HAMS
Haywire News
April 2010
www.marc.org.za
PO Box 1076, Hilton, 3245

MIDLANDS AMATEUR RADIO CLUB

AFFILIATED TO THE SARL & IN ASSOCIATION WITH THE NATAL CARBINEERS

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The Chairman's Report

I spent last Saturday the 19th April at the SA AMSAT space symposium in Durban and very enlightening it was too. South Africa has put two satellites, carrying amateur radio equipment into earth orbit.

The first was Sunsat or OSCAR 35 launched on 23 February 1999 and was operational for two years. It carried a digital store-and-forward capability and a voice 'parrot' repeater system that was used primarily for educational demonstrations. The satellite had two VHF and two UHF transmit-receive systems. Sunsat was built by post-graduate engineering students at the University of Stellenbosch. The project was so successful that numerous subsystems were sold to satellite programs in South Korea, Germany and Australia. This prompted the creation of SunSpace Information Systems, a spinoff company that now develops and manufactures satellites, and satellite subsystems commercially.

The second satellite was Sumbandila Oscar 67 was launched on 17 September, 2009 from Baikonur aboard a Soyuz rocket and was inserted into a 500km polar orbit. The satellite weighed 81.000 Kg. It was a project of AMSAT-SA. The Amateur Radio Payload is operating in conjunction with the University of Stellenbosch Software Defined Receiver project as it will share the VHF receiver and UHF transmitter used by the SDR project. SA AMSAT has designed and build the control system to facilitate a V/U voice transponder with an uplink in the 2 metre band and a downlink in the 70cm band and a parrot repeater.

There are a number of Cube satellites planned by various universities in the country and some details we given of a project at the South African Institute of Technology Cape Peninsula University of Technology, who with the French government and the Paris Chamber of Commerce are using it to train students in science and technology. A cube Satellite is based on a 10cm cube frame and there can be up to 3 cubes in a singe satellite unit. This frame is loaded with the various components some of which are now becoming standard units for such devices. It makes for ease of loading onto the launch vehicle and has reduced greatly costs. The costs of such a unit are estimated at about R500 000 including the launch costs. At the low orbits used the life of a satellite is about a year.

Here was also a talk on the Lalea around the world balloon project. This 1.6m high hydrogen filled balloon will carry a very small payload that includes a GPS, 2 HF radios a control system and a turbine driven power supply. This is another SA AMSAT project and will float at an altitude of 21km sending its position on the HF radios. The BACAR test flight are part of the testing for this project.

So amateur radio is been taken to the highest technical levels and some ground breaking systems are being developed in South Africa. It was a most enjoyable day and our thanks to the organisers at UKZN. Radio communication via such satellites offers amateurs a number of interesting challenges, contact over many thousands of kilometres have been achieved.

The Comrades marathon is to be run on the 30 May and it's a down run again and Hamnet is looking for operators at the various watering tables along the route. All that is needed is a mobile VHF radio. Again, we are there for emergency communications.

73 to you all, Mike ZS5BGV

Diary of Events

24 April	MARC Club Meeting at the clubhouse
24 April	SARL AGM, 09h00, Port Elizabeth
23-25 April	SARL National Convention, Port Elizabeth
3 May	Logs for the Autumn QRP Sprint competition must be in at the West Rand ARC
7 May	Closing date for stage 2 of the Construction Competition
15 May	MARC Club Meeting at the clubhouse
26 May	SARL club CW Contest
29 May	RTA Durban; CQ WW WPX CW
30 May	Comrades Marathon
31 August	Comments to be in on new SARL Contest Manual

The M.A.R.C. Infrastructure

Voice Repeaters (FM) *Visit www.marc.org.za/pages/freq.htm for updates of this list*

VHF	Tx	Rx	Equipment
Hilton	145.6625MHz CTSS 88.5	145.0625 MHz	SCR200 20W, Diamond X-200 rx and tx
Estcourt	145.700 MHz	145.100 MHz	Emcom SA256 25W, Diamond X-200 rx
Franklin	145.725 MHz	145.125 MHz	GE MVP 10W
Worlds View	145.750 MHz CTSS 88.5	145.150 MHz	Emcom SA256 25W, Diamond X-200 rx and tx
Greytown	145.775 MHz	145.175 MHz	Home Brew @ 20w, Diamond X-200 rx and tx
Underberg	145.7875MHz CTSS 88.5	145.1875MHz	Q8000 30W
Windy Hill	145.700MHz	145.100MHz	Hamnet repeater.
UHF			
Mt Gilboa	439.225 MHz	431.625 MHz	Vertex Standard VXR-9000, Diamond X-200 rx and tx
Zwartberg	438.775 MHz CTSS 110.9	431 .175 MHz	GE MVP 15W

APRS
The national APRS frequency is 144.800 MHZ (Tx & Rx). The I-Gate is at Hilton (ZR5S). Fixed stations should beacon at approximately 30min intervals with a path of WIDE5-5. Mobile stations should beacon at approximately 1min intervals with a path of "WIDE1-1, WIDE5-5". We have aprs digi's throughout KZN. A PBBS (mailbox) is on ZS0PMB-1 for emergency use. A KA-NODE is on ZS0PMB-7

Packet Radio
No packet radio frequency. However, limited packet radio facilities are available on 144.800MHz

ECHO-LINK "voip"
Our node number is 244279 Call Sign ZS5PMB. This Echo-link facility is available on the Midlands linked Repeater network.

E-QSO "voip"
We are in the " 101ENGLISH" virtual room, on the "repeater.dns2go.com" server. This is linked to RF at Blackridge on 433.000 MHz simplex.

BEACONS
Greytown 50.321 MHz (Tx) ZS5SIX FSK (off air)

WEB SITES

MARC'S very own website	www.marc.org.za
SARL's website	www.sarl.org.za
HAMNET website	www.hamnetkzn.org.za

Regular Events

The KwaZulu Natal Net (Early Birds):
Starts at 06h00 on 7.055 MHz. in winter and 3.650Mhz in summer and continues until 07h40. Colin ZS5CF hosts the net from 06h00 & Gary Potgieter (ZS5NK)-takes over later on.

MARC Sunday Morning Net:
Times: 07h45. Club bulletin is presented at 08h0.
Frequencies: VHF: 145.750, 145.6625, 145.775MHz, 145.725MHz, 145.7875MHz
UHF: 439.225MHz

Hamnet Bulletins: Sundays at 07h00 on 145.625MHz and 3.670MHz
Wednesdays at 19h30 on 145.625MHz and 3.670MHz

How I became a ham

Michael Boast, ZS5BGV

As a youngster I was always interested in radios and build a number of crystal sets which I used at high school to listen to LM radio especially on a Sunday night to the hit parade presented by David Davies. That was in the late 50's early 60's when I lived in the then Rhodesia. On returning to South Africa I met up with an uncle of mine Oliver Pearce ZS5JY who introduced me to ham radio. He lived at Illovo on the Natal South Coast and had a tower and a big beam that, must have been all of 30m tall. He had attended university in the USA and was a Collins man through and through. I spent some time listening to him chat with his many friends around the world.

I then went off to university here in Maritzburg and toyed with the idea of doing the RAE and joined the club here, that must have been about 1971. I remember Dannie Truter was the secretary of the club at the time. Funny enough he was a work college of Gayle my XYL although we had not met at that stage. I bought a Trio Receiver and used to listen in to the local nets. I found Morse code very difficult, and university studying didn't give me much time so never got around to writing the exams. I then got married and that was the end of that.

After spending many years in Swaziland I was transferred to Guyana in South America in 2003, and being on our own and very poor TV, there was time to do some study. Guyana followed the USA exams, so I got the books for the courses and got started. There is no radio club in Guyana only a hand full of ham in the small country, so I was on my own, but on QRZ.com you can write the exams on line and get instant feed back on who you have done. After I had done my work for the day I would spend 45 minutes each day online and write a test. Once I was passing them ok I wrote the exams and did the equivalent of the ZU and then the ZS on the same day. I was then 8R1R. Fortunately being close to the USA and often having to travel there on business I was able to get my rigs directly from the USA, even had a tower built for me which we shipped back in our container. So I was up and away on HF, no 2meter repeaters out there. Reception was really good and had many good contacts especially with the USA and Europe. Was never able to raise a ZS station though but did try often. When the hurricanes hit the Caribbean, things got very interesting, there is a whole hurricane net system established. I can remember listing to a guy on the Cayman Islands who was in his second storey of his house talking to the net controller in Florida. He had a single battery to operate with and the place was flooded including the airport runway and no electrical power after a bad hit. He was able to come on air at intervals for about 3 days.

Left Guyana in 2005 and was able to apply and get my ZS license without hassle. So consider my self very fortunate that I had the opportunity to get a ham license, it had been a dream of mine for over 30 years.

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One of my interests is antenna design, and this includes unusual antenna designs. Apart from marvelling at the ingenuity of some of these designs, many of these can help in emergency situations where one is forced to think outside the box. Some of these are so simple to construct. Please send me some of these designs for publishing. Here is one for those who have to hide their antennas from their neighbours:

The GRASSWIRE

another approach to hidden HF antennas

by K3MT - found on the internet public domain

Deed restrictions got you down? Neighbors intimidating your tower plans? Need a really easy portable HF antenna? Then the grasswire may be the answer! Virtually invisible, lightweight, and compact (you can carry one in your hip pocket), this antenna works! It has been used by K3MT in various installations for more than 10 years.

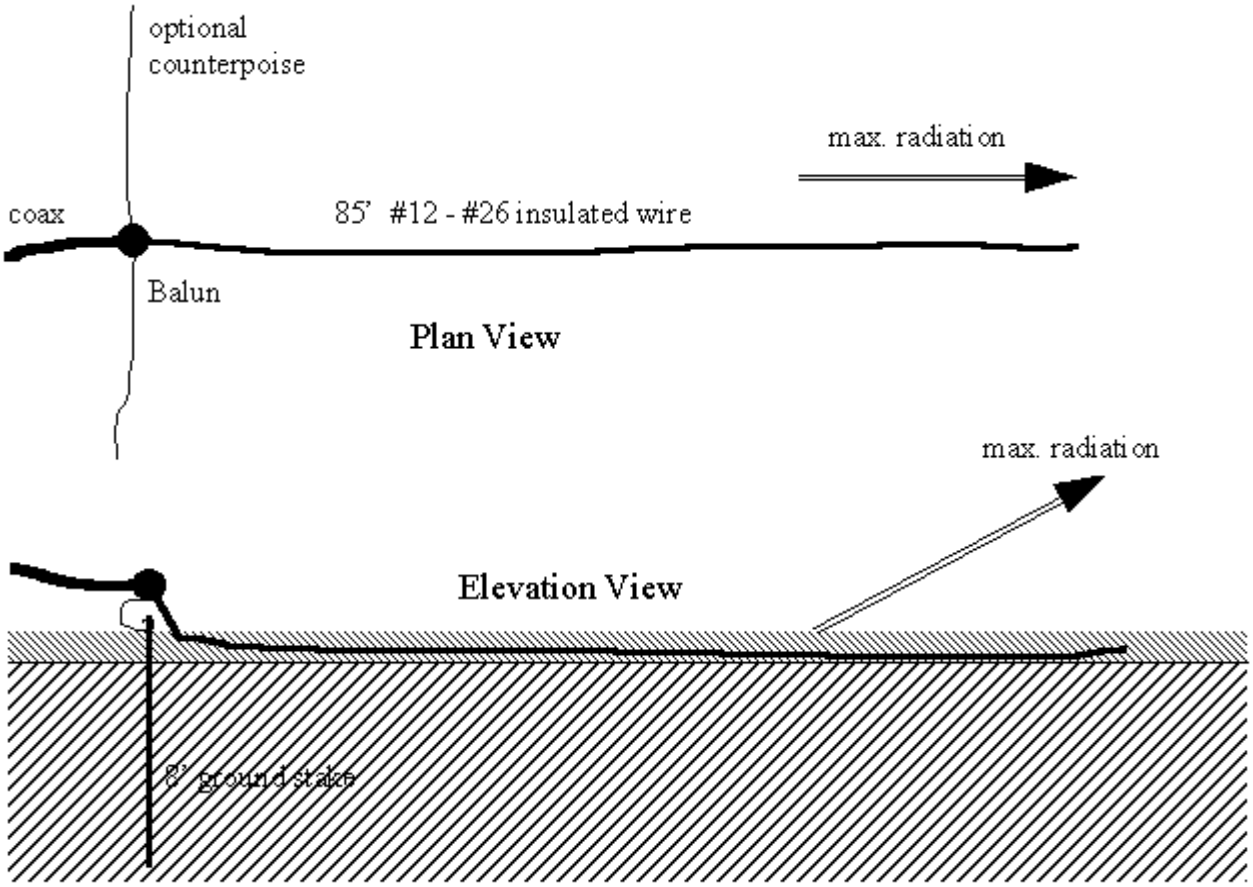
Read on - and listen to the "experts" telling you that this is hogwash, that an antenna like this can't work. But it

does. And true experts, who have taken a decade or more to come to grips with the intricasies of Maxwell's Math, know why it works.

This antenna will not out-perform a yagi, or a decent dipole up a half wavelength. Not in gain or signal strength, at least. But it will survive an ice storm, wind storm, and is practically immune to lightning. And it doesn't need a large tower or tall support. I deploy one from my hip pocket at times - the balun to match it is larger than the antenna!

THE GRASSWIRE - IN BRIEF

What is it? Put simply, it is an end-fed, longwire antenna that is laid right on the grass. Hence the name. The original grasswire used by K3MT in the summer of 1988 was just 204' of #18 AWG magnet wire laid along the property line, anywhere from 1" to 6" above the ground. This sketch shows plan and elevation views of a typical installation. Both an 8' ground rod and optional counterpoise wires are shown. Use one or the other. Both are not needed.



These antennas are largely resistive, with values ranging from 150 to 500 ohms or so on average ground. They have been used successfully on the average soils northwest of Washington, DC, on the sandy soils of the Cape Canaveral, Florida area, in the rocky, shale soils of the mountains in Somerset county, PA, and on river bottomland of Allegheny County, PA. One was used with great success by K3MT/VP9 in Southampton, Bermuda - the object of nightly pileups on 30 m CW for four nights.

REFLECTION AND THE BREWSTER ANGLE

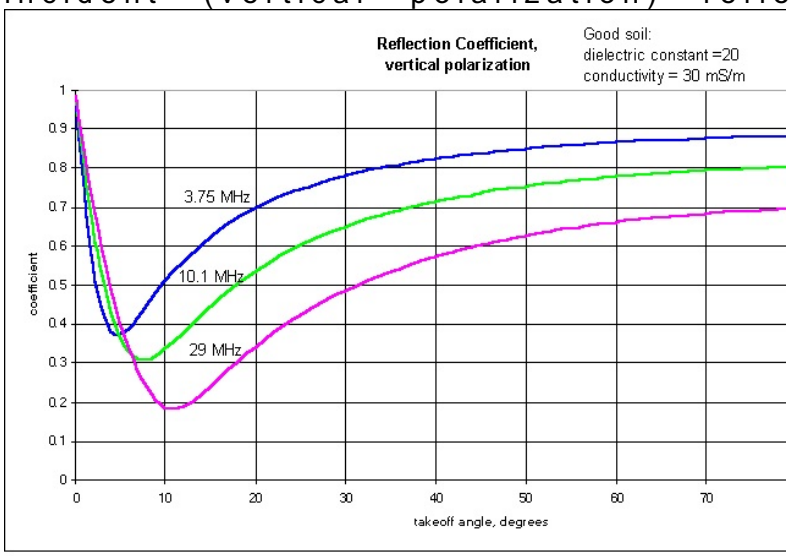
The skeptic in you will doubt that such low antennas can work. After all, its image in the ground radiates and cancels out all radiation. True - if the ground is perfect. But nothing is perfect! The grasswire radiates vertically polarized off the end of the wire. Extensive monitoring tests with wires laid along the great circle route toward WWV, and perpendicular to that line, demonstrate the end-fire nature of the antenna. So why does it work?

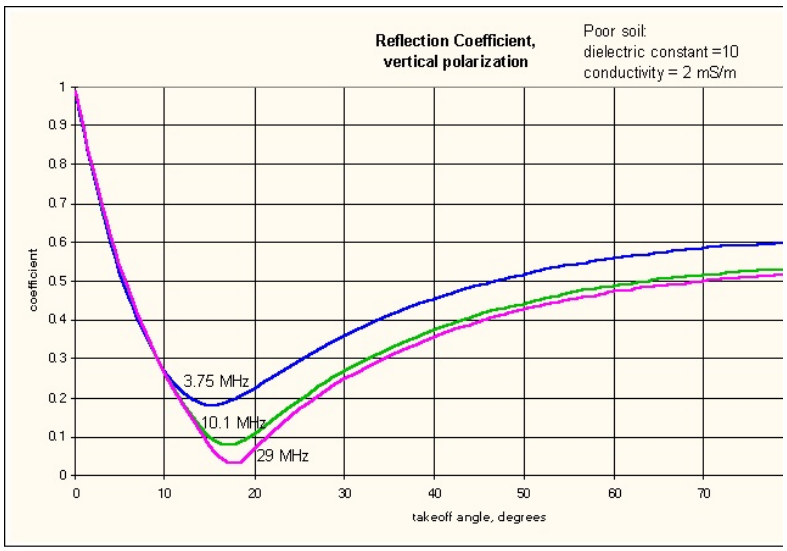
When a plane wave reflects from an air-earth boundary, an incoming ray reflects, giving an outgoing ray. These two, and the line normal to the boundary plane, form a plane of incidence. Solutions of Maxwell's equations differ for the case of the E-field being perpendicular to this plane (i.e., horizontally polarized), and the case when the

E-field vector is in the plane of incidence. You will probably call the latter "vertical" polarization, although this is technically not correct. Electromagneticists (a.k.a those who practice Electromagical effects) refer to these cases as normal incidence (horizontal polarization) and planar incidence (vertical polarization.)

For the normal incidence case, reflection is nearly total, with a nearly 180 degree phase reversal. Thus very low antennas neither respond to, nor generate, appreciable amounts of horizontally polarized radiation. But for the planar incidence case, the reflection varies in strength considerably. At some takeoff angle (angle between outgoing ray and the ground) the reflection becomes quite weak, and has a 90 degree phase shift. Near this angle, the sum of direct and reflected rays will have a magnitude as if the antenna were in free space! Of course, at other angles, ground reflection largely cancels the direct ray, and the antenna does not radiate well at all.

A *reflection coefficient* is calculated as the ratio of the electric field in the incoming ray to the electric field in the reflected ray. It varies from one (total reflection without loss) to zero (no reflection at all.) It depends on the takeoff angle, frequency, and the soil parameters (dielectric constant and conductivity.) Here are plots of planar incident (vertical polarization) reflection for typical "good" and



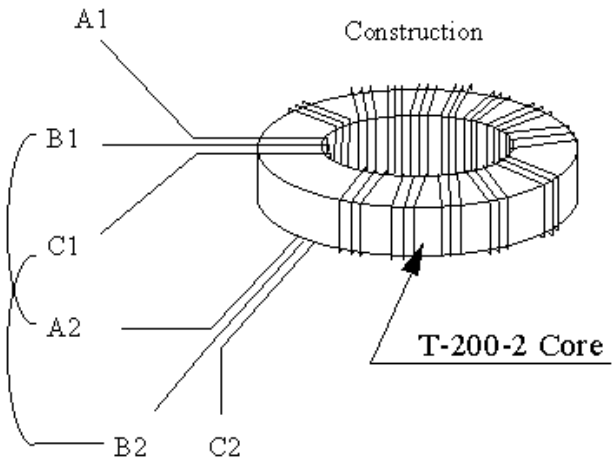


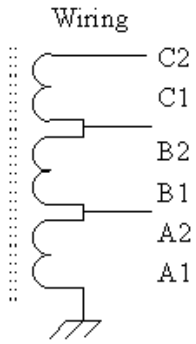
Notice that, at 10 to 25 degrees, the ground reflection is very weak. It also is shifted 90 degrees in phase from the incident ray. Therefore, radiation from the grasswire, off the ends will be about the same as if the ground were not present.

But launching a ray at, say, 15 to 20 degrees takeoff angle, in a direction toward Europe, can be useful! That's what a grasswire does. It is lossy in all directions, but least lossy when exciting the ionosphere for a long-haul DX contact. Contacts were made on 80, 40, 20, 15, and 10 meters. The signal reports are not fantastic. But contacts were made, and ham radio was enjoyed! Five countries were worked in 3 days. And the best part of this setup: the neighbors never knew that a ham station was on the air!

FEEDING THE GRASSWIRE

Since this antenna is largely resistive, a simple trifilar balun is all that I have ever had to use. This sketch shows how to make a balun that works:





Coax "hot"	Grasswire	Antenna Z
A2/B1	B2/C1	200 Ω
A2/B1	C2	450 Ω
B2/C1	C2	125 Ω

Trifilar Balun:
use #16 - #22
insulated wire

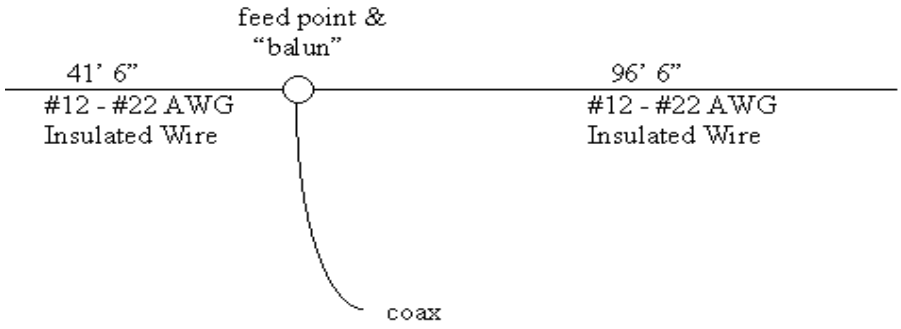
K3MT
(c) 1997
M. Tola

Typically I pull the insulation off of some indoor telephone wiring cable. Four insulated #22 copper wires are inside: discard one of these and use the remaining three. Wind about 16 turns on the core, without allowing the wire to twist (keep the three conductors parallel at all times.)

Notice that this "balun" really matches an unbalanced antenna to an unbalanced transmission line. It is basically a wide-band, three-winding autotransformer. Impedance ratios are as shown on the drawing. Generally it is necessary to connect the coax to either A2/B1 or B2/C1, and the antenna to B2/C1 or to C2. This may change from one band to another, and usually does.

WINDOM IN THE GRASS

I have elsewhere described a windom antenna. While it is usually hung from a pole or in a tree, it works when used in a "grasswire" mode. Just lay it on the ground. Dimensions are repeated here for ready reference.



Off-center fed Windom
lay on grass
Trifilar "balun" transformer

K3MT
(c) 1997
M. Tola

When I travel, I take one of these made of #22 insulated hookup wire. Since I often set up beside motel parking lots, and often after a day's work, the longer wire is black, and the shorter one is red. This helps me determine which way to point the windom. Remember, though, that it fires off the long end. Of course, it fires the other way, too, but usually works best off the long end.

I hope this has given some of you a good case of curiosity. Go out and try one of these ground - mounted wires. They're easy to build. Even the balun is easy to build.

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Editor's Waffle

This month has certainly flown, but that might be my perception only as I had my nose buried in paper work for much of the month, and when this happens time flies. But it also ensured that I could listen to the radio, in between phone calls and local trips, even if I could not join in.

There were some interesting conversations held, as well as some controversial. The same has to be said from the email forum. Some non-constructive comments and email volume led to some forum members asking to be removed from the mailing list. One request from me: please refrain from making derogatory and negative comments about the club and other forum members. Criticism is always welcome, as long as it is constructive. In the olden days negative criticism might have been seen as encouraging someone to get their act together. But I doubt whether this ever worked. For example: when someone tells me that I could or should produce a better HHN, without offering help, then he will not see an improvement, as he/she has not provided me with the tools to improve it. In fact, he might land himself the job as HHN editor as punishment. However, if he offers constructive help, there will be a positive result. Same goes for the other aspects of our hobby.

If something does not suit you and if you cannot offer a practical solution or help, and if you cannot leave personal feelings out of it, then rather keep quiet. I need to remind myself of this as well, as I sometimes battle to keep my mouth shut.

I did write something about netiquette a few issues back. One point we need to remember is that the forum is not there to send personal messages to other forum members. Only do this if you are replying to a topic posted to the forum and if you are certain that it will add value to the rest of the forum members. If this is not the case, email the other member directly, off list. The reason is mainly two fold - many of us do not care about personal messages being sent between 2 members, and secondly, it costs us unnecessary bandwidth - think of those who are still burdened with dial-up or poor cellular GPRS.

While I'm on a rant, please remember to leave a gap between overs to let others in. One way to ensure this is that when you have finished your over, put down the mic or hang it on it's cradle. When it is your turn to speak, count to two before picking up the mic. With Echolink count to 5. This will ensure a pause between overs.

Please also keep track of whom you need to hand the mic over to. When someone breaks in on a conversation, it is up to the one in control at the particular point in time to let him/her in, ie the one who has been handed the mic, not the person who had the last over. Likewise, funny quips between overs without call signs are generally not funny. I'd better stop here as I'm beginning to sound like a whinger as well...

It is encouraging to see that we are running a class A course again. We also have at least one class B student. I had a look at the manual which is being used at the moment, and must say that the theory is quite advanced. It ensures that all who pass have a good theoretical grounding. I wonder if I would be out of line to suggest that all of us read through these manuals when a new version gets published or released? Most who are attending the classes have class B licences, and some of them already posses good operating skills. I'm led to believe that many have already achieved their WAZS requirements! Well done chaps! This reminds me to try and extract an article from someone who did this on morse code, in a matter of a few weeks on cw, many years ago :-)

Our repeaters have generally been behaving themselves. We have acquired a new battery charger for Gilboa, and will need one for World's View as well now, as that one has been fried, probably due to electricity surges. The Estcourt repeater seems to have repaired itself, so we can't call Rod the "20 second" man from Ladysmith anymore. Or was is Ron, or both?

The Mighty Men Conference in Greytown was also well attended by hams from all around the country. I heard and spoke to some from Div 1, 4, 5 and 6, but was not always near a rig when they travelled to the venue on Thursday and Friday, and when they left on Sunday. Seems to me that they were a lot quieter when they left - maybe my volume button was turned down? What was interesting to note from the div 6 guys is that they commented on our repeater network. They said that they wished that they could implement it in Gauteng, but that local club politics prevented this - eish, it seems that politics gets in the way of progress in many aspect of our life. So, well done Shaun and Craig!

The SA AMSAT symposium in Durban was very interesting. It was heartening to note that our hobby is still very much involved in state of the art technology.

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If you have any useful articles for this newsletter, please email them to zs5ml@marc.org.za for publication. Any articles of interest to Amateur Radio, both technical and non technical, will be well received.

If you would like your own email address ending with @marc.org.za, please contact me.

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Ham Bulletin Readers

02 May -ZS5CID
09 May - ZS5ML
16 May - ZS5BGV
23 May - ZS5CID
30 May - ZS5ML

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Tailpiece:

Every Friday evening after work Van der Merwe would braai a big, fat juicy steak. But his neighbours, being Catholic and therefore reluctant to eat meat on Fridays suffered agonies of temptation as the delicious aroma carried on the evening breeze.

They persuaded their priest to try to convert Van. Success! Van attended Mass and the priest sprinkled holy water over him and said, "You were born a Protestant, raised a Protestant but now you are a Catholic."

Everybody was delighted.

But when Friday night came the wonderful aroma of grilled steak again wafted over the neighbourhood. The priest rushed into Van's garden just in time to see him clutching a small bottle of holy water and sprinkling it over the grilling meat and chanting, "You was born a cow, you was raised as a cow, but now you is a snoek!"

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