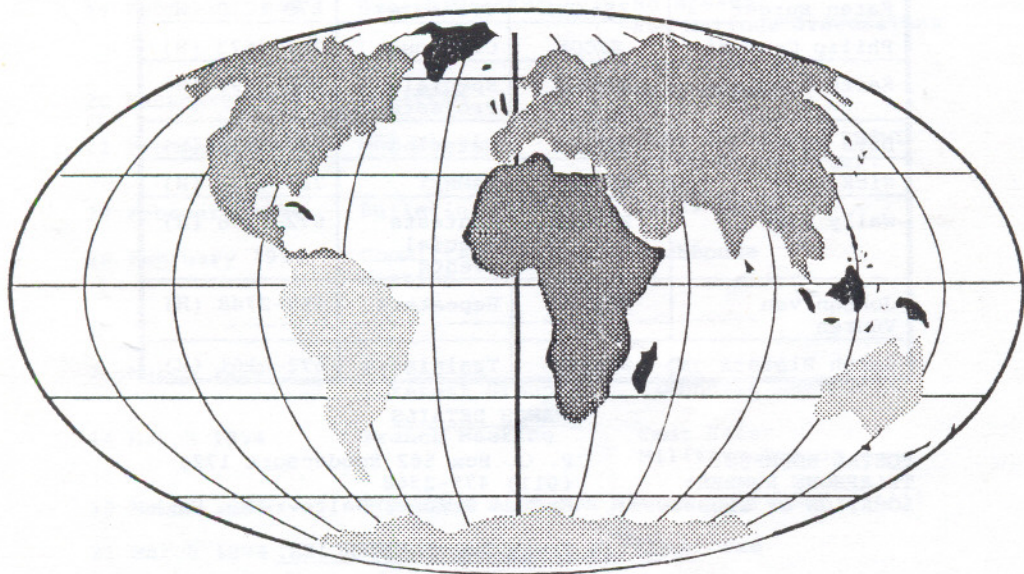


**FEBRUARY 1994**

# ANODE

NEWSLETTER of the WEST RAND BRANCH  
SOUTH AFRICAN RADIO LEAGUE



*West Rand Branch  
Wesrand Tak  
SARL  
P.O Box 562  
Roodepoort 1725*

# SOUTH AFRICAN RADIO LEAGUE

## WEST RAND BRANCH

### LIST OF COMMITTEE MEMBERS AND PORTFOLIOS

NAME	CALL SIGN	PORTFOLIO	TELEPHONE
Cedar Ryan	ZS6JQ	Chairman	763-6929 (H) 636-3436 (W)
Sarel Rossouw	ZS6APO	Vice Chairman Civil Protection	768-2091 (H) 082 496 8 742
Rina Wessels	ZR6RM	Secretary	766-3847 (H)
Karen Burger	ZS6KBM	Treasurer	679 1210 (H)
Philip Conradie	ZSCON	Clubhouse	763-4673 (H)
Keith Liddle	ZS6AGF	Special Projects	766-3293 (H)
Dave Lloyd	ZS6ACC	Catering	763-5128 (H)
Nick King	ZS6NIC	HAMNET	763-4333 (H)
Wally Sime	ZS6WAL	Contests Special events	672-7958 (H)
Johann van Vuuren	ZS6JVJ	Repeaters	955-2788 (H)
Garth Blain	ZS6BXT	Training	672-6161 (H)

### BRANCH DETAILS

POSTAL ADDRESS: P. O. Box 562 Roodepoort 1725  
 TELEPHONE NUMBER: (011) 475-2368  
 LOCATION OF CLUBHOUSE: Kroton Street, Weltevreden Park

### BULLETIN TIMES AND FREQUENCIES.

SUNDAYS: 11:15 start call in of stations  
 11:30 bulletin starts  
 145,025/,625 Mhz (West Rand repeater)  
 7,066 Mhz.

### MEETING DATES AND TIMES:

Branch meetings:	2nd Monday of the Month
QRP/Construction group:	3rd Monday of the Month
Satellite interest group:	1st Monday of the Month
Committee meetings:	Last Monday of the Month
Radio Examination classes:	Every Wednesday Night.

ALL MEETINGS START AT 19:30

# BRANCH ACTIVITIES and CALENDER

The following is a calender of amateur radio activities for the next few months.

6 February 1994	Bulletin	Keith ZS6AGF
5/6 February 1994	Contest	SARL HF Field Day Houtkoppen Site
7 February 1994	Satellite Interest Group	Clubhouse Cedar ZS6JQ
13 February 1994	Bulletin	Rina ZR6RM
14 February 1994	Branch Meeting	No speaker. AGM Motions discussions
20 February 1994	Bulletin	Nick ZS6NIC
21 February 1994	QRP Meeting	John Whitfield ZS6WL 70 Cm Transverter.
27 February 1994	Bulletin	Cedar ZS6JQ
28 February 1994	Committee Meeting	Clubhouse

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7 March 1994	Satellite Interest Group	Cedar ZS6JQ Clubhouse
14 March 1994	Branch Meeting	Cmdt Hefer Military Radios
19 March 1994	POSSIBLE DATE FOR BRANCH SWOP SHOP !!!!!	
21 March 1994	QRP Meeting	Clubhouse
26 March 1994	BACAR FLIGHT	Clubhouse
28 March 1994	Committee Meeting	Clubhouse

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18/19 June 1994	VHF/UHF Competition	FIELD STATION
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SOUTH AFRICAN RADIO LEAGUE: WEST RAND BRANCH  
SATELLITE INTEREST GROUP

For some time now there has been a latent interest in the world of satellites and especially amateur radio ones. Part of this can be explained by the decline in sunspot activity which causes DX operating to be erratic. However, a better reason is probably the "natural" desires of amateurs to experiment and construct; like the amateurs of yesterday there is still a driving force towards the unknown. Satellites provide the ground for this to occur.

At the first meeting held on 7 February the following issues were discussed amongst the 10 or so members present:

- The focus of the group must be on doing things, making parts and equipment and not on talking about action !!

- Wherever possible the concept of working groups will be used so as to build the knowledge level of individual participants.

- Details to be supplied on available satellites and modes of operation.

- A procedure to be put into place for the dissemination of Keplerian Elements and if possible times of operation for selected satellites.

- Antennas suitable for satellites and the construction of them.

- DXCC and satellite contesting.

- Advanced satellite theory encompassing items such as their construction as well as the principles behind Keplerian Elements.

- The use of satellites within one's own equipment budget.

- Beginners forum.

- Completion of the club station.

- BACAR involvement

- The Branch to join SA AMSAT as a Group Member.

- Guest speakers.

The task which the group set themselves for the next meeting will be discussing antennas and selecting those most suitable for construction. The next issue will be the actual construction of these. The idea was that we order the parts necessary to make a quantity of them and actually build them in a group. The idea was expressed that we do so at the clubhouse over a weekend. MORE DETAILS LATER. As an aside Johan ZS6JVV will be bringing his Crossed Yagi array to the meeting to allow us to see how these "things" are made. SEE YOU THERE.

From the chairman's desk.....

I am sure that members will welcome this edition of ANODE as there have been many sleepless nights worrying about the layman's explanation of Einstein's Theory of Relativity !! My interpretation of it is as follows: "..... If you sit next to a pretty girl for a minute or two, it seems to last a lifetime whereas if you put your hand on a hot stove plate it seems as if the time flies !!....." The purpose of that bit of useless information was merely to highlight how time can fly (especially when you're having fun !!

VHF contest fever is starting to build up. The latest report is that John ZS6JON and Nick ZS6NIC are in the process of constructing exotic antennas and pre-amplifiers for their station. Look out for some record breaking scores from these two in June. We will also be having John come and talk to us before the contest on proper operating procedures and how to maximise the use of a given frequency.

February/March is an odd sort of time for amateur radio events. The big occasion is the S. A. R. L Annual General Meeting to be held in Port Elizabeth over the week-end 12/13 March. Not too sure who the Branch's delegate will be but we will have him (or her as the case may be ) prepare a full report of the proceedings upon returning to the Reef. By the time that this newsletter reaches you, we would already have voted at Branch level on the various motions as enclosed with the January edition of Radio ZS. As always there is the usual mix of banal motions to those which affect the structure and operations of the League significantly. Only time will tell which of these will be accepted and which will be rejected. However it is encouraging to see that members across the country have the interests of the League at heart and are striving to improve it's operations by submitting motions for consideration at the Annual General Meeting.

The SARL HF Field Day contest was held over the weekend of 5/6 February with the Branch operating a station from the Houtkoppes Radar site. Older members will recall that the one sure way to "break the drought" and ensure that it rained was to have a West Rand Branch outdoor event. True to form it rained (and rained and rained and rained .....!!) This did not really hamper the operation of the station except at about 21:00 on Saturday evening when we saw the lightening start which resulted in us disconnecting the antenna. A big thank you to the following members who assisted in the operation and erection of the station:

Chris de Beer	ZS6RI for putting up the antennas in the rain.
Dave Brotton	ZS6BMD for towing the tower to and from the Clubhouse.
Dave Lloyd	ZS6ACC for towing the caravan
Abe Grove	ZS6BMX (of Kennis Caravans) for the loan of the caravan and "garage plates"
Dirk Beukman	ZS6AU for operating on Saturday Afternoon.

Philip Conradie

ZS6CON for making the superb breakfast on Sunday Morning.

Keith Liddle

ZS6AGF for supplying the antenna system.

A big thank you to all the visitors to the station especially the rescue team of Wally, Michael, Sarel and Craig who arrived late on Saturday Night after the emergency call out. Despite the rain they left in good spirits !! We managed some 75 calls which considering that we only managed to give the first call at around 12:30 on Saturday Afternoon was a fairly good performance. Using only 25w into a "nest" of wire dipoles for 20,40 and 80 meters we worked everybody that we heard calling which means that we ran a balanced station. The log sheets have not yet been submitted but upon recollection we worked ZS1, ZS2, ZS4, ZS5, ZS6 and 3DA0 call areas which equates to 6 of the 7 call areas allocated for scoring purposes. Again, looking back at this event as well as the recent Hunting Lions in the Air Contest it is clear that we are not particularly skilled HF operators which is not surprising considering our focus on VHF activities which call for a rather different operating style. Of course there was some debate on the air on how to increase activity for this contest. One way is to emphasise the FUN part of operating a field day station as the emergency aspects appear to have been glossed over when one considers that we used the transportable tower which needs a special vehicle for towing. The planning for the station also takes some time which is a commodity in short supply when a real emergency arises. There is also some conflict with the present rules and those relating to the HAMNET emergency contest which is run towards the latter part of the year. No doubt these matters will be taken into account when the contest is discussed at the next appropriate Council Meeting.

The first meeting of the Satellite Interest Group met on Monday evening 7 February. A full report appears elsewhere in this edition which will make interesting reading as well as fire up the enthusiasm of those who have not yet experienced the excitement of using the latest frontier of amateur radio resources. One of the positive things to come out of the meeting was the commitment to "do something" instead of simply planning or thinking about it. Members can look forward to antenna and equipment construction projects to suit all pockets coming out of this forum. Also, we are not restricting our horizons to the new generation "birds" but will be looking at using satellites within each members own equipment budget which means that all interests will be catered for. Join us again on 7 March when we look at the various antenna systems suitable for satellite communications.

Finally, improvements continue at the clubhouse. The latest is the purchase of 3 fans for installation on the ceiling to assist in the air circulation especially in the hot summer nights as well as 2 500w halogen lights to illuminate the grounds at night. Thanks to Philip for attending to these purchases.

As always, this column must come to an end. Enjoy your amateur radio activities in the ensuing month. Remember to peruse the activities calender as well as listen to the Bulletins for "fresh news" every Sunday at 11:30 on 145,625 Mhz.

## SOME OPERATING HINTS AND TIPS FOR USING RS10 SATELLITE

Two goals of all satellite operators are to use in-orbit resources efficiently and to avoid interference to other users. These operating notes for the RS-10 Mode A transponder were prepared in order to aid all users in achieving these objectives.

There is a transponder band plan in effect for RS-10. According to "The RS Satellites Operating Guide" by G. Gould Smith WA4SXM (published by AMSAT-NA), the downlink should be used as follows:

29.357 Beacon  
29.360 Passband lower limit  
\* CW \*  
29.380 Passband center  
\* USB \*  
29.400 Passband upper limit  
29.403 Beacon

Please use the appropriate portion of the passband to avoid interfering with users of the other mode.

Since the 2-meter Mode A uplink is at a higher frequency than the 10-meter downlink, RS-10 users should keep downlink frequency fixed and vary uplink frequency to compensate for Doppler shift. The equation for determining uplink frequency for this non-inverting transponder is

$$\text{uplink} = - \text{translation constant} + \text{downlink} - \text{Doppler}$$

using the convention that Doppler shift is positive during approach and negative during departure. The value for the translation constant is given in "The Satellite Experimenter's Handbook" by Martin Davidoff K2UBC (published by the ARRL) as -116.500 MHz. Recently, WD8LAQ noticed that his uplink was several kHz higher than what he had calculated using the published constant. By experimentation, N3KVQ determined that the translation constant is more accurately -116.5048 MHz. While the difference in values may seem small, searching for one's downlink 4.8 kHz in the wrong place will cause one to completely miss a CW or USB signal. It is not clear if the translation constant was simply reported to the nearest 0.5 MHz or if the on-orbit environment has changed some components in the transponder.

When searching for one's signals, send a few dits (CW) or speak your callsign (USB). Holding down the key or whistling uses a great deal of satellite transponder power and completely disrupts QSOs; these full-amplitude signals also inflict severe pain upon the ears of those unfortunate enough to be listening to that particular frequency.

Tuning with callsigns is also operationally efficient in that stations engaged in a QSO know that another station is tuned up and ready to answer a call as soon as the contact ends.

The high amount of Doppler shift for this low Earth orbit

satellite is certainly an operational challenge. If one QSO is conducted properly and a nearby second QSO is not, the second QSO can drift into the first one. The appropriate method is to choose a downlink frequency, tune the uplink frequency to correspond to that downlink frequency, then gradually increase the uplink frequency to compensate for Doppler shift through the pass.

For a typical RS-10 pass (horizon of 10 degrees, maximum elevation of 40 degrees), the Doppler shift is approximately 3.7 kHz at the beginning of the pass.

Many RS-10 users seem to avoid the top 10 kHz of the passband to prevent QSOs from sliding out of the transponder due to Doppler shift. Detailed calculations show that if the appropriate procedure is followed, a QSO slides only about 1 kHz in the transponder itself. While the total Doppler shift experienced on the ground is almost 8 kHz, the frequency compensation technique greatly reduces the shift at the transponder. For example, QSOs begun with a 29.399 MHz downlink will not slide out of the passband. There is 40 kHz total bandwidth, so please spread out and use all of it.

Attempting to manage the uplink equation with a rapidly changing Doppler shift during a pass is usually too complicated to be done in real time. An alternative is presented here in the form of a table. Simply tune the downlink to the desired frequency and leave it there, then look up the appropriate uplink frequency from the table. The AOS column gives the uplink at Acquisition Of Signal; the TCA column gives the uplink at Time of Closest Approach. Doppler shift has been incorporated into the AOS column in an average sense for a typical pass (10 degrees horizon for the receiving station, 40 degrees maximum elevation for the pass). The table should be within 1 kHz of the proper frequency.

With practice, the use of this table allows a user to avoid swooping through the passband in search of his signals. Once a user finds his downlink at AOS, it is a simple task to increase uplink frequency with every transmission to keep the QSO properly tuned.

#### RS-10 UPLINK FREQ TABLE

DWNLNK	-----UPLINK-----	
	AOS	TCA
29.380	145.8815	145.8848
29.382	145.8835	145.8868
29.384	145.8855	145.8888
29.386	145.8875	145.8908
29.388	145.8895	145.8928
29.390	145.8915	145.8948
29.392	145.8935	145.8968
29.394	145.8955	145.8988
29.396	145.8975	145.9008
29.398	145.8995	145.9028