

SOUTHEASTER

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Model Gliding Association . . .

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. . . and covering
the Activities of the



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Editorial

It's so nice when some feedback appears in the in-box — this time Anton Coetzee responded to the piece about the minute *SE-5* in last month's issue, built by Matt Keennon, who works for Aero-environment . . . Paul Macready's outfit (remember *Gossamer Condor* and *Gossamer Albatross*?)



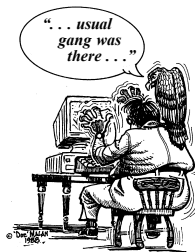
Albatross was the winner of the first Kremer Prize for man-powered flight and *Condor* made the first man-powered flight across the English Channel.) It seems that 85% of their engineers, working on Micro UAV stuff amongst other cool toys, are model fliers.

Anton remembers one trade name for “muscle wire” was Nitinol — a wire which contracts when a current passes through it.

In fact I should have made the association, that being exactly the way our muscles work — an

electrical stimulus causes the muscle to contract. In fact, that was just how Luigi Galvani discovered the basis for an electric cell or, to give it's original name, a Galvanic Cell. The story goes that he was partial to frogs-legs, and had a number of fresh specimens hanging on copper hooks suspended on an iron rod. When two legs touched, they twitched!

When he recovered from his surprise (nearly said ‘shock’ there!), being a serious scientist, he investigated the phenomenon, eventually arriving at the conclusion that when two different metals were in contact with each other and an electrolyte (salt water) an electric



current was produced — the basis of any modern cell or battery.

* * *

Following the introduction of a whole new series of official frequencies in the 27 MHz band and the expansion of the 35 MHz band as well as the imminent disappearance of 60 MHz., SAMAA recently issued a full list of official spots and Silvano used their version to create a new pegboard for us. Grazie, Silvano.

Don't forget to put your peg on the board before you fly! Either use the pegs Ed keeps on / in the plastic box or, as I do, keep your own peg and clip it in place when you arrive.

* * *



I don't know how many of you are as fascinated as I am by aerial photos and maps, but Johan Nepgen recently showed me some really unusual photos of our flying site — taken by satellite.

The first is an overhead view, from an effective height of 1,91 km, covering a patch from the Royal Cape golf course in the south to Kenilworth race course in the north and from Rosmead Avenue in the north and from Cape Flats railway line (east) to the Cape Flats railway line (east).

If that isn't enough, the second photo is an oblique version from Youngsfield south to just north of chez Lightfoot.

It's incredible to think that these must have been taken from a



height of a couple of hundred kilometres — makes it possible for one to imagine the resolution which allows the CIA to read the number plate on a car . . .

I have tried to estimate when they were taken — based on the fact that the Port Jackson jungle is still visible between the field and the M5 and the mass of armoured cars have gone from their park. My guess is around 2003.

* * *

I'm delighted to welcome a new Reporting Combo to these pages — Pieter (Wessie) van der Westhuizen and Sandy Sutherland have volunteered to provide a regular column on activities, not only on our local slopes but on any interesting happenings they encounter related to a slope.

* * *

Harry has reported an upswing in HLG activity in the last couple of issues, and Brian M recently remarked that some of the most exciting flying he remembers were HLG contests on the Common.

The discus launches which Dave Bryant has shown us recently have been an awesome sight, to the extent that Brian is investigating the chances of getting a “left-handed” (ie right-tip-pegged) wing to join in the fun.

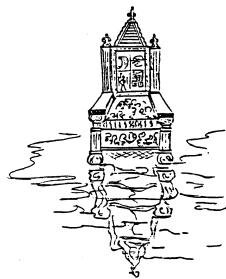
With the impressive list of HLG owners — Brian, Johan, Paul, Dave, Greg and Emanuele, there is a real possibility of trying a small contest in the near future. Don't watch this space . . . come to the field and watch the fun — or better, bring an HLG and join in!

--- o o O o o ---



Reflections of The Chair

Greg van Schaik



There are a couple of issues on which I would like feedback from anyone who feels so inclined.

Firstly, on the insurance issue, SAMAA have promised information and an update in the upcoming edition of the SAMAA News, but there are issues in terms of our organisation at the field which need to be tightened up.

Possible areas are —

- Having a sign erected at the gate (obviously we need the appropriate permission) stating that SSC is the resident club and that visitors are either to be SAMAA members or are to fly under the direct control of one of our members
- A register be maintained at the field of those flying, incorporating SAMAA numbers
- New members — what is the feeling about what are good methods to attract and keep members? What ideas have you got?

I think that we are in agreement that to keep our sport healthy we need to grow. How best do you think we should do this?

Competitions — or rather flying a specific format — do we do too much of it or not enough, and why do you think so?

Remember the club is in existence for the benefit of all of us. How can we maximise what we get out of it?

Please send your comments to me (or to John or Ed). If you don't talk to us, how can we know your feelings?

Greg

--- 0 0 O 0 0 ---

WHAT HAPPENS WHEN YOU...

- 1) have nothing to do**
- 2) own a sharp knife**
- 3) have a large lime**
- 4) own a patient cat**
- 5) drink too much tequila**



Competition Scene



Harry S. Hawk

The August Postal proved impossible until the very last day, which was also the first official day for the International event. The only difference in the rules is that the IPC allows clubs to accumulate scores from different days — provided no pilot has more than one attempt.

This meant that Brian's, JL's and Emanuele's scores from the 28th could form the basis of the Club score for the IPC, but two more were needed.

The 4th was cold and started with some drizzle, but cleared quite nicely by mid-day. There were numerous casual pilots to be seen and they collected their Southeasters, but there was no one interested in five Postals flights.

I did a double take on seeing André Swarts making a return to the scene — along with an elderly *Weevil* and two children — Kim and Ian. It seems Kim is interested in learning to fly but Ian can't relate to anything that doesn't have a monitor and surround sound.

*

The highlight of the 11th was undoubtedly the appearance of Andrew L, egged on by father, to contribute to the IPC scores. Of course it should have been foreseen that he would produce the best score — and also the mutters which accompanied his losing almost half his total points-off on his last landing! In his eyes, this constitutes a "blown flight"!

International Postal — September

						<i>total</i>	<i>avg</i>
Andrew LIGHTFOOT <i>New Sting</i>	359 100	356 100	356 95	359 95	360 85	2265	358 95
Brian MULDER <i>Sagitta-900</i>	358 100	359 90	353 95	357 95	358 95	2260	357 95
John LIGHTFOOT <i>Sagitta-900</i>	358 95	348 90	355 75	335 95	358 95	2204	351 90
Emanuele VALPERGA <i>Ava</i>	185 100	350 100	355 85	345 80	355 90	2045	318 91
Johan BEYERS <i>Pike Superior</i>	345 95	352 75	219 85	340 70	342 100	2023	320 85
Paul Rackstraw <i>Tragi</i>	359 65	356 95	298 85	258 45	358 45	1964	326 67
Wynton TAVILL <i>Big Bird</i>	248 75	179 0	179 75	130 75	250 0	1211	197 45
						Team Total	10797

André was conspicuously proud of young Kim, who, on her second flight, flew Ed's plane up the bungee, cruised around for four minutes and landed all on her own! Well done Kim!

*

The 18th was another of those rare but very welcome days, when there was just enough breeze to help the launch and there were numerous small patches of lift — hard to really call them thermals!

Paul and Johan were persuaded to put in scores for the IPC, and JL had been instructed to bring the *Sagitta* so Andrew could introduce Donvan to glider flying.



André had been having trouble with the *Weevil* on launch — it veered off violently to the right as soon as it was thrown. It did it again on finals, so Andrew tried it out, only to find it behaved perfectly — knew who was boss!?

Reassured, André took it up again, with another violent swerve on the line, which turned it all the way upside down, from where there was no recovery and serious dismemberment!

Despite his denials, most of those present were fairly sure it was a stall, resulting from too much elevator — was André “swinging” on the elevator to get / keep it in the air?

No one will know — he's unlikely to try repairing the beast.



My spies tell me that he has finished the large floater he's had on the board for several years, and his kids have completed a smaller model due to appear soon.

*

Brian phoned JL on the 25th, wondering if it was worth the trip —

Brian . . . “The wind's blowing here and it's just started raining” —

JL . . . “There's blue sky here, some cloud and almost no wind” —

They agreed that they'd see who else was mad enough to be out on the field.

Initially, only Dave Bryant, with his beautiful little HLG, which his discus launch gets to incredible height with a combination of a very clean airframe and an excellent swing / flick, although he still has to perfect the timing of pushing the nose over at the top.

Brian was invited to try it out and did his usual trick of finding a thermal and working it for several minutes. He's giving serious thought to acquiring one — if he can get a DL peg on the right tip — he's left-handed. Dave wanted to know how to tell when he was in lift!

The only others were Herbert Brink with his *Cub* and Johan Nepgen with a V-tail HLG.

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(Alan & Andy Imrie)



Spirit Elite
ARF 2m
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R 1350



Poly Quest LiPo battery
11,1 V 1800 mAh 22 C
142 g **R 695**



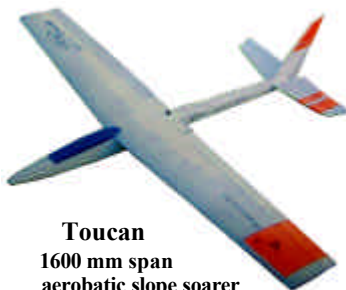
JR 770s
7 ch PCM receiver
R 700



Spirit
ARF 2m
Thermal Soarer
R 1100



Ripmax Spitfire
1250 mm span needs Speed-600 or equivalent
R 1200



Toucan
1600 mm span
aerobatic slope soarer
kit **R 995** ARF **R 1450**



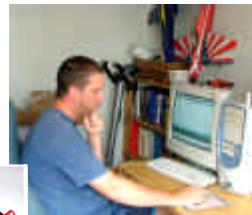
Instrument Sets
from 1/9 to 1/4 scale
(self-adhesive)
from
R 20 to R 80



Hawk
semi-scale
1000 mm span
aerobatic slope soarer
kit **R 850**
ARF **R 1299**

Electric Motors — part 5

Brian Mulder



Motor Efficiency 101

Whether you build motors or just use them, you ought to know something on the subject of optimizing a power system. Of course you could just adhere to the motor manufacturer's specifications for a bought motor, but for a self-built motor, you ought to know how your motor is performing. Doing the calculations will reveal if you have made a bad motor, or a real good motor that you would perhaps want to duplicate. And if you take the time to measure all the motor's parameters, you could answer a number of interesting questions without burning out a motor and learning the hard way.

What is Motor efficiency?

It is the ratio between input power and output power. The closer we can get the output power to the input power, the better the motor system.

Doing it the Simple way

In this case, all we are interested in is finding out how well our motor is performing with a certain propeller. If we change propellers and repeat the measurements, we can deduce which is the better setup for a particular model.

Input Power

To calculate Input power, we need Volts and Amps whilst the motor is running at full power. Measuring volts is easily done, but you need to know a few details. For a brushed motor, you would take the measurement as close to the motor as possible. The reason for this is to eliminate the voltage drops across the battery and motor wires.

For a brushless motor however, you cannot measure as just described. The best place would be the speed control input wires. This may well be where you have your Deans connector. We are just going to have to live with the losses in the controller and wires in this case. We will see later how these losses become apparent.



To measure current, we place a 10A (or better) multimeter in series with the negative controller wire. This would be the input wire from the battery to controller. To get useful results, the resistance of the sensor element in the multimeter must be low. A meter that can only measure 5 Amps would most likely have a higher sense resistance than a 10 Amp meter. Of course, should your motor be capable of 20 or 30 Amps, you would need a suitable meter to measure these currents.



I happened to have an old 30A panel meter lying on a shelf, but my only concern with these meters is the accuracy (or lack of) at which it can measure a pulsed

current from a controller. When compared to a digital meter, it seemed to work very well. When taking a current reading, ideally you want a voltage reading at the exact same time. Unless you're using a power supply, battery voltages can drop between measurements, resulting in reduced accuracy.

Calculation of input power is simply the product of Volts and Amps.

Output power

This is where it gets interesting. We are no longer dealing with electrical energy, but mechanical energy expressed in rotor torque and rotating speed. The problem here is that of measuring torque. You will need to build some kind of test fixture and then calibrate it somehow. This is a whole project on its own and not really the route we want to go. If you

were really serious about motors though, you would probably land up making one anyway.

A pretty simple way of getting a ballpark figure of output power is to measure the RPM of a propeller attached to the motor. The RPM value together with propeller size and pitch, will allow you to calculate an output power level and expected thrust.

Now not all propellers with a given size and pitch perform the same way. As you may well know, propellers can look quite different from each other and produce different levels of thrust. Therefore, to increase the accuracy of the measurement, we add a Propeller Constant (specific to the brand of propeller used) to the formula that then results in better accuracy of the output power. A minor snag with this approach is getting good propeller constants. You could easily land up finding a few different constants for a specific propeller when surfing the net. The only way to get any sort of real accuracy is to measure the thrust with a thrust meter and compare results against those predicted. You can then create your own propeller constants. The only drawback here is, you have built a thrust meter and no longer really require the use of a prediction program!

You now have output power and input power. Efficiency is then output power over input power multiplied by 100 to give a percentage.

But wait . . . there is an even easier way!!

Sounds like an info commercial, doesn't it?

The major problem with the above example is that of owning suitable equipment for taking measurements.

A decent multimeter can cost a fair sum of money and then you still need a tachometer. Well, there is a nice tool available that does everything and more. Heck, it will even do the dishes for you . . . it is the Hyperion E-meter.



This tiny little gadget measures Volts, Amps and RPM. It even allows you to enter propeller constants into the unit so that it can display output power, efficiency and expected thrust. To add to its usefulness, it also has a battery monitoring function and shows the accumulated current going in and out of a battery. So by using a cheap power supply, you can have the features of a more expensive battery charger. Oh yes . . . it also has a serial port output that allows it to stream data to a computer! You then have access to neat looking graphs, which you will be seeing shortly. Let me say it again . . . a very neat tool for under R1000!!

I was about to order one of these E-meters from abroad, when Hobby Warehouse had a special that made it attractive enough to purchase locally. Although, the unit comes with a 100 Amp probe which is great for those Amp-hungry setups, for measuring under 20 Amps for our small CD rom motors and battery charge features, an optional 20 Amp probe is required for better accuracy. Unfortunately, I could not find a 20 Amp probe locally and had to bring it in from overseas. I would recommend that the local hobby shops look into the 20 Amp probe, as it really is a necessity.

So how does it work? Simply connect your Deans battery plug into one end of the power sensor and your motor into the opposite end. Power up the motor and whilst moving your throttle stick, you can monitor the RPM via an optical sensor on the E-meter and simply read the data displayed. It's that easy.



The motor data displayed here is what I stored in the E-meter's memory and recalled later. It shows a Warp 4 motor's no load test data.



The Battery mode would show Volts at the top followed by charge or discharge rate. Right at the bottom is a timer function to monitor progress.

For measuring thrust, we enter suitable propeller constants (very easy to do) and read the thrust directly from the E-meter.



*

Motor theory — Wading In deeper

I had always wanted to experiment with the mathematics side of motor theory and having to write this article finally gave me the push I needed. I had downloaded an article or two some time back that explained everything I needed to know, so I dived in, expecting to find everything reasonably straightforward.

Unfortunately, this has turned out not to be the case and has resulted in more questions than answers.

Lets have a look and see what the issues are.

To measure efficiency, an alternative method to measuring output power is to rather measure certain parameters and calculate the losses in the motor instead. Output Power is then the difference between Input power and Losses.

Before we can calculate any figures, we need some data to work with. It happens that there are just three bits of information that are required, those being . . .

Io current

RPM/Volt (KV)

Motor resistance.

These three variables are the critical ingredients for all motor prediction calculations.

Io Current —

is the current required to overcome frictional, iron and other related losses in a motor. If a motor is drawing a current of 1 Amp at 20 000 RPM without a load attached to its shaft, then this is the current that will not be contributing towards driving a load. It is regarded as wasted. If a load is attached to this motor that results in 4 Amps being drawn, then only 3 Amps will be doing useful work. Your 1 Amp of Io current in this case would represent 25% wastage. So before even calculating other losses in the system, you are already down 25%.

What is interesting about Io current though, is that it is not voltage dependant. If you draw 1 Amp at say 6 Volts and then increase the voltage to 8 Volts, the RPM will rise, but the Io current will remain the same. Well, this is what motor theory says . . .

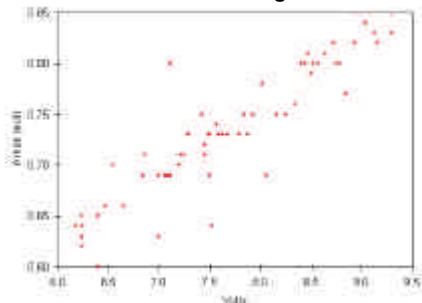
I tested the theory with a new speed 400 motor and found that the Io did stay reasonably constant. It fluctuated a little, but more or less followed the theory.

The same test applied to a fairly used 400 motor however revealed a different story. The Io value simply rose all the way with RPM. The motor did sound a bit rough, so I deduced that the rising current was a result of an unwanted load — worn brushes and bronze bushes.

The next test was related to brushless motors since these are the motors we want to build and test. I used a power supply to vary the input voltage to the controller and left the speed controller throttle setting at maximum power.

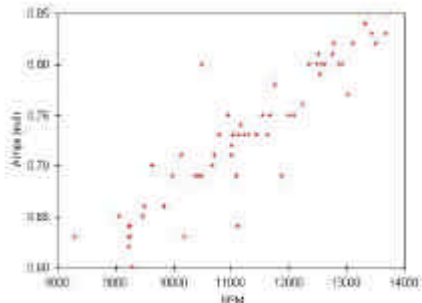
From the graph, you can clearly see that the current is rising reasonably linearly with voltage. The current gain is not that much though, and considering an outrunner has a lot of external area that is rotating, it ought to be expected.

Current v Voltage



The I_o is an important value for our calculations, and an inflated value will result in prediction calculations not being as accurate as they could be. The accepted method here is to use an I_o value that is reflective of the intended RPM we would expect to see when the motor is loaded. For example, should you expect to swing a propeller at 10 000 RPM, then looking at the current vs RPM graph, we would like to use the I_o current that represents the losses that occurs at this RPM level, which in this case would be around 0,7 Amp.

Current v RPM



So, if you purchase a brushless motor and read the I_o current specified in the data sheet, it may well be a useless value. You would need to run some tests to establish the correct I_o for the intended RPM. As a guide, if you intend using a 3-cell Lipoly pack, do the I_o test on a 2-cell pack. This will give you a reasonable value to work with.

RPM per Volt (KV)

You may remember for an earlier article, I mentioned that this figure could be calculated

by taking the no load RPM and dividing it by the voltage used to power the motor. This method gives you a pretty good idea as to what the KV figure is, but for better accuracy, we must measure it . . . or calculate the figure from certain test results.

Measuring KV Directly

This is supposedly the most accurate procedure for determining the KV specification.

The most popular method is to spin the motor to some known RPM, in a drill press or hand-held drill, and measure the voltage produced at the motor terminals.

I happened to purchase a rotary impact drill some years ago that had the RPM listed. It stated 0 – 1000 RPM, but just to make sure, I attached a marked disc to the drill and measured the RPM with the E-meter. The meter read 1050 RPM, with a resolution of 15 RPM. After playing around a bit, I felt I needed better accuracy than the 15 RPM and used my digital scope to get a more reliable RPM figure. It worked out to be 1040 RPM.



The first motor tested was an old brushed Speed-400 motor, which produced a voltage of 0,33 Volt DC at 1040 RPM. Doing the math, we work out the KV to be around 3120 RPM/volt.

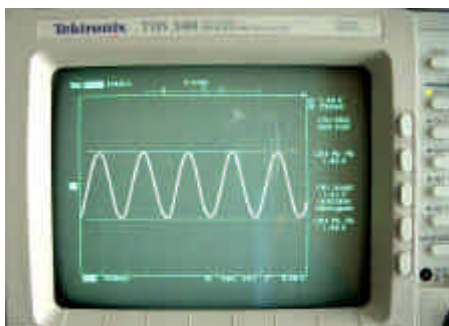
If you power the motor without a load and measure the RPM achieved, you could also calculate the KV this way, as already stated. To do this, you need to attach some sort of disk to the motor that has two black and two white quadrants as required for the tachometer to sense. After trying this and comparing the results to the above described method, I found I

could not get close (about 75%) to that of the drill test. John L explained that this was due to air resistance. A flat disk may not pose a real load to a motor, but the viscosity of air and disc area does result in the motor seeing enough of a load to drop its RPM. Fair enough, makes good sense.



For a brushless motor, we can do the same drill test, but this time we measure an AC voltage across any one phase. The actual measurement though is not as straightforward as you might think. Multimeters, when set to read AC voltage, will display an RMS AC voltage (RMS = root mean square, and is 70,7% of the peak-to-peak value), which is not the correct value to use. We want half the peak-to-peak voltage, which represents the actual peak voltage produced by the motor.

To make this statement a little clearer, I attached the motor terminals to my digital scope and recorded the waveform at 1040 RPM.

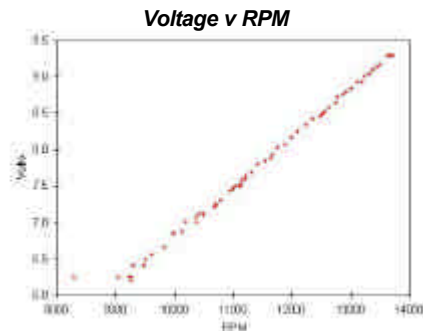


As you can see, the voltage peak-to-peak is around 1,47 V for a single sine wave. This voltage is swinging symmetrically above and below a zero volt potential. As we only want the positive value, we divide the peak-to-peak value by 2 and arrive at 0,735 Volts. This is the generated voltage the motor is producing. A multimeter goes one step further and multiplies the 0,735V by 0,707 and arrives at the 0,52 Volts. If you do not have a scope, you can in fact work backwards with the multimeter by multiplying the value by 1,414. This then gives you your Peak voltage you require.

Right . . .

$$1040 \text{ RPM} \div 0,735 \text{ V} = 1414 \text{ RPM/Volt}$$

Lets now see how the powered test compares. The Io test data, as already shown, contained all the data required already. Using the E-meter pc software, we select the data we would like to view and created this nice graph.



The graph represents what we would expect to see, a linear rise of RPM with voltage. To calculate the KV/Volt, we could take the RPM reading at 9,0 V (13230 RPM) and divide it by the 9 Volts.

But wait . . .

Is the motor really seeing the 9 Volts?

No it is not! A motor has resistance due to its windings. Current flowing through this resistance creates a voltage. This voltage is referred to as "lost volts" and needs to be subtracted from the 9 Volts. We then arrive at the real voltage the motor actually responds to.

So looking at the Voltage vs Current graph, we see that the I_o is 0,8 A at 9 V. If the motor resistance (plus controller losses, we'll get to this later) happens to be 0,25 Ohms, then the lost voltage will be $0,8 \times 0,25 = 0,2$ Volt.

Thus the motor only sees $9 - 0,2 = 8,8$ Volts

$KV = 13230$ divided by $8,8 = 1503$ RPM / Volt.

But hang on . . . that is quite a bit higher than the drill test. What do I believe now? If anything, I expected the 1503 value to be a bit lower than the drill test, taking winding resistance and controller variables into account. This result puzzled me more than a little, and had me put my thinking cap back on.

After various discussions, somebody mentioned the speed controller might be artificially increasing the RPM due to timing advance. The Castle Creations controller had been set to automatic timing and did not really allow me to set a low timing advance. The various programming options only allow you to set maximum timing settings.

So, as an experiment, I repeated the test with a Hyperion 30 Amp and a E-flite 20 Amp controller. They gave me slightly lower RPM/volt values to those using the Castle Creations controller, from which I deduced that the CC-35 Controller was using a slightly harder timing.

Another issue to consider is that of the square wave drive sequence a controller uses. The drill test produces sine wave that will have a lower RMS value than that of the 3 phase square wave sequence used to power the motor.

A fellow user group member supported this theory, and informed me that the value for the conversion is 0,955. He had been using this "constant" for some time already to increase his measurement accuracy.

So if I apply 0,995 to 0,735 volts above, we arrive at an RPM of 1481.

I still think that our "powered" test ought to have revealed a lower value than the drill test due to air resistance, but I'm now convinced that the discrepancy is a result of motor timing as well.

Late addition —



I have just received a new motor I purchased from Japan. It is an RCer Warp 4 motor. It came with all the motor constants printed on a nice glossy sheet. Must say, it is a very nicely produced motor.

I tested the motor with a drill and got a peak-peak value of 808 mV. Without using the RMS 3 phase value, I arrived at 2574 RPM/volt — a mere 6 RPM off the specification. This did not do my theory much good at all!

The powered test however with CC-35 controller worked out to 2779 RPM/Volt and the Hyperion controller gave me 2688 RPM/Volt. These values were also over-inflated.

It has since been confirmed by a "motor expert" (MRK Group member) that a factor of 0,95 must be used to convert the "peak voltage" to a more accurate voltage figure for use in the KV formula. Whether or not motor manufacturers know about this is another story!

Motor Resistance

Well, it sure sounds simple enough. Measure motor resistance with a milli-ohmmeter or pass 1 Amp (or more) through motor terminals and measure the resulting voltage. Resistance is the Voltage divided by Current. For a brushed motor, you would need to prevent the shaft from turning if you are measuring resistance with the latter method.

Physically measuring motor resistance is the accepted method and is used by all motor manufacturers. If you purchase any decent motor, you will find the motor resistance specified in the motor data. MotoCalc seems to prefer this value for its predictions too.

As I do not own a milli-ohmmeter, I measured my motor's resistance by passing 1 Amp through a winding (phase) and measuring the voltage, from which I then calculated the resistance to be 0,2 Ohms.

Now an alternative method to measuring resistance is to calculate the value based on real world results. My understanding was that the value ought to be very close to the measured value. But based on what I have discovered thus far, you just never know.

What we need to do is run two tests with similar propellers and record the results. For the data to be of any use, the propeller loads should be suitably matched for the motor. It could be two propellers you have in mind for use with the motor, but not sure which one is the best choice. This is what an Ezone article explains. It also says that after calculating the resistance, you must calculate the maximum current the motor can handle and then compare the current readings obtained with the two selected props and check that one falls within 30 to 60% of maximum current and the other prop falls within 80 to 100% of maximum power. If they do not, then the reading will not be as accurate as they should be.

The following table lists the results I obtained. All measurements are taken with the E-meter.

Table 1a

	<i>motor data 1</i>	<i>motor data 2</i>
Prop	9x4,7	7x4
Voltage	6,9	6,88
Current	8,9	5,20
RPM	5655	7680

Initially I did not use the 7x4 propeller and found that when I calculated the resistance and maximum power numbers, the currents

obtained for the lighter load did not fall within the 30 – 60% range. Luckily, I had a 7x4 propeller lying around which gave me the results I needed.

To calculate Ri, we use —

$$R_i = \frac{rpm_2 V_{mot1} - rpm_1 V_{mot2}}{rpm_2 I_{mot1} - rpm_1 I_{mot2}}$$

Table 1b

	<i>motor data 1</i>	<i>motor data 2</i>
Prop	9x4,7	7x4
Calculated Resistance		0,3616
Calculated Max Current	9,814	9,786
Max. Motor Efficiency		69 %

Using the data above, I calculate Ri to be 0,3616 Ohms

The calculated Ri is significantly higher than the measured resistance! Unlike a brushed motor, where you can measure voltage right at the motor terminals, we now have to measure voltage before the controller. This Ri value now takes wiring losses and controller variables into account as well. So at the end of the day, we are not just looking at figures relating to a motor, but a whole power system instead.

To calculate the maximum current the motor can handle we use —

$$I_{Pmax} = \frac{V_{mot} + R_i I_0}{2R_i}$$

Because the voltage is almost the same for both sets of data, and I have chosen an I₀ value of 0,55 Amp for all my measurements, the two figures would be very similar.

In this case the maximum current the motor should ever handle is 9,8 Amps.

Now this figure is interesting. Should you exceed this current, you will not be creating any more power — just more heat and less power!

What you should keep in mind though, depending on wire used in a motor (and other cooling factors), you may not actually be able to sustain this level of current in normal use. My own motor was already starting to fry itself at about 80% of this value!

As you can see from the data, motor data 1 current falls within 80-100% maximum current and motor data 2 falls within 30-60%.

And finally, to measure motor efficiency —

$$\eta = \frac{P_{out}}{P_{in}} = \frac{(V_{mot} - R_i I_{mot}) (I_{mot} - I_0)}{V_{mot} I_{mot}}$$

So looking at the Motor Data 1

$$\begin{aligned} \text{Efficiency} &= \frac{P_{out}}{P_{in}} \\ &= \frac{(6,9 - (0,362 \times 8,9))(8,9 - 0,55)}{6,9 \times 8,9} \\ &= 50\% \end{aligned}$$

And if we do the maths for motor Data 2, we get a much healthier 65%

But hang on . . . if we use the ideal load for the motor, what maximum efficiency could we attain and what would be the current draw?

To find this out we use . . .

$$\eta_{max} = \left(1 - \sqrt{\frac{I_0 R_i}{V_{mot}}} \right)^2$$

This formula calculates the maximum efficiency for our motor, which in this case, works out to be 69%.

The current requirement at this efficiency would work out to be 3,23 Amps based on formula . . .

$$I_{\eta_{max}} = \sqrt{\frac{I_0 V_{mot}}{R_i}}$$

At this point, I decided it would be interesting if I could have a look at how this motor performs with different battery packs and find the “sweet spot”.

I ran some tests and compiled the data contained in Table 2 below.

Now it is quite interesting to note how the different pack voltages affect the calculated resistance. The Nicad pack is a 15+ year old 6-cell 1300 mAh pack that was able to hold a steady voltage better than an equivalent sized Lipoly. The Lipoly would come into its own though, once warmed up.

(continued on page 23)

Table 2

Propeller Load		8x4.3	9x4.7	8x3.8	7x4	Calculated Ri	Max Current	Max motor Efficiency
Lipolv : 2 Cell 1500mAh	V	7,02	6,9	7,0	6,88	0.3617	9.79	69.0 %
	I	6,8	8,9	7,2	5,2			
	rpm	6915	5655	6765	7680			
Efficiency		59,71	50,05	58,00	64,98			
Nicad : 6 Cell 1300mAh	V	7,5	7,5	7,45	7,29	0.4025	9.33	68.5 %
	I	7,5	9,6	7,9	5,6			
	rpm	7200	5805	6900	8040			
Efficiency		55,37	45,70	53,33	62,30			
Lipolv : 2 Cell 850mAh	V	6,36	6,00	6,29	6,29	0.3421	9.04	68.4 %
	I	6,0	7,5	6,0	4,5			
	rpm	6480	5205	6315	7200			
Efficiency		61,52	53,04	61,19	66,29			

Bill Vos #6 — September

Dennis Bird

What a pity the wind got up to spoil the party! Having no throw aways definitely did not suit quite as few of us, but as someone once said, if you want to win, you have to beat everyone else. So the Day went to the two most consistent fliers — Fred and Allan. Well done chaps. Don deserves the prize for the best flight of the day — 10:00 + 50. Now you can't beat that. Brian was very unfortunate to have a

potentially good flight spoiled, excuse the pun, by a troublesome spoiler. Hard lines Brian.

Don't forget round 7 on 2 October. Please try to be there by 9:30 so that we can get started by 10:00, if possible. I would hate to end the contest with another 2 rounder.

Regards,

Dennis

Bill Vos — 2005

	<i>best 4</i>	<i>Jan</i>	<i>Mar</i>	<i>Apr</i>	<i>Jun</i>	<i>Jul</i>	<i>Sep</i>	
1	Dave Greer	3999	1000	1000	1000	999	1000	0
2	Warren Butler	3876	0	984	711	1000	930	962
3	Dennis Bird	3869	835	969	865	1000	994	906
4	Alan Sneedon	3835	862	1000	812	973	848	1000
5	Brad Conlon	3769	962	830	855	1000	952	825
6	Fred Wittstock	3723	514	937	895	891	838	1000
7	Paul Boswarva	3450	816	798	949	0	887	0
8	Brian Fanning	3435	927	972	0	0	949	587
9	Russel Conradt	2795	969	999	0	0	0	827
10	Simon Nelson	2729	817	999	0	0	913	0
11	Don Slatter	2646	796	364	0	649	531	670
12	Norman Smith	2630	621	536	838	0	635	0
13	Scott Munn	2590	0	1000	872	0	0	718
14	John Coulson	2378	651	0	1000	727	0	0
15	Sheldon Macglone	1989	0	697	0	838	0	454
16	Paul Munn	1963	0	778	734	0	0	451
17	Ryan Nelson (j)	1794	884	910	0	0	0	0
18	Adrian Baker	1480	849	0	631	0	0	0
19	Kim	1300	0	0	428	872	0	0
20	Tim Potter	1162	334	0	0	0	0	828
21	Ross Henderson	962	0	0	0	0	962	0
22	Peter Strauss	916	460	0	456	0	0	0

I've sure gotten old . . .

I've had two By-pass surgeries, a hip replacement, new knees, fought prostate cancer, and diabetes. I'm half blind, can't hear anything quieter than a jet engine, take 40 different medications that make me dizzy, winded, and subject to blackouts. Have bouts with dementia. Have poor circulation; hardly feel my hands and feet anymore, can't remember if I'm 85 or 92, have lost all my friends. But . . . Thank God, I still have my driver's licence!

Slope Report

Pieter van der Westhuizen & Sandy Sutherland

Hello everyone — as from this issue, the slope report is going to look a bit different. Since Sandy Sutherland and I, Wessie, just about LIVE on the hill anyway, and to give Andrew Basson a break, we have volunteered to do the Southeaster Slope Report from now on.

The Slope Report will no longer be only AFC-related, but will contain news and snippets from slopes around the Cape Peninsula, and who knows, possibly from other parts of the country as well.

We have been involved in RC flying for around 3 years — Sandy started off with IC planes and was converted to slope, and I started out on the slope, tried glow for a while, and eventually gave it up to slope full time.

Neither of us claims to be expert at either sloping OR writing, but with the help of the slopers out there, we hope to keep our contributions fresh and exciting, and worth the read.

On that note, I have always fancied the idea of a community-based article, where the report is done BY the interest group FOR the group — much like the reader-written Radio Control Soaring Digest —

www.rcsoaringdigest.com

So if you come across interesting people, happenings or models on the slope, please send us a note, article or picture, and we will try and include it in the next report.

Our address is —

Slope-Report@webmail.co.za

*

What's New

By all accounts, it looks like the next big thing on the Cape slopes is going to be the long awaited revival of slope racing. More than one slope pilot has acquired his own set of pylons, and the local clubs have included racing in their line-up of events. Peter Netterville (AFC) has been appointed the Events Manager for

Hermanus 2005, and will have pylons set up there as well, so start practising guys. Looks like the point of departure for 4 legs of a 100m circuit currently stands at around the 30 second mark.



Another thing that is fast gaining popularity on the SA slopes are the small scale (30 inches or so) pocket-rockets. It must really be nice to be able to fit these small aircraft under the car seat, in the off-chance you might find yourself on a windward-facing hill somewhere.

One example is the *Limit EX*, developed by Julian Beckett

See www.glidernut.com for a free plan



A few of these are under construction at the moment, and will be seen on the slope real soon.

*

For the plastic enthusiasts out there with limited budgets, the Correx *Beetle* — www.rcsail.com/beetle.htm



— has recently been seen on the slope, and by all indications flies extremely well.

If all goes well, a few all-moulded *Mini-Falcons* may make their local appearance soon. Watch the next issue for a review.

*

Signal Hill Report (AFC)

The AFC have completed the artwork for the Peg Board, and as soon as the Parks Board has given it the rubber stamp treatment, it will be erected on the slope. (Finally!)

Plans for Hermanus 2005, to be held on the weekend of November 26, are coming along swimmingly. Online pre-registration will be available soon.

We headed out on the weekend to practise our Pylon skills, and had a blast. Keep your ears peeled, rumour has it that there will be a pylon day on the first weekend of October — unconfirmed at time of printing.

We finished off with “Limbo”, which is WAY more difficult than it looks, but SO much fun.

*



After a full week of ghastly southeasters at the end of the month, Mother Nature rewarded us with a final weekend of stunning northwesterers. On the 24th the lift was simply ridiculous. Marcel (*Opus-W*) and Peter (*Stripey*) ROCKED the slope with some very high speed “Star-wars” passes. Mind you, I was seen to smile from ear to ear when my 3,2 kg *Arkanj* did some pretty impressive runs as well.



Seems that the *Mugis* are even making a comeback, and no fewer than three AB Models *Toucans* were seen flying at the same time as well.

*

Slopes down South (TOSS)

What to do when the wind suddenly fades, you ask? The chaps at Red Hill have taken to using a homemade bungee to get their planes into the lift-band.



I had my first try at it last weekend, and have to admit that it is certainly more fun than I thought it would be. It is amazing the speed that the glider attains at

launch, so much so that flutter just about self-destructed a **BEE** before the release point.

Maybe those flat-field guys are onto something after all!

In an effort to encourage all round development of their members, the club have introduced a 5-level Club Grading system — check it out at www.toss.co.za

Martin tells me that even though some of the requirements may seem high, the thinking is to make sure that everyone, including the pilots with LOTS of experience, have something to aim for. The TOSS members are planning a cleanup day at the slope soon, to remove all the dead tree stumps and rubbish from the slope. This will certainly make landing there a bit less traumatic.

A reminder to slopers out there that the TOSS wind report is updated every couple of hours on weekends. The number is **072 029 1713**.

If your club has an event soon, let Martin know, and he will mention it straight after the Wind Report.

*

News from Afar

The Rosendal weekend has come and gone, and apart from the occasional “So what happens to my glider when the lift fades?” concerns, it seems that everyone had a really fantastic time. A full report appears in this issue and here is also a most impressive photo gallery and report

<http://mysite.mweb.co.za/residents/iti20090/rosendal.htm>

We have been playing with the idea of visiting them on an organised, all expenses arranged SLOPE WEEK, but that will be discussed more on the SARFLY list.

* * *

Next Month —

Mini-Falcon Slope Review
Limit-Ex build article — Part 1
6m Ventus 2c — Big Monster!

*

Well, that’s all we have for this issue, we hope that we live up to the standard that the AFC report set — see you on the Hill.

Wessie & Sandy

*In the 60’s, people took acid to make the world weird.
Now the world is weird and people take Prozac to make it normal.*

* * *

There are two kinds of pedestrians — the quick and the dead.

* * *

The only difference between a rut and a grave is the depth.

*Iraqi terrorist Khay Rahnajet didn’t pay enough postage on a letter bomb.
It came back with “return to sender” stamped on it.*

Forgetting it was the bomb, he opened it . . .

G2K Jamboree

Lionel Brink

The G2K event was introduced to encourage individuals, particularly newcomers, to compete using relatively inexpensive model gliders. The event is considered by the MGA to be a developmental competition, but is sufficiently challenging to maintain interest for those people who have competed in the other gliding classes.

The 2005 G2K Jamboree was held at WHRF just outside Centurion, in rather windy conditions with approximately 27 entries from as far a field as KZN & the Free State.

The competition maintained the traditional G2K concept for 2 metre span gliders, G2K launching from an approved bungee and G2K PLUS launching from a standard winch (200 metres to turnaround) all flown strictly according to the defined rules.

During the lead up to the competition, it was evident that a number of people were keen to fly their rudder-elevator gliders, but did not wish to launch using bungees for various reasons. To accommodate these, an intermediate class was introduced for the Jamboree that required a G2K model (2m & rudder-elevator) launched using a winch equivalent to that of the G2K PLUS class. Interestingly, the overwhelming number of entries to this class (17 entries) suggests that the MGA could consider including this class for future events. The required field team structure of three people was generally adhered to, with each team being self-sufficient regarding supporting each other, in accord with the essence of this fun event.

On Sunday 11 September, at 07h00 the Met Office reported that the wind would be calm, from the northeast, gradually swinging to a northerly direction in the late afternoon. Maximum thermal activity was predicted to begin at approx 14h00 lasting until 16h00, with lift approaching 4 m/s. This was exciting news, as the previous day had looked identical with massive thermal activity all over the field

and surrounding areas. Unfortunately, we did not realize that the Met Office had provided us with yesterday's report as the wind on the day soon swung from the east and increased from calm to rather brisk.

I can only echo the sentiment that I read recently that there is a "special kind of hell reserved for weather predictors".

What the weather did achieve was to make the flying more challenging and the eventual winners were indeed worthy of their achievements. The wind may have been tough, but the Met office did correctly predict the lift, as thermals were available in abundance and most people hooked a good few flights throughout the day, encouraging everyone to come back again next year.

The bungee competitors were achieving amazing launch heights, fully utilizing the prevailing winds to kite up to the maximum stretch. Each team maintained very tight management of their bungees to prevent crossing lines of the other competitors who were spaced at 15 metre intervals across the flight line. Although the bungee is an excellent launch mechanism and surely the cheapest form of launching small gliders in a postal type competition, this Jamboree with its 9 teams of three people imposed inherent restrictions on the number of bungees that could be safely used, and future competitions would need to take this aspect into account during planning/field layouts, should the demand require additional bungee lanes.

The majority of people elected to fly in a winched launch class and the rudder-elevator models showed strong support for this simpler type of model/flying. The ability to wind down the winch line after launching is a strong safety factor that needs to be considered for any man-on-man type competition. What is most interesting is that the scores suggest that the rudder-elevator only (G2K-Winch) models competed on a remarkably favourable footing

against the RES and full-house models (G2K PLUS) – I am sure that the results were due to the combination of individual pilot skills & climatic conditions experienced during the flights. In fact, the top 30% of scores were all

within 15% — which represents a relatively narrow band considering the diversity of models, the prevailing conditions throughout the day and experience levels of the competitors.

— G2K —

1	Sigi Prigge	SGC	4032
2	Conrad Klintworth	SGC	3627
3	Volney Klintworth	SGC	3254
4	Kobus Smith	WHRF	1321

— G2K plus —

1	Dennis Bird	Sharks	4534
2	Sigi Prigge	SGC	4111
3	Dave Greer	Sharks	4102
4	Craig Barker	ETB	4040
5	Conrad Klintworth	SGC	3689
6	Malcolm Siebert	WHRF	3306
7	Grabe de Villiers	de V	2942
8	Stephen de Villiers	de V	668

— G2K Winch —

1	Fred Wittstock	Sharks	4994
2	Izak Theron	ETB	4973
3	Piet Rheeders	BERG C	4754
4	Lionel Brink	WHRF	4261
5	Mike May	BERG B	4221
6	James Shaw	BERG A	4207
7	Alan Sneedon	Flying Munnkeys	4006
8	Evan Shaw	BERG B	3689
9	Kurt Stockton	WHRF	3647
10	Charl Viviers	BERG C	3536
11	Paul Munn	Flying Munnkeys	3317
12	Scott Munn	Flying Munnkeys	3250
13	Bruce Judd	BERG B	2675
14	Rick Mitchell	WHRF	2194
15	Peter Karner	BERG C	2122

— Junior —

1	James Shaw	4207
2	Craig Barker	4040
3	Conrad Klintworth	3689
4	Kurt Stockton	3647
5	Conrad Klintworth	3627

As a development event, it is also most important to recognize the achievements of the Juniors flyers who competed (not class specific):



Lionel Brink times for Conrad Klintworth

Charl Viviers launches



A special thanks and congratulations to all competitors who made the event so enjoyable and particularly those that had to travel so far to participate. I'd strongly suggest that one-day events of this nature are held on Saturdays in future as I am convinced that this will permit more teams from the distant provinces to compete, eliminating the pressure of immediately having to travel home after the event.

Many thanks to Mike Spalletta who was the CD on the day. He ran a very tight competition — it should be noted that even though we began about 45 minutes late, we still flew 5 rounds with 5 slots in each and had a 30 minute lunch break, yet we eventually finished on time!

Mike was ably assisted by his team; Melanie capturing the scores on the computer and Licia running up and down the flight light to collect and deliver completed scoresheets. They assisted in taking the pressure off the competitors to focus on their flying and the close scores attest to the success of this approach.

Although windy, the day was extremely hot and the competitors' inner strength was maintained by Ilma and her team with their endless supply of coffee, tea, cool-drinks and the best chicken burgers on the field!

*

To promote development, a number of stalls displayed modeling goods that would permit the newcomer to begin with the hobby or even the more experienced to advance their competitive advantage.

Mike showed "almost ready to complete" and competitive 2m gliders built by Henry Heim.

The Hyperion motors Andre had on display looked awesome for those leaning towards e-power and his e-Sky servos appear to represent real value for money for those requiring these to be light weight and powerful.

The Murdoog Flying Machines store was also in evidence with numerous ARF kits for e-power, as well as a complete range of GWS servos and extra "goodies" for glider guiders.

Of particular interest was their "Emergency Field Repair" kit that is comprised of all the essential items required to repair models whilst in the field.

Ilma was offering a special on these self-contained units with a generous sheet of carbon fibre cloth included for the Jamboree competitors. From personal experience, this kit helped more than one model back into the air and these were competitive as they began the day.

Evan (actually most of the BERG participants) was also showing the latest *Tsotsi* glider — which is a very light and strong fibreglass fuselage coupled to strong foam core wings. The launches that these models were achieving and the spot landings being made, were all extremely competitive and I understand that the research & development is almost complete and that these models will soon be made available in a near ARF "kit" form. Thank you to the exhibitors who showed what quality is available in South Africa for developing model gliding and at very reasonable prices.

WHRF provided the field and facilities — and is excellent for gliding competitions. The club is a mixed discipline club that supports all aspects of RC aircraft, including IC and electric powered airplanes and helicopters, as well as gliding. Thank you to the members for allowing us to use the field for the full day for the competition.

The competition would not have been possible without proper safety, and inherent frequency control was managed by utilizing a matrix that ensured that individual frequencies did not clash during slots. A peg-on approach was used by the individual competitors to ensure no clashes or incidents occurred outside of the pre-allocated slots. Many thanks to Dave and Volney for reviewing and assisting with the matrix, and the many versions required to achieve the final format.

* * *

Contacts

- Peregrine 2m gliders — Mike Spalletta can be contacted on 083 636 1407

- e-Powered model supplies, including Hyperion motors, and e-sky servos — Andre Killian can be contacted on 083 627 5312
- GWS gear and the amazing emergency field repair kit — Ilma Stockton can be contacted on 082 824 7400, or go to www.murdoog.co.za and visit the on-line shop

- *Tsotsi* 2m glider — Evan Shaw can be contacted on 083 254 1809
- Information about White Hills Radio Flyers can be found at their web-site www.whitehills.co.za

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(Electric Motors — part 5 continued from page 15)

The Nicad higher voltage results in more current being consumed and results in a higher Ri value being calculated. One would think that the Ri value ought to be constant due to fixed cable and controller FET resistances.

You have got to remember here that as current increases, heating effects cause the resistance of copper to rise as well as the FET resistances. It is worth noting that as current levels drop and calculated Ri falls slightly, the max efficiency calculations might reveal better results. But this would also depend on how the Io current rises as a result of a lighter load and higher RPM figure. You would need to experiment if you want more accurate results in this case.

The 800 mAh pack is the one I have been using in my Shock Flyer, and it is barely able to hold the minimum allowed 6 Volts for a 2-cell pack when cold. The lower current drawn though,

results in a slightly lower Ri and better efficiency. The only snag here is that the 7x4 propeller offers the best efficiency as a result of the lower current level (it is approaching the 3,23 Amps we calculated) but can't be used because it develops too little static thrust.

* * *

Well finally I am done for now. This article has been a bit of a nightmare to research and write. I made a few observations along the way that enlightened people on RC groups found surprising. It's only when you start to question certain issues that you open up a can of worms.

For further reading, find E-zone's Inside Story — Feb 2003, and look for feature article "Motor Constants — How to find them and use them" — by Joachim Bergmeyer.

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. . . and some more on the Jamboree from . . .

Dave Greer

Congrats to Lionel Brink for all the hard work and preparation in putting on an excellent event, along with presenting it to us with such infectious enthusiasm and great aplomb.

The scorekeeper team of lassies did a sterling support job along with the Stockton munchies clan, whilst no social comp should be without CD Mike Spalletta at the helm.

The dusty wind driven conditions were helluva challenging for the 2m gasbags and made for something akin to a vasbyt army camp (just so blerry lekker when it was all finished and it was time to sink the frosties ;-). My paltry ten 'chute fetches equated to four kilometres but I shudder to think how far Klint's 41 bungee fetches worked out to. His work paid off with good results for Sigi, Conrad and himself.

Of course, ETB's smiler Izak and his *Gentle Lady* (seen on the left below, along with Craig Barker and *Elite*) also always seems to corner some of the glory.....



The team BERG red shirts really gave colour and pizzaz to the occasion and there are thoughts of a suitable "Mauled by the Sharkies" team shirt for the future.



Sharkie's Fast Freddie got the G2K winch win he was so determined to get, along with lots of admiring visits to see his immaculate balsa OD craft.



Mr "I'll never be in the final" Bird did his best to throw it away all day but just could not help himself in beating up us Plus folk. The other coastal team, Flying Munnkees, also had their share of excitement at their first away G2K event.

It was heartening to see the juniors being suitably encouraged and rewarded — there was also some interesting comradeship between young Kurt Stockton and Fast Freddie that was just so special. All the other local yokels also made for a cheerful and enjoyable G2K Jamboree 2005 and, with of the calibre of folk like Lionel continuing to drive these events so efficiently, this can only bode well for the future of local gas bag competition!

Cheers

Dave

Rosendal — 2005

Warren Butler

We left Hillcrest on the Friday at about 11h30 in Allan Sneedon's bakkie, camping gear in the back, planes snugly packed in the trailer.

The main site is situated on a hill about 10 km outside Rosendal. Upon our arrival at the campsite at around 16h30, it was a very difficult decision to make between flinging off a *Zagi* in the silky smooth valley release lift or erecting our tents before it got too dark. The tents won! Not fun trying to set up a tent with minimal light.

The usual setup of a main army tent, generator, gas shower, skottels (no open fires due to extreme fire hazard, the grass was very dry!) was superbly laid on by Grobbie as in previous years. The hospitality and friendliness of these folk had to be experienced to be appreciated. Some of the guys had been on the hill since as early as the Tuesday. They brought up their caravans and all their creature comforts — even literally the kitchen sink!

Rosendal has a few slopes to offer since the wind can vary quite a bit. The main hill where we camped takes a westerly, perfect for that sunset valley release flight.

A 200m walk from the campsite takes you to a cliff that works best in a north westerly wind and further off to the right, the hill curves back to make the best use of a north easterly. The north westerly cliff face is not for the faint hearted since a slip up could very well be the demise of your model, never to be seen again. The one chap wowed us with his glass bagged *Zagi*. Extremely stiff elevons driven by strong zippy metal gear servos gave a new meaning to the term “twinkle rolls”! Loops simply ate up huge amounts of sky and after a climb to height, the resulting speed run would even give a *Toko* a run for its money! Now during all this “wowing,” a bunt towards the slope face suddenly brought the pilot and helper, at rapid pace, very near the edge, as they peered desperately over the side, trying to catch sight



of his pride and joy going seriously down! We never heard the crunch. After a few minutes of peering and pondering, he gave up the decision to go and look for it since about 700ft of sheer cliff and a lot more rocks would have made a search impossible.



Don King had us Durbanites suitably impressed with his “foamy warbirds”.



These 60 inch span aileron/elevator models, made of carved foam, covered in fibre tape and vinyl sticky-back, correx tail feathers, really flew well. So far, he has made a *Must Prang* (*Mustang*!), *Me 109*, *Focke Wulf*, and now is busy with a *Kawasaki Hien*, a sort of Japanese *Zero* type of fighter. He wants to keep their scale about the same since it is actually pretty cool to see a few of them scooting around the same patch of sky! Playing ‘tag’ between the “Must Prang” and the German designs brought on the expected cheer every time anyone touched! These were surprisingly hardy models since even after some seriously bouncy landings on the rocks, they still kept their pose. Don works at Orsmond Aviation in Bethlehem where a large fleet of crop spraying aircraft lives. Two rookie crop-sprayer pilots also

involved with model aeroplanes flew a German foamie each, made by Don. The grey drab and swastika emblems really looked smart.

We investigated another site, closer to the town and a much friendlier one too, since in the event of a mishap, you could, after a bit of a walk, retrieve your model.

Hugh Edmunds had an upset with his Mike Summers designed and built *Sabre*. After lucking out in the weak lift off the main slope, to save the model, he opted for heading out and landing in the ploughed field way down the bottom of the hill. Not noticing the close proximity of the high tension wires leading up to the farmhouse, brought on an unplanned fireworks display since the carbon spars did their best to carry as much current as they could. This resulted in the carbon spars having their epoxy instantly vapourized due to the extreme temperature of the flash. Amazingly, the radio gear escaped being fried — airframe not so lucky. I couldn't believe the sight of the spars at the contact points, as if you had purposely frayed some fresh carbon tows! Felt like soft cotton wool.

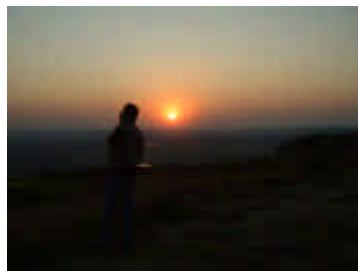


Scott Munn, also from Durbs, had a very nasty surprise when his model stopped responding to control inputs. Suspectedly shot down, it proceeded to smash itself into the side of the pinnacle face, a spot only a seasoned climber with the right equipment could ever reach. Since this was his G2K model he was planning to use the following weekend at the G2K Jamboree, he was naturally peeved. Earlier on, a test flight with a *Zagi* look-alike, ended in a not so final fate for him as well. The very turbulent but weak lift caused by the breeze curling over an upwind part of the hill, smacked

his plane straight down. Fortunately a grueling climb down the bushy footpath lead him to the model. He decided to remove the radio gear and sacrifice the plane to the mountain. He commented that it never flew well anyway!

In the initial absence of a frequency control board, before you wanted to fly, it was decided to peg your name and frequency to the main guy rope of one of the caravan side tents, obviously after ascertaining if your frequency was indeed free. Later on, this method was abandoned when the peg board arrived. Despite this, there appeared to be at least one crash attributable to frequency clashes.

The highlight of my weekend was certainly that of my last flight on Saturday. I launched my *Zagi* about half an hour before sunset.



The lift was still good but silky smooth. There were two other models still flying at the time. It was a strange feeling to be flying way out from the edge in smooth air with not the faintest hint of turbulence. The lower the sun went, the weaker the lift became. A low pass over the flat rock where most pilots had started gathering after they had landed, found the air even smoother.

I would have expected sink in this area but heading out into the lift again, the smooth valley release got the model climbing to about 15 m above the slope, no higher. Another pass over the same spot above us got it doing the same thing. This went on for about 20 minutes after the sun had set, each pass getting slightly lower than the previous one. Comments like “wings filled with helium” and “invisible electric motor” were heard amongst many of the disbelieving pilots. This got me more and

more determined to keep it going since a *Zagi* should not still be able to stay up out there in the dwindling lift and fast fading light. Eventually, a last pass and a plop onto a grass tuft ended a magic flight. Much merry making and braaiing followed a good days flying for most. If that army tent could talk, what stories it would tell!

Sunday dawned with a few of us flying our electric planes. My *Tucano* ARF with HET brushless Micro 6 carved up the crisp morning air. A few minutes later, a fairly stiff north easterly came up, not at all suitable for the main slope. A few of us took a walk, foamies underarm, to the northeast facing part of the main hill. Since a narrow valley upwind destroys most of the lift, it was extremely turbulent but if you were determined, you could scoot away from the sink and try to float in the lift. The problem with this type of flying is that as you slowed down to the necessary speed to use the rising breeze, you had less and less control to fight the gusts that did their level best to smite you into the rocks. If you found it, a tiny patch of consistent lift was available above a small bowl in the notch of the valley, making for pretty boring flying after 5 minutes.

Anywhere away from this patch and you had about 10 seconds to choose your bush! After a greasy breakfast and coffee, (is there indeed life before coffee?!) the mob decided to visit the same user friendly slope we flew at the previous day. With much more of a blow this time, PSS type of models appeared out of nowhere! Ricky Mitchell had a superb study of an A-10 Warthog tank-killer as well as a silver Russian Mig 17 (or was it a '19' Ricky?) done in foam.



With able test pilot Don King at the controls, an initial launch by Grobbie saw the *Mig's* nose raised too high since the tail was pulled down a split second before release. The resultant cartwheel cracked the elevator but was repaired with a bit of cyano a few minutes later. The next launch went better but the lift seemed to die off suddenly, resulting in Don having to keep the plane close in to put it down near the bottom of the slope. Had this been the northwest cliff, it would have been 'tickets.' Another stiff walk later had the model back.

Don did some amazing flying for the many cameras with his camouflaged Impala Mk2. The pics I took could easily have come from Angolan border mission footage way back in the 80's. The dry bushveld backdrop made for a perfect setting.

Herman Weber displayed a fine PSS model of what looked like a Polish LET jet trainer of some sorts. It certainly looked good in the air. Constructed from balsa with a shiny silver film covering, it would have made a scale modeller proud! An overshoot on landing approach missed the designated bush and a crunchy landing made for some minor damage to the nose and underside.

A fully moulded full-house 2 meter *Whisper* kept its distance for the whole morning. Its yellow and red wings and sexy V-tail certainly would have been appreciated more by the folk there but since a mishap with something like a foam *Zagi* could have sent it into the rocks very easily, the pilot opted to keep his distance from the melee.



A German chap arrived with a moulded scale ASW something-or-other, about 5m span. About to launch, I could see trouble brewing since he was really battling to even hold the model steady in the wind, let alone keep the wings level. An offer to help steady a wingtip before launch was met by the “not to worry, I’ve done this many times before” answer, so I stood back to take the ‘sure as nuts’ pic of the day. The aforementioned pic came a few seconds later! As it left his hand, the glider’s left wing lifted up about 30 degrees,

cartwheeling the plane into the rocks. Surprisingly, it sustained very little damage — more to the ego I think! A later successful launch by a helper got it doing what it was designed to do. Wide sweeping turns, huge loops and very scale like thermal turns brought on the ‘wows’ from local onlookers who probably bunked church that day!

At about midday on the Sunday, we decided to head on back to the campsite to pack up. The annual Rosendal event has been supported for 19 years now. Next year promises to be the “biggie” with a bumper turnout. I’d add this to the “must do at least once” list to everyone keen on slope flying. Despite the many rocky areas, the vast majority of crunchy models survived since if you kept your head, you could put it down in a grassy patch or a bush. As for foamies, this place is heaven for them!

Many thanks to Grobbie, Ricky Mitchell and the many other unnamed folk who assisted in laying on a fine event. I’ll certainly be there in 2006!!

Warren

Among many other interesting pictures were these two which weren’t identified in Warren’s commentary —

On the left, one character was making quite sure he had enough models to see him through the weekend,

and below, an impressive but unidentified model which looks rather like a *Gnat*.



Minutes of the **MGA Committee Meeting** **held on Tuesday 20th September**



(It should be noted that this is a condensed version of the Minutes, for the information of readers. It has been edited where practicable, and should not be regarded as the Official Version. JL)

Present —

Peter Joffe	Klint Klintworth
Piet Rheeders	Evan Shaw
Malcolm Siebert	Ilma Stockton
Izak Theron	

Apolgies were received from Charles Flee

Approval of minutes of previous meeting was proposed by Evan, seconded by Malcom.

Treasurers Report — Klint Klintworth

The only major new items are the funds raised for Craig Baker, which amounted to R6751 (paid out to them already; see Appendix B for letter of thanks from his family) and the SIG money (R5000) that has been received.

Portfolios

F3J

Peter Joffe commented that concerns were raised about the safety of the models in F3J while launching and landing, and suggested staggered launching times to prevent midairs. Most present thought that it would not be a good idea as part of the challenge in F3J is the man-on-man launching and landing. If the field allows for it, the distance between teams could rather be increased.

The 2006 World Championships are scheduled for the last weekend in July and the first weekend in August.

F3B — Charles Flee

The world championships have been finished and well reported on. The MMS F3B invitational is scheduled for the coming weekend. Ilma explained what they are planning for the event with regards to the “handicapping” of the pilots. It is hoped that with this system more people would get involved in F3B as they stand a higher chance of winning in the competitions.

F3K — Stephane Du Ponsel

The following report from Stephane, who has agreed to take on the portfolio, has been submitted by email.

Exposure of DLG at the Nationals has opened a few eyes and we hope that more pilots will be attracted to this amazing form of RC gliding. There are a few factors that I believe are holding pilots back from joining F3K, such as fear of the launching technique as well as a lack of locally made gliders for those who do not enjoy building. We have our annual Jamboree coming soon and I will address these issues with the rest of the dedicated few.

Our warm up practice day for next year's league will be in the first week of postals in November and we hope that this will be a success, but we need more pilots to make the league more attractive.

Slope Soaring — Izak Theron

ETB has had another successful outing on the day originally scheduled for their annual XC event. They would like to add a formal slope event to the calendar next year. Evan suggested they could use the Black Eagle name for the event, as LMAC is unlikely to organize another Black Eagle. Date to be confirmed.

Postals — John Lightfoot

Everyone should have the August results by now.

G2K — Piet Rheeders

Jamboree was a roaring success and the G2K winch class is definitely here to stay, judging by attendance figures. It was suggested to move the Jamboree to a different time in the year that is less windy and possibly having two events next year. New dates and venues to be determined before the next meeting.

Cross Country — Paul Carnall

Izak Theron reported on the past weekend's cross-country held in Volksrust. Although the event only drew three participants, the combination of the route and the conditions on the day proved to be quite challenging. The best distance achieved was a 13,2 km.

ETB would like to host another cross-country event early in 2006.

It was suggested combining a Highveld Thermal league event with a XC event on a weekend down in Volksrust. The HTL event can be held on the Saturday and the XC event on the Sunday.

ETB to report back on the suitability of fields where a HTL event can be held.

F5X — Malcolm Siebert

Some of the locals did very well in the last international postals. Evan asked if it was possible to compile a report on the event for publication in the Southeaster and SAMAA magazine. Malcolm will compile a report.

Malcolm would like to cater for a national event on the calendar and will report back on a possible date.

Proficiency Badges — Evan Shaw

Applications are still trickling in. Evan is to forward details of new badge recipients to Ilma for publication on the F3X website.

Thermal League — Lionel Brink

Lionel has agreed to be the new rep for HTL. The next competition will be at SGC on the 23rd October.

MGA Rules and Safety Code

SAMAA would like to finalize the Rules and Safety Code and want the SIGS to submit their suggestions. Evan will distribute a generic safety code that their club has been using to club chairmen to look over and suggest changes and additions. Transmitter control at clubs must be enforced to identify radios like the new Supersport 2 radios that do not comply with specifications.

Reports of Regional delegates

Evan read the reports from the regional delegates (attached in Appendix A).

Transformation & Development

— Ilma Stockton

Ilma reported that the event at Swartkops was quite successful again with mostly Gauteng schools attending with lots of interest shown.

The program at Hatfield College still running well, as well as Craig's venture at St. John's.

MMS has found a self-taught junior, Simon Tladi who is an ideal PDI candidate to be fast-tracked as a member of the junior team that will attend next year's F3J world championships. Provided he can attain a standard of 80% of the seniors score, he will make up the third member of the junior team; Conrad Klintworth and Kurt Stockton to make up the other two members.

An official letter of introduction from the MGA to be drafted for Ilma with which she can approach candidates for sponsorship.

Calendar 2005

Calendar must be finalized soon. Evan to distribute a draft calendar to committee members and club chairmen, and will coordinate all feedback.

The following suggestions were made — Klint suggested F3X events to be held on Saturdays with earlier starts.

The first HTL event to be held in Volksrust combined with a cross country and hosted by ETB.

Black Eagle slope event to be reinstated and organized by ETB at Volksrust.

WMAC provisionally given the OK to host the Nationals for next year provided their field can cater for the event and they have the manpower to run the event.

MGA Communication

Apart from a couple of new members the MGASA forum has been quiet.

Other Business

G2K, 2m, RES100 and Open are now confirmed as the classes to be flown in

competitions next year. RES100 confirmed again as —

- a) any model with only rudder, elevator, spoiler as controls and no limit on wingspan

- b) any model with a wingspan not greater than 2,5m and any control surfaces.

The next meeting will take place on the 22nd November.

Appendix A

Reports from Regional delegates

WP

Nothing special to report, except that there have been several really good mornings, enjoyed by an encouraging number of pilots in all categories — winch / glass models — bungee / lighter models and electrics.

We managed to put up a score for our Postals on the last day (making a habit of that!) and have just assembled the required number of scores for the International Postal, although there seems to be some trouble about where to send them — Brian Sharp is not responding.

Freestate

The Freestate has been the host to a very successful Slope weekend at Rosendal, having had a total of 57 visitors this year, 2005.

The winds blew as though they were trying to make up for their weak showings over the past two years.

The Maluti Model Gliding Club of Bethlehem, is going from strength to strength, now boasting a membership of some 16 paid-up members and quite a few more “very interested, waiting for Dad to buy the radio equipment” youngsters who have been camping in Don's workshop. Don, by the way, is not very well at the moment, and is probably heading for a spell in Hospital.

We were arranging a 'glide-in' at Senekal, with invitations to the Bethlehem, Welkom and Bloemfontein guys, for Sunday 2nd October, but might have to postpone, in view of Don's health situation. Should know by this Wednesday 21st September.

WMAC has been on at me about hosting a National gliding event in Welkom, but this will have to be discussed. Evan could probably

explain the shortcomings of the WMAC field, with the mine dumps and proximity to main roads etc.

A very early plug for Rosendal 2006. It will be the 20th year that Rosendal will be hosting a slope weekend (or week, if you prefer), so there will be some special events arranged to celebrate this anniversary, with hopefully, some assistance from the village community itself. More info at a later date.

Kwazulu-Natal

On 18 September three of us had our last shot at G2K for the third quarter. It seems that the weekend at White Hills took its toll on men and equipment. Most of the locals have developed a strong resistance to the use of bungees; however, I am pleased to say that several of the new chaps are working on their proficiency badges.

We are about to have a pretty busy time over the next few weeks. This coming weekend we will fly another round of the Bill Vos (the one that we postponed to allow people to go to Rosendal) and then we will fly the final round of the Bill Vos the following weekend.

Preparations are in progress for the Natal Championships, which will take place on 22/23 October at Summerveld.

Gauteng

A busy gliding season continues in Gauteng with a number of events completed & even more to follow. Weather conditions remain excellent for gliding purposes — clear skies and a little wind to assist on launches.

The G2K Jamboree was held with moderate success - 29 entrants enjoyed challenging wind conditions and most indicated that the day was enjoyable. The inclusion of a provisional class

“G2K Winch” appears to have been very successful, with 17 of the entrants dedicated to flying rudder elevator from winch launches. All agreed that the class winners were worthy of their positions and most importantly no disputes were recorded during this fun event.

Also to be noted is that a number of clubs will be planning their 2006 calendars shortly and it is recommended that the gliding calendar preparation begin early to ensure that fields are made available for competitions.

Appendix B

Letter of thanks from Baker family

Dear MGA members,
We would like to express our deep gratitude to all who contributed to the gift of money paid to us recently, to assist with the expenses incurred as a result of Craig's illness in Finland. We are deeply touched by this gesture and realise that you were concerned by the extreme distress we all experienced during this time.

We are pleased that Craig has fully recovered and the final doctor's report rules out any

long-term disorders. The final diagnosis was delirium, a medical condition which in Craig's case was triggered by burnout, stress, sleep deprivation and dehydration.

Yours Sincerely

Adrian, Michelle, Jodie and Craig Baker

** Craig would like everyone to know that his CG is in the correct position again!

- o o O o o - - -

*It takes only one drink to get me drunk.
The trouble is I can't remember if it's the
thirteenth or the fourteenth. George Burns*

— Article of Faith —

A young Nun who worked for a local home health care agency was out making her rounds when she ran out of gas. As luck would have it there was a gas station just one block away. She walked to the station to borrow a can with enough gas to start the car and drive to the station for a fill up.

The attendant regretfully told her that the only gas can he owned had just been loaned out, but if she would care to wait he was sure it would be back shortly. Since the nun was on the way to see a patient she decided not to wait and walked back to her car.

After looking through her car for something to carry to the station to fill with gas, she spotted a bedpan she was taking to the patient. Always resourceful, she carried it to the station, filled it with gasoline, and carried it back to her car. As she was pouring the gas into the tank of her car two men watched her from across the street.

One of them turned to the other and said, "I know that it is said that Jesus turned Water into Wine, but if that car starts, I'll become a Catholic for life!"