



WATTS

01-2010

Year 80 + 1m

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



PARC, PO Box 73696 Lynnwood Ridge 0040, RSA



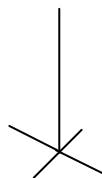
<http://www.parc.org.za> mail: zs6pta@zs6pta.org.za

Bulletins: 145,725 MHz 08:45Sundays / Sondag
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

ZR6FD logo

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Jubilee

ZS 80 PTA

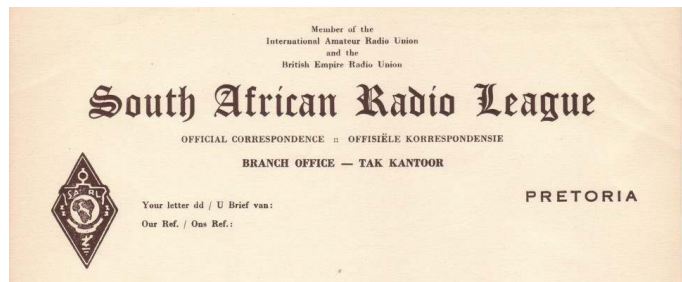
(callsign not applied for)

1930-2010

1929/30 Pretoria Radio Club formed
1935 Pretoria Section of Div. 6 of the SARRL



1944 PRC revival after WWII
1945 PRC rejoins League after League revival
1946 Independent Branch of the League



1996 Pretoria Branch becomes a Club affiliated to the League. Own Club logo.

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- Minutes 12 /12 Notules
- Member's pages Lede-bladsye
- Member news / Activities Lede-nuus en Aktiwiteite
- TTL Frequency doubler
- Technical Are sunspots disappearing?
- Spiderbeam vs Hex-beam
- Page eight Bladsy agt

In hierdie uitgawe

Next Meeting

Date: 13-01-2005
Time: 19:30 for 20:00
PARC Clubhouse,
South Campus,
University of Pretoria.
SE cnr University and
Lynnwood roads.

PARC Management team / Bestuurspan Aug. 2009 - Aug. 2010

Committee members

Chairman , Rallies, Hamnet	Johan de Bruyn	ZS6JHB	chairman@zs6pta.org.za	012-803-7385	082-492-3689
Vice-Chairman	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za	012-567-3722	082-908-3359
SARL liason, fleamarket					
Treasurer, Secretary	Richard Peer	ZS6UK	treasurer@zs6pta.org.za	012-333-0612	082-651-6556
Repeaters, Technical	Craig Symington	ZS6RH	craigsym@global.co.za		083-259-3233
Contests	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Public Relations	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
Social	Doréén de Bruyn	ZR6DDB		012-803-7385	082-857-9691

Co-opted / Geko-opteer:

Auditor	Elma Basson				
Newsletter/Kits	Hans Kappetijn	ZS6KR	editor@zs6pta.org.za	012-333-2612	072-204-3991
Asset control	Andre v Tonder	ZS6BRC	andreh.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
Webmaster	Nico v Tonder	ZS6AQ	nico@admin.co.za		082-326-9345
Hiistorian/Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Public relations	Thobile Koni	ZS6TKO	toko40@mweb.co.za		082-493-2483
Social	Molly Peer	ZR6MOL	molly@peer.co.za	012-333-0612	

Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 12 Dec. 2009.

Welcome: The chairman welcomed all present.

Present: See register, 13 members, 1 visitor

Apologies: 8 as per register.

Joys & Sorrows: Jack ZS6QA has is back in hospital with a bladder infection.. Alf ZS6ABA is in hospital with a back operation. Sig ZS6SIG will be leaving Pretoria in May next year, either to Nevada or Afghanistan.

Minutes: The minutes of the previous meeting were in Watts, approved by Pierre ZS6PJH.

Matters Arising: None.

Finances: The balance in the current account is now R6258.78. The post box and trailer licenses were paid. The donation to Viv was handled during November.

Membership: There are 110 paid up members of the total of 139. Efforts to get Viv ZS6BZS back on the air were discussed.

Activities

Rallies: The next season starts in February with the Belfast rally on 20 February.

Flea Market: The next PARC flea market is proposed on 27 March 2010 at POMC.

Technical: A discussion took place on the repeater tail.

Contests: Hans ZS6KR gave a talk for the desert island and he was agreed the winner of the award. Hans ZS6KR also produced some bifilar wound HF antenna traps and was declared the winner of the constructors trophy.

General:

Next meeting: The next meeting will be on Wednesday 13 January 2010 at about 20:00.

Editorial

Our December meeting was - in my opinion - poorly attended and one would have expected more interest and contributions from a membership of over a hundred. Is there enough enthusiasm left in our largely ageing membership? Were we all otherwise occupied with other matters that puts ham radio and the club in the back of the queue?

The PMC venue and the weather was superb and could have accommodated five times more attendance – not only for the meeting – but also for great eyeball QSO's and the subsequent braai.

It is not your editor's job to chastise anyone but I have purely stated my disappointment as I remember much livelier end-of-year functions where common interests were found and friendships were strengthened or renewed.

As you read this, we are probably already in our 80th year of existence. Your dedication is needed more than ever before to instill enthusiasm in the younger generation to perpetuate the club to a hundred years.

Redaksioneel

Ons Desember vergadering was – na my mening – swak bygewoon en 'n mens sou verwag het dat daar meer belangstelling en bydraes sou gewees het van 'n ledetal van meer as een honderd. Is daar genoeg entoesiasme oor in ons merendeels verouderende lede? Was ons almal besig met ander sake wat amateur radio en die klub agter in die tou geplaas het?

Die PMC geriewe en die weerstoestand was puik en kon maklik nog vyf maal die bywoning geakkommodeer het – nie net vir die vergadering – maar ook vir gedugte persoonlike QSO's en die braai wat gevolg het.

Dit is nie die redakteur se werk om enigiemand te berispe nie maar ek uiter slegs my teleurstelling want ek onthou baie meer lewendige jaar-eind funksies waar gemene balangstellings gevind is en vriendskappe versterk en weer gevind was.

Terwyl julle hierdie lees, is ons waarskynlik in ons 80e bestaansjaar. U toewyding word meer as voorheen benodig om entoesiasme in die jonger generasie te wakker wat ons klub kan vootsit na een honderd jaar.

Birthdays

Jan.
Verjaarsdae



02 Alf ZS6ABA
05 Pierre ZS6PJH
06 Carmyn, daughter of Gary ZR6GK
06 Brendan ZS6BW, son of Peter ZS6PJ
08 Darren ZR6TY, son of Selma and Joe ZS6TB
13 Carol, lv van Hein ZS6Q
20 Errol ZR6VDR
20 Theresa, dogter van Margriet en Tobie ZS6ZX
23 Mark KW1O
25 Margriet, lv van Tobie ZS6ZX

Jan.

Anniversaries Herdenkings

03 Margriet en Tobie ZS6ZX ()
05 Louise en Almero ZS6LDP (19)
07 Doreen ZR6DDB en Johan ZS6JHB (32)
09 Rita en Sarel ZS6AC (39)
20 Helga and Hans-Peter ZS6AJS (49)

Joys and Sorrows | Lief en Leed

Pieter ZS6PVW het begin Desember waterpokkies gekry en moes 'n week binnenshuis bly. Eish.
Aif ZS6ABA het Woensdag 9 Desember 'n rugoperasie ondergaan
Jac ZS6QA had to make another visit to hospital

Diary | Dagboek (UTC times)

Jan. 02-03 EUCW 160m Contest 2000- 0700
15-17 PEARS VHF/UHF Contest
09-10 Hunting Lions in the Air 0000-2400
10 DARC 10m Contest 0900-1059
16 LZ open Contest 0000-0600
15-17 PEARS VHF/UHF Contest
16-17 Hungarian DX Contest 1200-1200
29-31 CQ 160m CW Contest 2200-2159
30-31 REF CW Contest 0600-1800
30 SARL Youth Day Sprint 0700-1100
30-31 UBA DX SSB Contest 1300-1300

Thanks

*"I wish to thank all who contributed to my rehab fund especially ZS6RJ and ZS6QA for their generosity".
Viv ZS6BZS*

Thanks

*"I would like to thank Andre van Tonder and Johan de Bruyn for clearing out Jac's (ZS6QA) shack today, a task which I thought would take at least 3-4days. Words cannot convey my thanks, and they do not realize what a burden they have lifted from my shoulders. The two of you have displayed the real meaning of ham friendship".
Anne Roux*

Snippets | Brokkies

Deryck ZS6KQ will donate a mast for Viv ZS6BZS to use.

Roy ZS6MI offered to donate a power supply and an antenna. **Jac ZS6QA** offered a radio. Thank you to all for your consideration.

PARC Fleamarket: planned for 27 March 2010.

Sig ZS6SIG will leave South Africa for another work-related overseas appointment in May 2010.

At our last meeting Sig brought to our attention with a slide show that apart from Japanese amateur radio products there are many unique and competitive American products in radios, interfaces antennas and software. (Those of us that get QST can vouch for that). He also gave a demonstration of some of his preferred personal hardware and software accessories using his radio and laptop set-up.

PARC came first in high power category of the SARL HF Field Day contests of Feb. and November:

"1st Pretoria ARC,
ZS6PTA, 30 488 points,
Multi-operator field
station"

Well done Pierre ZS6PJH and his team having beaten the nearest contender by some 10.000 points.



An old, but not cold design idea to double the frequency output of a TTL signal generator or frequency (reference) standard (eg: 5MHz to 10MHz)

TTL-compatible frequency doubler rejects harmonics without tuned circuits

Two retriggerable, monostable one-shots (SN54123s) and one NOR gate (SN54128) plus a few discrete components can be configured as a frequency doubler that accepts a 5-MHz, TTL-compatible, symmetrical square wave and delivers a similar waveform at 10 MHz into a 50- Ω load (see Fig.). Also, harmonic and subharmonic rejection is 40 dB without tuned circuits over a 1-dB bandwidth of $\pm 20\%$.

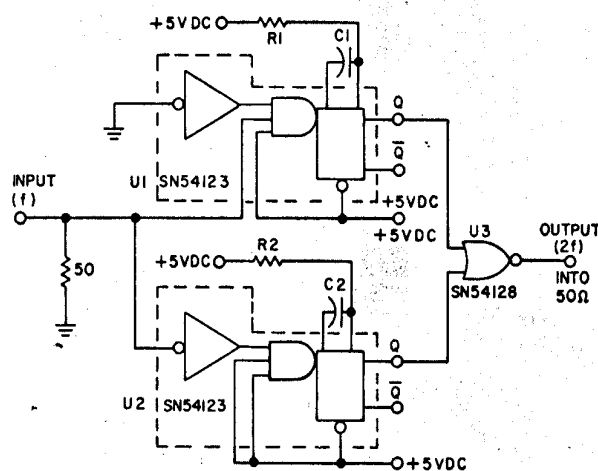
The key circuit elements are the one-shots, U_1 and U_2 . Their output pulses are programmed by selecting external resistances R_1 and R_2 and external capacitances C_1 and C_2 . These components are selected such that the duration of the output pulse from each one-shot is one-fourth the input waveform period. With the input signal at 5 MHz, period $T = 1/f = 1/5 \times 10^6$, or 200 ns. The pulse widths at the outputs of the one-shots (Q and \bar{Q}) are 200 ns/4 or 50 ns.

One-shot U_1 is triggered on the leading edge of the input waveform, and U_2 on the trailing edge of the input waveform. The U_1 and U_2 Q outputs are then applied to the NOR gate (U_3), thus producing a square wave at U_3 's output at twice the frequency of the input to U_1 and U_2 .

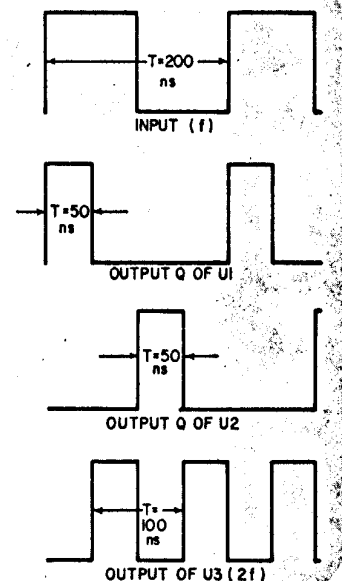
Other important characteristics of this circuit include inherent frequency stability (no parametric oscillations of the type present in transistor or step-recovery diode multipliers) and an output that stays leveled with a 6-dB variation in the input signal. Note that the frequency of operation may be extended by employing ECL circuit components.

Ralph W. Carfi and John T. Bartholomew, Design Engineers, Solid State Equipment Engineering, General Electric Co., Court St., Syracuse, NY 13201.

CIRCLE NO. 313



This frequency doubler, operating between 5 MHz (input) and 10 MHz (output), has harmonic and subharmonic rejection of 40 dB.



Jerry Sevick, W2FMI, one of ham radio's great technical contributors, has passed away peacefully at the age of 90.

Jerry embodied the old-fashioned amateur spirit of innovation by experiment, applying his many years of experience as a Bell Labs researcher to a retirement project analyzing the performance of short vertical antennas. That work led him to the study of **transmission line transformers**, for which he became well-known in both the ham and professional radio engineering communities. He brought a little-known piece of technology to the forefront, and worried until the end whether enough people understood the principles behind the operation of these devices.

Are Sunspots Disappearing?

Author: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#) from: Nasa.gov

September 3, 2009: The sun is in the pits of the deepest solar minimum in nearly a century. Weeks and sometimes whole months go by without even a single tiny sunspot. The quiet has dragged out for more than two years, prompting some observers to wonder, *are sunspots disappearing?*

"Personally, I'm betting that sunspots are coming back," says researcher Matt Penn of the National Solar Observatory (NSO) in Tucson, Arizona. But, he allows, "there is some evidence that they won't."

Penn's colleague Bill Livingston of the NSO has been measuring the magnetic fields of sunspots for the past 17 years, and he has found a remarkable trend. Sunspot magnetism is on the decline: Sunspot magnetic fields measured by Livingston and Penn from 1992 - Feb. 2009 using an infrared Zeeman splitting technique.

"Sunspot magnetic fields are dropping by about 50 gauss per year," says Penn. "If we extrapolate this trend into the future, sunspots could completely vanish around the year 2015."

This disappearing act is possible because sunspots are made of magnetism. The "firmament" of a sunspot is not matter but rather a strong magnetic field that appears dark because it blocks the upflow of heat from the sun's interior. If Earth lost its magnetic field, the solid planet would remain intact, but if a sunspot loses its magnetism, it ceases to exist.

"According to our measurements, sunspots seem to form only if the magnetic field is stronger than about 1500 gauss," says Livingston. "If the current trend continues, we'll hit that threshold in the near future, and solar magnetic fields would become too weak to form sunspots."

"This work has caused a sensation in the field of solar physics," comments NASA sunspot expert David Hathaway, who is not directly involved in the research. "It's controversial stuff."

The controversy is not about the data. "We know Livingston and Penn are excellent observers," says Hathaway. "The trend that they have discovered appears to be real." The part colleagues have trouble believing is the extrapolation. Hathaway notes that most of their data were taken *after* the maximum of Solar Cycle 23 (2000-2002) when sunspot activity naturally began to decline. "The drop in magnetic fields could be a normal aspect of the solar cycle and not a sign that sunspots are permanently vanishing."

Penn himself wonders about these points. "Our technique is relatively new and the data stretches back in time only 17 years. We could be observing a temporary downturn that will reverse itself."

The technique they're using was pioneered by Livingston at the McMath-Pierce solar telescope near Tucson. He looks at a spectral line emitted by iron atoms in the sun's atmosphere. Sunspot magnetic fields cause the line to split in two—an effect called "Zeeman splitting" after Dutch physicist Pieter Zeeman who discovered the phenomenon in the 19th century. The size of the split reveals the intensity of the magnetism.

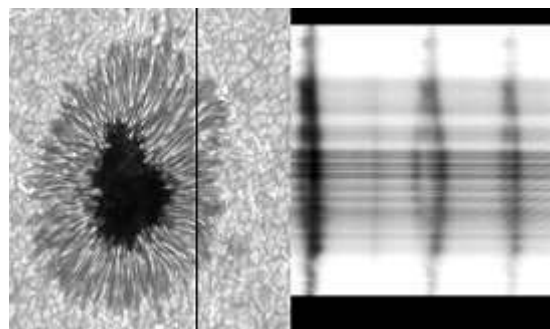
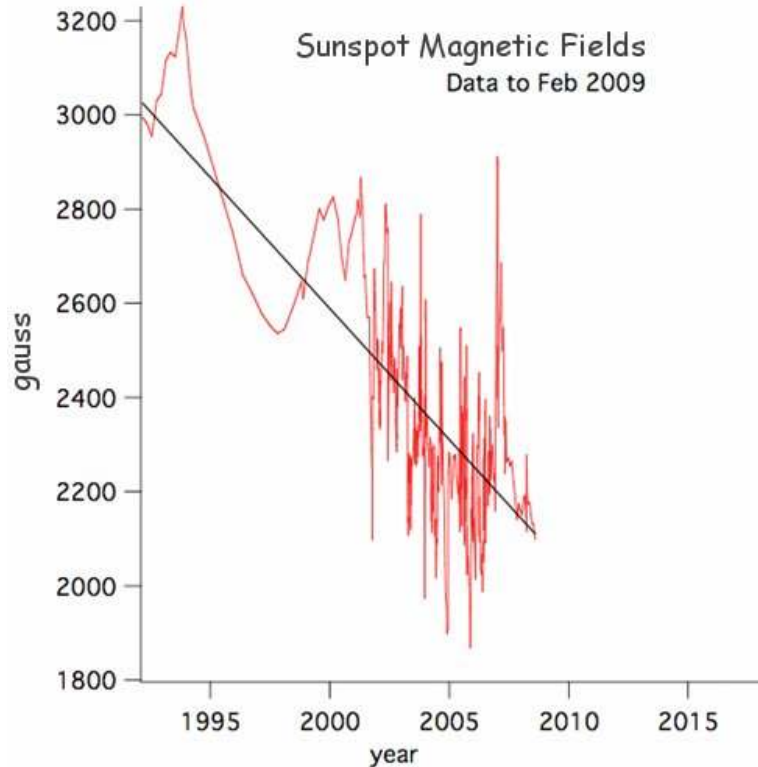
Right: Zeeman splitting of spectral lines from a strongly-magnetized sunspot.

Astronomers have been measuring sunspot magnetic fields in this general way for nearly a century, but Livingston added a twist. While most researchers measure the splitting of spectral lines in the visible part of the sun's spectrum, Livingston decided to try an infra-red spectral line. Infrared lines are much more sensitive to the Zeeman effect and provide more accurate answers. Also, he dedicated himself to measuring a large number of sunspots—more than 900 between 1998 and 2005 alone. The combination of accuracy and numbers revealed the downturn.

If sunspots do go away, it wouldn't be the first time. In the 17th century, the sun plunged into a 70-year period of spotlessness known as the Maunder Minimum that still baffles scientists. The sunspot drought began in 1645 and lasted until 1715; during that time, some of the best astronomers in history (e.g., Cassini) monitored the sun and failed to count more than a few dozen sunspots per year, compared to the usual thousands.

"Whether [the current downturn] is an omen of long-term sunspot decline, analogous to the Maunder Minimum, remains to be seen," Livingston and Penn caution in a recent issue of EOS. "Other indications of solar activity suggest that sunspots must return in earnest within the next year."

Whatever happens, notes Hathaway, "the sun is behaving in an interesting way and I believe we're about to learn something new."



Hex-beams and Spider beams

Roger ZS6RJ

Although they appear to be similar, there are considerable differences:

The Spider-beam is 10 m or a whopping 33 ft across. The hexbeam is only 22 ft across. Therefore you're looking at a turning radius of 16,5 ft vs 11 ft. Both antennas weigh around 11 kg - but it depends what you make them out of. My first one weighed a lot less (about 7 kg), but the spreaders gave up after 4 years.

Spider-beams generally require the use of a balun - hexbeams don't.

Spiderbeams use 4 spreaders, hexbeams use 6 shorter spreaders.

The hexbeam is affected a lot less by the direction of the wind.

If you wanted to add the 6 metre band to a spiderbeam, you'd have to extend the boom length to just under 12 m, whereas on a hex you can add it by merely increasing the length of your vertical centre post by 10 cm!

Spiderbeam antennas rely on careful spacing of elements to avoid interaction, because they are all in the same plane – just like a traditional interlaced yagi.

Hexbeam antennas are much easier to sort out on the interaction side, because the elements are three-dimensional in that they stack above each other moving up the centre post the lower you go in frequency.

The only two tricky ones are the 10 and 12 m band, and you can merely slide the hose clamps up or down a bit on the spreaders to eliminate any problems.

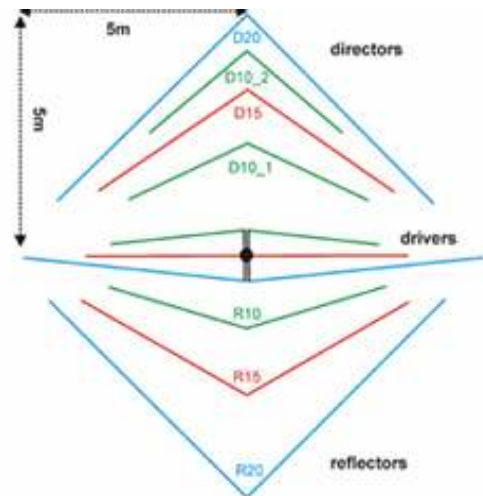
Finally, spiderbeam hardware is more complex.

If you want to shove up a hexbeam in a hurry, you could buy a bit of plywood for a middle hub, some 20mm electrical conduit, strap 'em onto the plywood with big plastic cable ties, and string 3mm copper earth cable around the conduit, using the wire itself to yank the conduit into shape. Great for a field day.

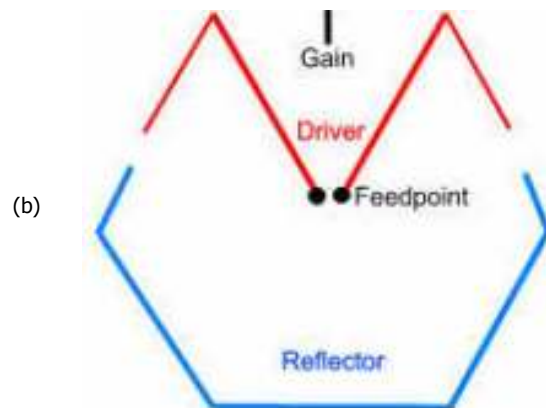
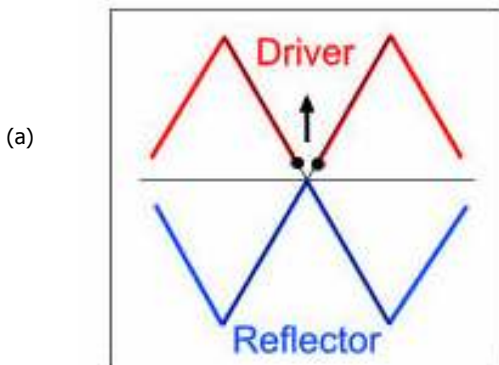
Being a sceptic, I did this first time around to test the concept and I had a 20 m monobander version going in about 45 minutes for R120 that was out-performing my tri-bander! That's what convinced me.

On the performance side, spider-beams can be configured to be 3 elements on some bands, whereas hexbeams are always 2 elements per band. However the third element means a much larger antenna and not a lot of noticeable performance gain (about 1db), which I really don't think is worth an extra 11 ft of boom up on the tower!

This is the layout of a Spiderbeam:



and these are the two alternative element layouts of the Hexbeam:



(a) This is the traditional hexbeam. Using a double "arrow" shape instead of a single arrow shape like a spiderbeam has no noticeable effect on performance and the huge advantage of saving 11 ft of boom space. There was one minor drawback in that bandwidth was a little narrow in terms of covering both CW and SSB band portions. My original hex I've just pulled down was like this.

Being a CW man, I cut my elements for CW and used a tuner in the SSB portion – although my SWR was still never more than about 2.3:1 at its worst.

However, a recent development by Steve (G3TXCQ) who originally designed the hex, has been to change the shape (and length/end-spacing) of the reflecting element to look like (b).

This gives you full coverage of all bands without the need for any antenna tuner and your SWR should be less than about 1.6 to 1 at the worst, with most portions being 1.1 to 1.3 to 1. It adds 28 cm to the diameter of a 6 band hex. Note that the reflector does not end at the centre spreader now, but actually feeds through the loops and has 10 cm forward of the centre spreader before the spacing cord to the DE.

This is the design that I have now put up. I have not used the antenna yet with a rig, but all the testing tells me it is fine. I've spoken with Steve the designer quite a lot over the air and I think this hex development is going to be really great.

Anyway – I'll condense all the info into an article that's not too long for Watts and give tech details of FB ratios, and all lengths required to build your own etc. But I warn you, if it catches on there's going to be a lot of TH3's for sale cheaply! This antenna is brilliant to play with on 17 and 12 metres – I worked over 200 stations in Europe on 12 ssb using 80 watts a couple of weeks ago one afternoon.

Cheers, Roger.

PS: Main issue in this country is to find durable enough fibreglass spreaders. I'd like to have something that can hit 8 to 10 years without maintenance. I think what I have now might approach that, but I had to import the spreaders from the States this time around - I'm going to be looking for cheap alternatives locally. The fishing rod blanks I was using cost R 1 600 for 6 from Blue Marlin, and as I've discovered, 4 years is their maximum expected life in our sun.

Long Term HF Propagation Prediction for Jan 2010

courtesy ZS6BTY

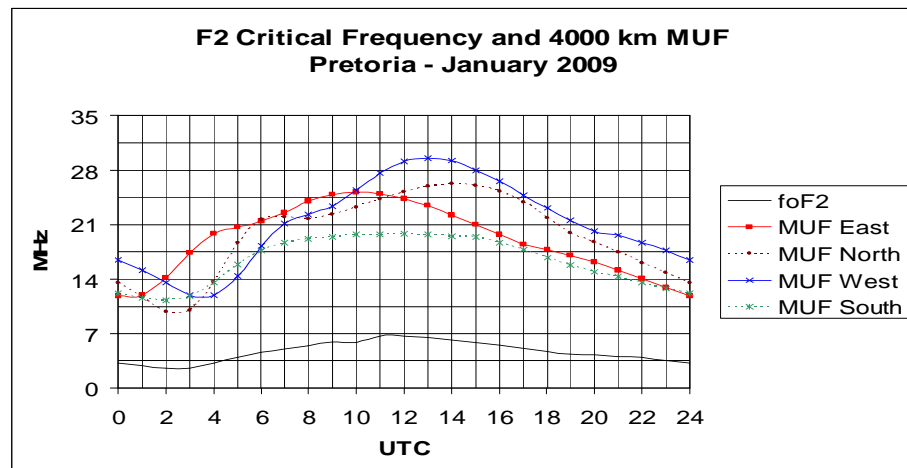
(see also our website propagation tab)

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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THE GREAT SEAL BUG STORY

Condensed from www.spybusters.com

(A Replica of the Great Seal bug is on display at the National Security Agency (NSA))

In 1946, Soviet school children presented a two foot wooden replica of the Great Seal of the United States to Ambassador Averell Harriman. The Ambassador hung the seal in his office in Spaso House (Ambassador's residence). During George F. Kennan's ambassadorship in 1952, a routine security check discovered that the seal contained a microphone and a resonant cavity which could be stimulated from an outside radio signal.

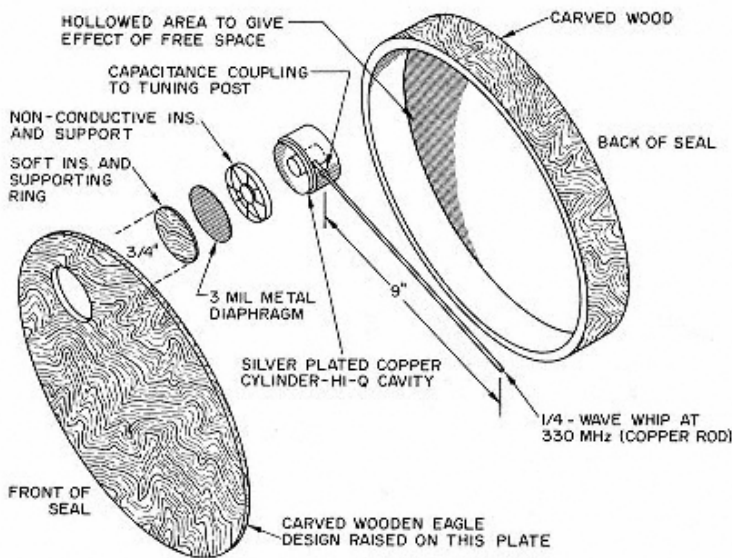
The Great Seal bug was discovered in 1952, but its existence was not made public until 1960.



May 26, 1960
Ambassador Henry Cabot Lodge, Jr.
displays the Great Seal bug at the United Nations.



In displaying this equipment to the United Nations, Henry Cabot Lodge charged that more than 100 similar devices had been recovered in U.S. missions and residences in the U.S.S.R. and Eastern Europe.



The triumph of the Great Seal bug, which was hung over the desk of our Ambassador to Moscow, was its simplicity. It was simply a resonant chamber, with a flexible front wall that acted as a diaphragm, changing the dimensions of the chamber when sound waves struck it. It had no power pack of its own, no wires that could be discovered, no batteries to wear out. An ultra-high frequency signal beamed to it from a van parked near the building was reflected from the bug, after being modulated by sound waves from conversations striking the bug's diaphragm.

