar Rapids. Many were made by other companies under defense contracts. About 20,000 of the 55,000-plus R-390 HF receivers made came from Collins.

"The stories about this radio are legendary," Robinson said. "There are still urban legends circulating that there are old-timers deep in the bowels of these three-letter agencies still using them."

Robinson said the United States government shredded "literally thousands" of the radios, apparently to keep them out of the wrong hands when they were no longer needed.

Rockwell Collins has had a corporate museum since 1983 for its clients and employees.