HAMS Haywire News
April 2011
www.marc.org.za
PO Box 1076, Hilton, 3245

MIDLANDS AMATEUR RADIO CLUB

AFFILIATED TO THE SARL & IN ASSOCIATION WITH THE NATAL CARBINEERS

CLUB COMMITTEE 2010-2011

CHAIRMAN, HHN, WEBMASTER & EMAIL
Mike Lauterbach ZS5ML
082 372 0997

VICE CHAIRMAN & TECHNICAL
Shaun Rudling ZR5S
082 676 1488

SECRETARY & TREASURER
Ian Pearson ZS5AZ
082 419 6450

EVENTS, PRO & TRAINING
Shaun Fisher ZR5SF
076 600 4460

DISASTER MANAGEMENT
Des Mullen ZU5DM
082 496 9573

Club House Manager
Gavin Claasen ZR5GAV
076 305 9644

The Chairman's Report

As one has to spend a lot of time scratching for good articles to include in the HHN, I'm always on the look-out when reading through the forums. I spotted a thread on 6m beams on the SARL forum, and included two of these references in this edition, as they are well presented with the finer construction details and have some interesting construction ideas.

As always, I appreciate article submissions. It's your magazine - I'm merely the editor. If you come across an interesting article, please forward it for inclusion. The really interesting articles are the ones concerning you: how you constructed something, made a plan, wrote a program, made interesting contacts... the list is endless.

This edition follows closely on the heels of the March HHN. Initially I thought that I'd wait for ICASA to release the corrected regulations. But this could take some time, and I decided to release this edition before the weekend of our next meeting. Until the corrected regulations are released, it seems to be safe to assume that with immediate effect ZRs have the same privileges as ZSs in all respects, only candidates younger than 20 can sit the Class B ZU exams and that ZU licence holders over the age of 25 have 2 years to upgrade to a Class A licence.

Please also ensure that your licence is up to date. If you have not received an invoice for the 3 month's January to March 2011 be aware that your licence may have been cancelled if your account was in arrears for 2010.

Do not just pay on an old account but contact ICASA to check the status of your account. Peter ZS5PHL has offered to assist. Contact 031 3349515. Do not sit back and wait for an invoice that might not arrive, make a call to check. The licence fee this year is still R27pa.

There are 3 possible upcoming events on the cards. The first one is at very short notice - we require operators for the UCI Mountainbike World Cup held in the hills behind Cascades this weekend. Should it go ahead it will clash with our monthly meeting, but I will take a break from the race to attend the meeting.

Then Shaun ZR5SF has arranged another work party at World's View on Saturday 7 May to finish the work started there. Please stay tuned to our bulletins and forum for further details closer to the time.

We have also been approached to help with communications in the National Battlefields Off Road Race in the Dundee area, on 20 and 21 May. Eight operators will be needed. It is in the preliminary planning stage. Travelling expenses and accommodation will be covered if we participate. If you can join and help out in all three events above, please contact Shaun ZR5SF.

Happy Easter to all, and safe journeys to those who will be travelling.

73
Mike ZS5ML

----------**********----------

Diary of Events

15-16 April	SARL National Convention at Vaal University for Technology.
16 April	MARC monthly club meeting at 11h00
7 May	RTA in Cape Town.
18 June	Programming in Windows course in Gauteng. Book at www.sarl.org.za.

----------**********----------

Ham Bulletin Readers

17 April - ZS5ML
24 April - ZS5AZ
1 May - ZS5SF
8 May - ZS5V
15 May - ZS5ML
22 May - ZS5AZ
29 May - ZS5SF

----------**********----------

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 Hilton on 433.000 MHz simplex. Temporarily on 145.450MHz

BEACON

Greytown 50.321 MHz (Tx) ZS5SIX FSK (Not active at the moment)

Banking Details

Account Name: Midlands Amateur Radio Club
Account type : Cheque
Bank: First National Bank
Acc #: 62057756507
Branch: Bank St
Branch Code: 220825

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: 145.750MHz, 145.6625MHz, 145.775MHz, 145.700MHz
UHF: 439.225MHz
HF : 7.090MHz

Hamnet Bulletins: Sundays at 07h00 on 145.625MHz and 3.760MHz
Wednesdays at 19h30 on 145.625MHz

----------**********----------

A Small Yagi for 50 MHz by Ken Willis, G8VR

I wrote an article under the above heading in the Spring of 1989 and it appeared in Practical Wireless in July of that year. In a later edition some further notes were published, following some computer simulation studies on the antenna by Dr. Ian White, G3SEK and my good friend Bob Reif, W1XP. Since then, several of these antennas have been duplicated around the world, and from time to time I still receive enquiries from potential builders. Consequently the editor of Six News suggested that it would be a good idea to prepare an updated article, now that some six or seven years of operational experience using this little antenna have shown its capabilities. We are indebted to the editor of Practical Wireless who readily gave permission for some of the original text and art work to be reproduced here.

There is little doubt that the most important part of any amateur radio station is the antenna system, yet few of us are fortunate enough to live in areas where tall masts supporting the sort of arrays we would like to use would be tolerated. The release of 50MHz facilities posed antenna problems for many amateurs, particularly those who previously operated only on the VHF/UHF bands where element and boom lengths are less conspicuous, being more in keeping with typical domestic TV aerial systems. In the early days of Cycle 22 , I commenced a study of the literature in an attempt to find a really compact antenna, with forward gain, for six metres. From the outset there was no escaping the fact that a compromise solution would be necessary.

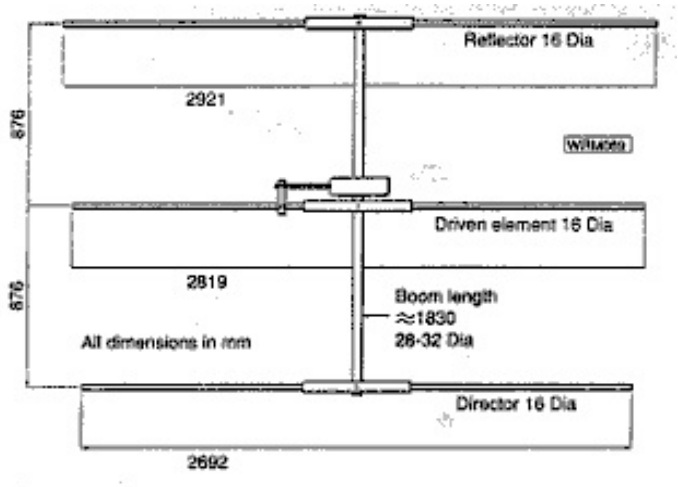


Fig. 1

My thinking was that as the solar cycle progressed the real DX would be arriving via F2 propagation, so I favoured a small yagi which should offer low-angle radiation, reasonable directivity and suitable front-to back characteristics, useful for reducing interference. Some early arithmetic soon indicated the problems. A 50MHz 5-element yagi with elements spaced 0.25 wavelength would require a boom length of almost 20 feet, definitely a non-starter at my QTH. Reducing the spacing to 0.2 wavelength still resulted in a boom length of almost 15 feet, which coupled with element lengths of the order of nine feet was again larger than I was prepared to contemplate and risk disturbing the excellent rapport with neighbours which I enjoy.

Eventually I found a reference to a small 3-element yagi designed for 50MHz portable operation by Ed Tilton, W1HDQ who was for some years the ARRL VHF editor and one of the operators involved in the first transatlantic six metre contacts with G6DH way back in 1946. Using his antenna as a starting point, I eventually came up with the small yagi described here; its dimensions and the matching system which I finally settled on are shown in the diagrams.

In my original article all the dimensions were given in inches, but in the Practical Wireless figures, reproduced here, they were converted to the metric system. Obviously some discretion is needed here, since, for example, a driven element shown as 2819 millimeters in length suggests the need for an accuracy of nearly one part in three thousand which is certainly not the case! Using a pocket calculator to divide the millimetric lengths given in the figures by 25.4 will give a close enough length for those like me who prefer to work in inches. I aimed at an antenna resonant close to 50.110MHz , for obvious reasons, and the dimensions given reflect this but before you take a hacksaw to metal, read the update paragraph later.

Construction.

The great attraction of this little antenna is that its boom length is less than six feet. The design is an example of what used to be known as a "plumber's delight". This descriptive name arose from the fact that in this type of antenna, the boom and all elements are bolted together with no form of insulation between them, so standard plumbing parts such as T-junctions can readily be used to simplify the construction. In my design, instead of using plumbing parts I chose clamps of the type sold for securing car exhaust systems. These are readily available in various sizes from automobile accessory stores. The U-bolt part of these should be a snug fit around the tube selected for the boom. A short length of mild steel tubing (brass might weather better) is welded (brazed) to the clip supplied with the U-bolt as shown in Figure 4. [Please note that the spacing between the gamma match and the driven element should be 58.5mm NOT 23mm.]

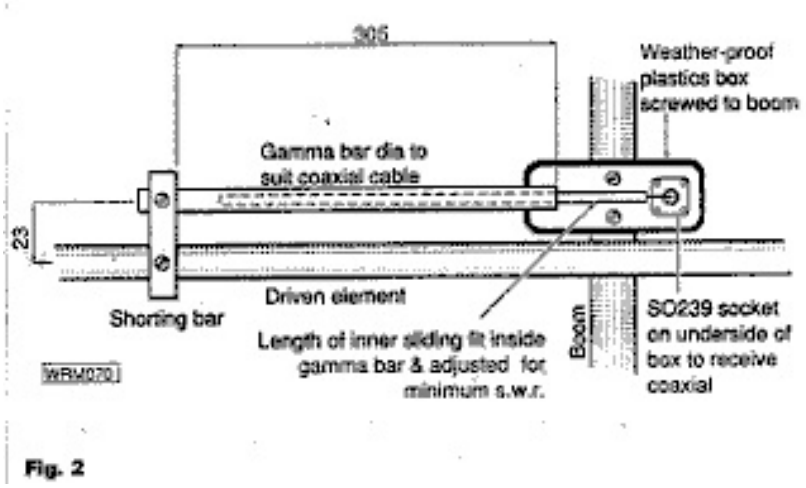


Fig. 2

The internal diameter of these tubes should be just large enough to admit the yagi elements in a nice sliding fit. A single self-tapping screw through the outer tube and biting into the element beneath enables the element to be centred on the boom and prevents sideways movement. Figure 3 shows the dimensions and construction of the shorting bar which is not at all critical, but preferably should be fairly "hefty" to reduce inductance. As for the three yagi elements, provided they are not of the extremely narrow type, their diameter is also not critical. In my prototype I used half-inch outside diameter tubing.

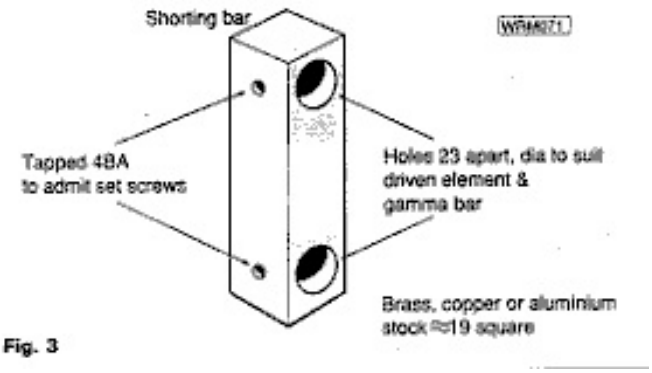


Fig. 3

Matching the antenna

For efficient operation a good match between antenna and feeder is paramount. With commercially built antennas there is usually little one can do but to accept what is offered and hope for a good SWR, but with a home-brew antenna things are more flexible. Over the years I have always favoured the gamma match, for not only is it capable of providing an excellent match with the minimum of problems, it is also particularly suited to the "plumber's delight" design because it does not require the driven element to be cut in halves for a central connection to a feedline. For those not conversant with the system, a gamma match consists of a short bar (the gamma bar) running parallel to and off-set from one side of the driven element which is an unbroken length of conductor. The end of the gamma bar furthest from the boom is connected to the driven element by a shorting bar (Figure 2). The outer (braid) of the co-axial feed line from the transceiver is then connected to the centre of the driven element boom), while the inner conductor, via a suitable capacitor, goes to the open end of the gamma bar. The length and diameter of the gamma bar and its spacing from the driven element are not at all critical, but for any given arrangement there will be an optimum value of capacitor to achieve a match. A problem has been finding a good quality capacitor of just the right value which can be mounted near the centre of the driven element where it risks being exposed to worst of the weather.

In this yagi the problem is overcome by making the capacitor a co-axial one, using a length of heavy duty coaxial cable with its outer copper braid stripped off, inserted into the tube which forms the gamma bar. (Figure 2).

Obviously the tubing and coax dimensions should be chosen to result in a good sliding fit, with little or no gap between them. By adjusting the length slid into the tubing, the capacity can be adjusted over a wide range. The dimensions shown in the figures are probably a good starting point for anyone wanting to duplicate this antenna.

They resulted in an almost unity SWR with my antenna. Some trial and error will usually be necessary to achieve a good match. I am fortunate in that my mast (which is camouflaged to look like a square drainpipe) can be cranked down to ground level very rapidly, so I was able to make several adjustments to the tubular capacitor to achieve the

lowest SWR.Reference again to Figure 2 will show how I used a small plastic box mounted on the boom to provide a weatherproof anchorage for the various bits and pieces. A piece of sheet brass was cut to fit inside the bottom of the box , forming a mounting plate for a SO 239 socket bringing the feed line up from the transceiver. Self tapping screws through the brass sheet secure the box to the boom , at the same time providing an electrical connection between the braid of the feed line and the centre of the driven element (which electrically is also the boom). The centre pin of the SO239 then forms a convenient anchor point for the free end of the gamma capacitor cable. This should all be clear from the figures. Make sure that in practice the SO239 socket and its associated plug are well and truly taped up to give protection from the weather.

Results

Considering the small amount of aluminium in the air, this little antenna has produced outstanding results at my station. By the time Cycle 22 was in decline, I had qualified for DXCC with more than 110 countries worked on 50MHz and 3 G-firsts (V47, ZWØ and 4J). I was also surprised to be the first in the UK to hear K6QXY "off the moon" in the February 1993 50MHz EME tests, though I suspect this was aided by my QTH which favours ground reflections.

Update

Following publication of the original article, Ian White, G3SEK, and Bob Reif, W1XP, both used my design to illustrate the use of the powerful computer program MININEC for modelling antennas. This showed the predicted performance was good at 50.2MHz, but it would be even better at 51.2MHz, witha forward gain of 5.7dB and the back/front ratio of some 14dB. The implication was that the element lengths I had chosen were too short by about 2%. (1MHz in 50MHz), so a 'quick fix' might be to increase element lengths by this amount and re-adjust the gamma match.

Another feature of MINNINEC is its ability to opimize an antenna design, and it suggested the following changes:-

Reflector - add 85 mm to length (about 3.3 inches)

Driven element - no change in length

Director - subtract 25 mm from length (about 1 inch)

Of more significance were the recommended element spacings for the optimized version, which were quite different, i.e. reflector/driven element 555mm (22 ins), driven element/director 1125mm (44.3 ins).

MININEC predicted these changes would increase forward gain from 5.7 to 6.0dB (hardly significant) but considerably improve radiation pattern to a front/back ratio of 31dB as opposed to the original 14dB.

If I was to make this antenna again, armed with the computer data, it would be sensible to adjust the element lengths to bring resonance closer to 50.110, though the effect on forward gain would be minimal.

I would consider changing the position of the elements on the boom, however. The existing front/back ratio appears adequate for my purposes, giving enough signal off the back to alert me that things might be happening in directions other than the one I am pointing at the time. Also, from the point of view of the centre of gravity of the antenna, I like having the driven element close to the mast-head which is where feed line arrives. Remember that computer figures are one thing, achieving maximum theoretical performance in practice is another.

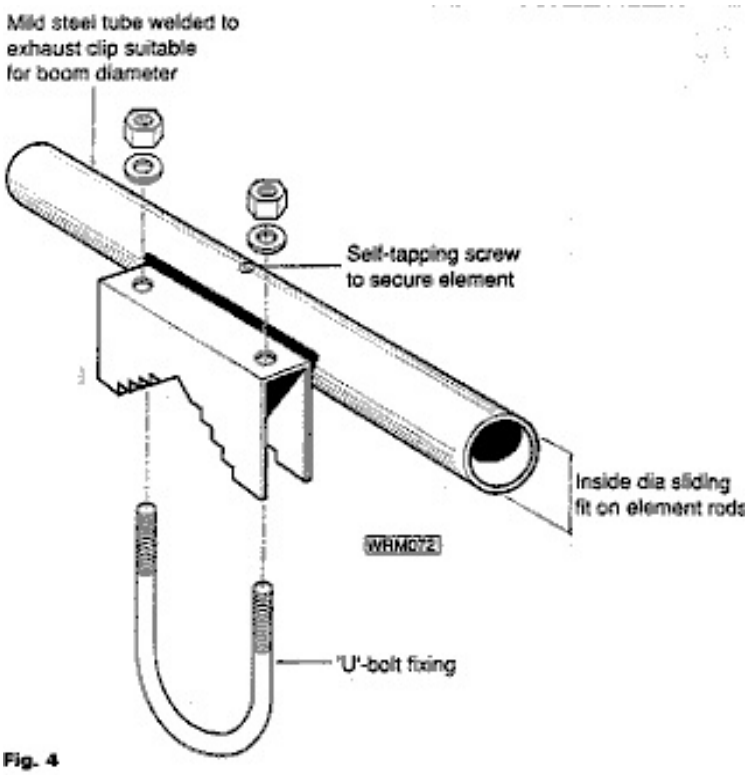


Fig. 4

If you decide to build one, whichever dimensions you choose, the result will be a compact, rugged antenna performing well. We would all like a bigger antenna, but when F2 is about, 50MHz behaves more like HF. Would you turn up your nose at a well-matched 3-element yagi on 14 or 28MHz?

From a reception standpoint, it must be admitted that the lower forward gain of this small antenna compared much larger arrays used by some of the "big guns" on 50 MHz was noticeable during some major openings when stations they were working in areas such as W7 and JA were a few dB down at my QTH, but I don't think I missed a lot and I had more than my share of the good things on offer. I see no reason for changing to a bigger antenna for Cycle 23.

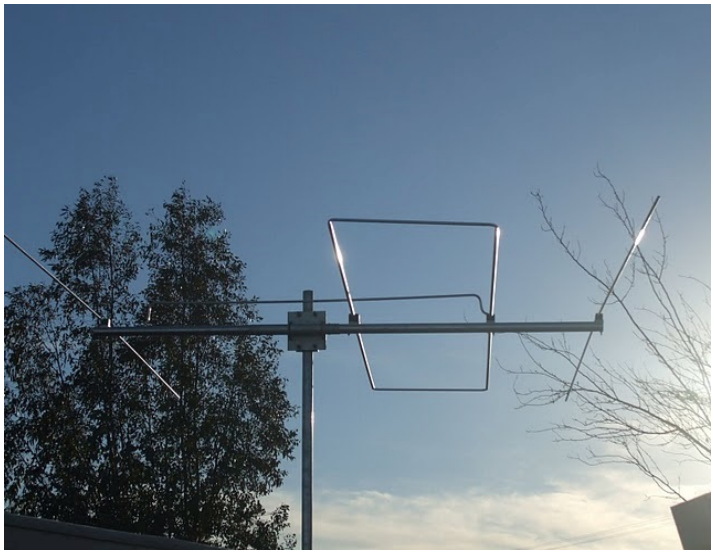
A short 3 element LFA Yagi for 50MHz with a 1.94M boom by G0KSC (www.g0ksc.co.uk/3el-19mtr-boom-lfa.html)
Ed: Some nice construction ideas in his article:

If you suffer with noise from living in the city, this is another low-noise antenna from G0KSC

This antenna is a great stacker stack at 4.7 metres apart either horizontally, vertically or both. For more information on stacking this antenna, Email me.

This antenna has been designed in order to minimise the upward and downward lobes typically seen the the EL plane on Yagi antennas. By doing this, a drastic reduction in pick up of unwanted noise in City locations is the result. The double bonus is the likelihood of reducing transmitted interference too. However, this version is not a model with optimum suppression which would see a reduction in forward gain of 1dB. If you suffer with very bad noise on 50MHz and have room for an antenna of this size, Email me for details of the very high suppression version.

The 3el LFA for 50MHz at AD6D



AB5EB's version of the antenna for IOTA

The 3el G0KSC LFA Yagi at VK2GOM
'The SWR hardly shows on the meter... probably about 1.1:1 across the part of interest (50.000 - 50.300)...' VK2GOM

The 3el 6M LFA built by Chris, M5LRO - Pawsey stub and thru-boom mounting also, well done Chris!

Construction ideas from K5DIY

Full view of the K5DIY 3el LFA

This antenna can be built with Metric or Imperial sized tubing:

Performance
Gain: 8.47dBi @ 50.150MHz
F/B: 30.37dB @ 50.150MHz
Peak Gain: 8.58dBi
Peak F/B: 30.7dB
SWR: Below 1.3.1 from 50MHz to 50.500MHz

Construction
Download the EZNEC files here:
http://www.g0ksc.co.uk/file-download/category/1-antenna-design-files.html?download=62%3A3el-50mhz-lfa

For full details of how to make the LFA, read here: http://www.g0ksc.co.uk/making-the-lfa-loop.html

Antenna Dimensions

Spacing		Half Element Size in Metres	Element Diameter
Reflector	0.000	1.485	3/8 inch
DE1	0.416	1.221	1/2 inch (feedpoint in this element)
DE2	0.947	1.221	1/2 inch
D1	1.940	1.326	3/8 inch

Metric tubing:

Reflector	0.000	1.484	10mm
DE1	0.416	1.218	12mm (feedpoint in this element)
DE2	0.947	1.218	12mm
D1	1.940	1.325	10mm

The ends of DE1 and DE2 are connected together with 10mm or 3/8 inch tube. the Feed point is the centre of DE1.

----------**********----------

SA's R25m satellite conks out in space

www.timeslive.co.za, Apr 10, 2011 2:25 AM | By BOBBY JORDAN

South Africa's R25-million satellite has partially broken down, less than two years after launch - meaning that years of effort by some scientists have gone to waste.

The news that several projects are unlikely to take place is a blow to researchers who prepared hi-tech experiments to be launched by the spacecraft, SumbandilaSat.

The satellite's stabilisers have malfunctioned, causing SumbandilaSat - launched at the end of 2009 - to tumble in space, and radiation from the sun has damaged the high-resolution camera.

In a written reply to questions in parliament recently, the Minister of Science and Technology, Naledi Pandor, said engineering troubles were likely to last until the end of the satellite's life.

"Owing to SumbandilaSat's physical condition, the forced- vibrating-string experiment (Nelson Mandela Metropolitan University) and the very-low-frequency radio experiment (University of KwaZulu-Natal) payloads have not yet been turned on and have not had a chance to download information ... This will probably last until the end of SumbandilaSat's life," Pandor said.

"Due to the tumbling effect of the satellite and its battery capacity, priority has been given to SumbandilaSat's multi-spectral imager, its main payload."

Andrew Collier, head of the University of KwaZulu-Natal's project, said he had given up inquiring about his experiment.

"It is quite disappointing, because a lot of time and effort went into designing those experiments. We have been waiting for the results ... because I have students who will then go ahead and work on the analysis of the data that comes back. "

Eugene Avenant, spokesman for the SA National Space Agency, labelled the satellite project a success. "We are downloading useful images on a daily basis that are being used by students and other researchers in studying natural phenomena."

He said SA had also gained valuable experience in building satellites.

----------**********----------

Earth's magnetic pole shifts, screws up runway at Florida airport

By Liz Goodwin, Yahoo News

An airport in Tampa, Florida, has had to temporarily close its runways to keep up with Earth's magnetic north pole, which is drifting toward Russia at a rate of 40 miles per year.

Fox News reports that the international airport was forced to adjust the signs on its busiest runway Thursday because pilots depend on the magnetic fields to navigate. The runway will be closed until Jan. 13, and will re-open with new taxiway signs that indicate its new location on aviation charts, the Tampa Bay Tribune reports.

Paul Takemoto, a spokesman for the FAA, says the Earth's magnetic fields are constantly in flux -- but rarely so much so that runway signage needs to be changed. "You want to be absolutely precise in your compass heading," he told Fox. "To make sure the precision is there that we need, you have to make these changes."

"The Earth's poles are changing constantly, and when they change more than three degrees, that can affect runway numbering," FAA spokesperson Kathleen Bergen told Fox News. It's unclear whether any other airports will have to adjust their runways.

Earth's magnetic field, which still flummoxes those who study it, "is thought to be generated deep inside the planet," LiveScience writer Jeanna Bryner explains. "An inner core of solid iron is surrounded by an outer core of molten iron. They rotate at different rates, and the interaction between the regions creates what scientists call a 'hydromagnetic dynamo.' It's something like an electric motor, and it generates a magnetic field akin to a giant bar magnet."

Sometimes, the poles completely flip -- and presumably when that happens, many bigger changes are afoot than modest tweaks to airport signs. The last time the planet experienced a polarity flip was 780,000 years ago.

----------**********----------

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 zs5ml@marc.org.za

----------**********----------

Tailpiece

Wife asked her husband to describe her.

He said, 'You're A, B, C, D, E, F, G, H, I, J, K'.

She said, 'What does that mean?'

He said 'Adorable, Beautiful, Cute, Delightful, Elegant, Foxy, Gorgeous, Hot'.

She said, 'Oh that's so lovely. What about I, J, K?'

He said 'I'm Just Kidding...'

----------**********----------