



PROP TORQUE

Official Newsletter of Launceston Model Aero Club Inc. PO Box 1204 Launceston TAS 7250

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From the Secretary's Desk

Hi All,

Well here we are back again with the first Newsletter for the year of 2011, and could I miss mentioning the weather—I think not! What a summer this has been right across the country.

No need for me to highlight any of that for you as you are well aware of what has been happening, Bushfires in the West, Cyclones in the north and west and floods mostly all over and here in Tassie as well. But despite all that flying has continued sometimes even in the windy conditions to some regret I might say by some. Even though some time has now passed since your committee has met, the first meeting of the year took a bit to get going again being a quiet time of the year.

You will be informed of the outcome of the latest Tomboy competition held recently in

this issue. The Glider day did not start due to a very wet day on the day that it was scheduled.

One thing that must be emphasised is the need to sign in the daily book when at the field, it has been noticed that this is being neglected by some of the pilots.

It would seem that the most important thing to do when getting to the field is getting the models into the air as quickly as possible. An appropriate suggestion would be that after the unloading has taken place and the vehicle has been parked, the very next item and habit to get into is to fill in the daybook in the clubhouse as you head out to the pit area. It will be too late to think about making a claim later on if your presence cannot be established as being signed in on the day an accident has occurred and you are up for the full cost of any claim that may be made.

The committee has decided following a request that provision of a control line circle be established as there are members who are keen to have a go at this ancient form of aero modelling, more will be mentioned on this a little later on.

I would like to welcome on behalf of the club four new members into our ranks, two new and two re-joining, Max Wiggins and Don Gray have re-joined as Associate members, that is they have their full membership with another club and Doug

Colbeck as a new Senior member and George Gray as a new Junior member, we do welcome them all.

Birthday's greetings: for February are Michael Green, Bill Hellinga, Michael Hope, and Don Gray.

And coming up in March quite a flush of birthdays – Owen Cameron, Richard Cooper, Peter Daniel, Will Deal, Andrew Dewater, Jacques Wakae, Kane Williams, and Fred Willis.

We do wish them all a great day on their special day and a great year ahead to all of them.

Well that about wraps it up for me for now but as usual I would like to leave you with a thought – **(Cheers to a new year and another chance to get it right)**

Happy landings all

Geoff.

From the Editor's Desk

As the second newsletter of the bi-monthly series there have been some more contributions from Owen and Merv Cameron, and another interesting electronic posting on the internet found by Jacques Wakae.

The report by Will Deal heads a section related to Control Line enthusiasts. As you have read in Geoff Hays' Secretary's report, a Control Line circle will be established at the Club, which will bring back many happy memories for many of us who had our first exciting experience of model flying with this modality. Many

thanks to the above for their interest and efforts.

Obituary. – Ron Moulton.

Most of us I think would have been brought up on literature written or edited by Ron Moulton who died in October 2010. He wrote, I understand, the best book on Control Line modelling which is of interest, given this issue's contents. He was Editor of Aero Modeller and eventually Editorial Director of Model Aeronautical Press (MAP). He therefore had a formative role in the development of the model aeroplane hobby in the UK, of the same stature as Dave Boddington who died in April 2010.

Servo Torque.

I have been trying to understand the figures for torque output of servos. Unfortunately these are reported in Imperial; and metric form. Converting from one to the other is not obvious. However there is a web site (of course!) which documents these figures for you when you have to choose the power of your servos: www.servodatabase.com.

It contains a very comprehensive set of data including street price!

If you think about the meaning of torque in the context of servo output, and servo arm lengths you will see that the way the specifications are presented, often by the sales people or manufacturers, can be confusing. It would be very helpful if a member could contribute an article in this area, giving ball park specifications of servo torque for each situation, when choosing them for a project.

...Richard..

SAFETY REMINDER

- **Taxiing in the pits is not permitted.**
- **All models must be restrained when starting.**
- **All mobile phones must be switched off in areas west of the clubhouse.**
- **Spinning propellers are dangerous.**

Careful! - too long battery wires will kill Electronic Speed Controller (ESC) over time

Problem

If you are having problems installing an electric power train because the distances between the motor and battery and/or the ESC are too long for the wires, this article will help with arranging the wiring correctly.

The basic message from all the web links below, show that all controller manufacturers say the same thing: **battery wires that are too long will kill your ESC over time.**

The standard input capacitors (large cylindrical devices in thin shrink wrap) on the ESC will be destroyed *over time* because they heat up. Using thicker wire will not help; it is mainly a wire [inductance](#) problem, not a [resistance](#) problem.

This goes for *all makes of ESC*, which use the same principle (except [Sinus](#) controllers, which use sinusoidal instead of trapezoidal signalling: they tested 70 metre length wires without capacitors).

Solution

Lengthen the ESC to the motor wires, *not* the battery wires. The lengthening is not critical because there is already a lot of wire in the motor itself. If the *motor to ESC* wire

eventually gets too long, it will not harm the motor and/or the controller. But as this may cause radio interference, it is always a good idea to twist the three wires around each other: a matter of good practice in this situation anyway.

Rule of thumb

If you do *have* to lengthen the battery wires, add extra [electrolytic capacitors](#). As a **rule of thumb, for every 4inch/10cm** extra length/distance between battery and ESC, add an extra 220uF capacity near the controller (the voltage specification should be the same as for the capacitors already installed). Also keep the positive and negative wires as close to each other as possible, by twisting and/or taping them together. If the wires are close to each other than the series inductance will be reduced, because the current is going in opposite directions in each wire (and therefore producing opposite polarity magnetic fields which cancel out). For example, 13AWG wires separated from each other by 1 inch have about 4 times higher inductance than if they are bound together.

Capacitor type

The main specifications you need are low impedance and low ESR (equivalent series resistance). The only thing you will find at Radio Shack will be general purpose capacitors do not have low ESR, for which you will have to look up the manufacturer's specification sheet. The Rubicon ZL series mentioned in the Schulze instructions is a good one and is available from Newark/Farnell. The Panasonic FM series is another good low impedance capacitor and is available from Digikey. You should note that the voltage rating on the capacitor should be significantly higher than the battery voltage, i.e. the same voltage rating as the installed devices, a higher rating is no problem.

Attention

Electrolytic capacitors, like batteries, have a (+) and (-) lead! If you solder them in the wrong way round they will get hot, pop open or even explode. Nasty fumes and the liquid stains. Don't ask how I know!

Explanation/theory

First a watery analogy, with water running in a pipe and through a tap. If you turn off the tap quickly you will hear a loud knock/shock sound in the pipe. The water wants to continue flowing but it can't, because for a moment the water pressure is much higher than the static water pressure. It is the same for an electric current that is switched off:- because of the inductance it wants to keep on flowing and the voltage increases rapidly. This is what causes sparks (brush fire) in a brushed motor, as the brushes are swept from one section of the commutator to the next.

The electronic speed controller is like a water tap that is turning on and off very quickly : (8,16, 32kHz) to get the desired current for the motor. Turning off the current, in combination with the battery wire inductance, causes voltage spikes because the current wants to continue on its course (like the inertia of the moving water column). These voltages are higher than the battery voltage. The input capacitors take care of these spikes by reducing the wire inductance. The longer the wires, the higher the voltage spikes induced in the wires, the harder it is for the input capacitors to cope with the extra energy absorption. They will heat up and eventually explode. Since wire inductance, depends on the wire length, while wire resistance, depends on thickness, using thicker wire will not help with this problem specifically.

Web Links: can be obtained from www.rcforums.com from which Jacques Wakae kindly supplied the above information, which has been edited slightly. There are more details on the addition of capacitors on www.schulze-elektronik-

gmbh.de/guide/gfutc-de.pdf

YGE controllers, extra capacitors and their location, nice pictures, click to enlarge:

www.yge.de/caps2.php.

Internet posting from Jacques Wakae.

(Full details can be found here

<http://www.rcgroups.com/forums/showthread.php?t=952523>

George)



The Great Control Line Gathering 2011

William Deal

The much anticipated control line day was held in perfect weather at the Mangalore property of Elaine & Tony Gray on Saturday 22nd January. The clock was turned back too many years to remember as many of the modellers in attendance flew control line together in the 1950's! With 16 control line models on show all was ready for some serious fun. As Tony gave the grass circle a final trim the sheep soon found the quiet end of the paddock when the diesel & glow engines fired up.

Merv & Owen Cameron produced a brace of models including Owen's brand new mini Ramrod powered by a Taipan 2.5 glow. The very nicely finished Ramrod ended up bouncing off the turf after an ill-timed loop with the motor off song. On inspection Owen exclaimed "they still sell glue don't they" Jason George surprised everyone by

flying the Sabre Trainer first time after receiving only "do this" instructions from Owen. George Gray was thrilled to fly some laps with his AeroFlyte trainer and unlike his grandfather Tony, didn't try a vertical landing. John Moody put in some nice flights with his Blue Pants model and also presented all modellers present with a commemorative "Control Line Gathering" sticker. Many thanks John.

Faye & Bill Hellinga together with Kerry & George Carnie made the trip down and found out what the "good old days" were all about. Former control line modeller Peter Wisby heard of the event on the grapevine and was a welcome visitor. At one stage George & Merv ventured into Tony's big shed and there were grave fears that they may never be seen again, however they finally turned up.

Regular "round & round" modellers Dave Christian & Peter Allen had many flights on the day treating us to slick maneuvers with their well sorted models. Tony Gray flew his newly built and very neat Aerobat powered by a Taipan 2.5 diesel. Fuel starvation problems led to an inglorious landing of the vertical variety which ended the day for the Aerobat. Fortunately no major damage sustained. Geoff Leverton, Gavin Hallam, Ron & Peter McGuinness all arrived a little later in the day with models and all had successful flights. Gavin's little Rascal model powered by a Philtech diesel was flown by Peter Allen who was heard muttering "I know why they called it the Rascal" Geoff flew a model with a drop off undercart originally from an old control line speed model. Geoff flew the fast little model showing he could "still do it" Greg Hall & John Jounbloed also enjoyed the day and flew some "wireless" models. With the control line models only taking up half a sphere there was plenty of room for JJ's electric glider & Greg's wild wing.

The flying session was paused for a magnificent BBQ lunch beside the pool. Sincere thanks to Elaine, Tony and family for providing such a lovely lunch and hosting such an entertaining and memorable day. Another Control Line day is proposed for autumn – details later.



Phantom by Merv Cameron,
powered by Thunder Tiger 10.



Ramrod, by Owen Cameron,
powered by Taipan 2.5 glow



Group photo: from left to right are Jason George, Merv Cameron, Dave Christian, John Jongbloed, Peter Allen, Tony Gray, kneeling are John Moody and Owen Cameron.



Tony Gray with Aerobat, powered by Taipan 2.5 diesel. >>>>>

<<<< Dave Christian, with his own design:





The grey model with red and orange stripes is a blue pants owned by John Moody powered by OS 25, (?). Small white and blue model is owned by Tony Gray's grandson (previously started by Will Deal some 30 years ago and given to Tony who gave it to his grandson and then completed it for this Xmas!) powered by an ED Sabre diesel. The small brown model is a Sabre trainer built by myself ,powered by an OS10, which impressed the crowd by the speed it flew at (a real rat racer model) My friend Jason George had his first ever flight with this model, mentioned in Will's write up above. Silver winged model with yellow tail is Tony Gray's (think it is own design) powered by an OS15. The orange model & orange and white models are both Peacemakers owned by Peter Allen Powered by some exotic diesel engine? Gold model with red wing/yellow striped is a Talisman built by myself powered by OS 10.

All photos and legends supplied by Owen Cameron.

Blast From Past. (Letter from Owen Cameron.)

The more I thought the more I thought you should do a write up from the past. 1957 was a good year for Tasmania. I believe it was almost the first year of the MAAA or very close to that.

Dave Jacobs won the National championship for open FAI sailplane, second in the Class 1 Teams Race with the previously mentioned team. Although if you ask Dave they won it and there was a mishap with some of the times! Greg Waddle won the R/C event and I can only imagine what he was flying back then. My dad (Merv „Editor) ended up second the Power Ratio and second in the Nordic A2 Sailplane with Dave Jacobs in third. Dad would have won it only the glider was lost before the last heat.

I hope you can use the old photos, I have lots of historical modelling photos and if anyone else has more, I wouldn't mind being able to scan them into my collection.

Pick Dave Jacobs and Baron Cordell in the “Legends” photo below.



<<<<<<
A young Will Deal!



Merv Cameron O/D power ratio
model powered by Oliver Tiger
2.5cc diesel – 2nd placed



Tony Farnan 1957 Nationals



Baron Cordell 1957.



Dave Jacobs - 1957



Team Racers from 1957
Nationals at Campbell Town.

You would have read the report from Will Deal elsewhere in this newsletter on the Control line (C/L) day at his place on the 22nd of Jan. Initially we expected at least 9 people as definite starters, myself included as I have a collection of control liners. For this occasion I decided to build a new one and had an old Taipan 15 in the drawer. Once again with the help of Will Deal I acquired a plan of a Ramrod stunter (2nd and 3rd in the 1957 nationals at Campbell Town). Dave Jacobs and my father (Merv) teamed with the late Baron Cordell achieved a second place in the teams race. Anyway I have built the shrunken version for Tony's C/L day. (see photo above in the control line report, ..ed.)

There has been a bit of an interest in control line flying from some of the newer Launceston members, John Moody, a new member from George Town, ex Queensland C/L flyer, young Tony Gray (Anthony) and his son have a new trainer, Dave Jacobs and I still have some tucked away. At this stage there are quite a few diehards in Hobart still supporting this breed of flying. Although some of the older members think that this is a thing of the past, I think they should look at where most of them started. It is a cheap and easy way to introduce young people into our hobby and builders into the basics of building. Ultimately it is all great fun and a social event. Go back to the past and have a look at the photos.

Owen Cameron.

"Tomboy" & Old Timer Competition - February 12

By George Carnie

The popularity of the "Tomboy" event has not waned at all with new competitors joining the ranks for the February contest. The unpredictable weather kept a few of the usual Hobart attendees at home but Tony Gray, Peter Allen and Will Deal made the journey north. We live at Perth just 10kms from the field and it was "blowing a gale" and I was not confident that the event would get a start - at least not the "Tomboys". However as we got within 5kms of the field, the wind was dropping.

Thanks again to Will Deal for CD'ing the days activities. Dave Jacobs is normally active in these events and his absence was missed. I called him the following day to make sure his health was okay but it turned out the windy weather kept him at home and he was surprised that the event went ahead. It just goes to show how variable our island weather can be with just a separation of 20-30kms! The day was well attended by spectators as well as non-competing members. Richard Cooper came and brought along Peter Riall. It was nice to see Peter about after a bout of ill health had him grounded for most of 2010. Let's hope 2011 brings you some good health Peter! A big welcome to our new members who also attended on the day (yes 4 more new members which is very encouraging!); Doug Colbeck was a spectator for the day (a bit worried Doug that you already have RC gear for sale!) Also one time member Don Gray who has relocated back from the mainland. Next our newest Junior member, George Gray, grandson to Tony Gray had a couple of flights under the expert tuition of "Pop". Lastly, Max Wiggins has rejoined as an Associate, indicating he is looking to rejoin as a Full Member in July. After a bit of persuasion, Max entered his first competition in a long while with his electric Sportster and given the result it may not be his last comp.



Terry Pearson is more than happy to take a back seat for day and be the assistant for his grandson and "young gun" Jackson Oliver. With most LMAC members competing Will Deal again carried out the CD duties. Will's report is below. Will reports "a gentle breeze" but if my memory serves me correctly that soon changed with the wind spending all day coming from every direction and finishing the day very strongly from the north. I'll let Will report on the day's competition. (More photos from the day can be found on the web site)

Tomboy

A cloudless sky, gentle breeze, a bunch of "Tomboys", what more could you ask on a February morning! Another excellent turn out with 5 starters in electric plus 8 in I C class. Three full competition rounds were flown plus an all in "last model down" fun fly to finish off the day. Good to have Max Wiggins join the regular flyers with his electric Sportster.

As usual with the Tomboys all models flew well, however the day was filled with rather a lot of "drama". A rather large bird, probably a hawk decided to take an interest in the models of Greg R & Max W. The hawk had a good look at Greg's model then decided he liked Max's Sportster better and decided to attack. After several attacks and some very neat evasive work by Max the hawk finally flew away defeated and Max continued his flight. That was close! Those "powerful" 0.6cc diesels also dished out some knuckle rash to the I C crew with no less than three pilots making a trip to the band aid box. Unfortunately Jackson Oliver missed his final two flights after running out of helpers! Owen C decided to start one of his electric Tomster flights with a 3D display of manoeuvres not seen before. Very impressive Owen, but no extra points.

The recently included landing points proved to be the difference in the results in both electric and I C. In Electric Max W missed his final landing points to give Greg R a well-deserved 1st place for the day. Similarly Kevin H also missed the final landing to hand 1st place to Peter A's MPJ Tomboy in I C class. As you will see from the results below the results were very close and it is apparent that even with a variety of different models, the difference in performance is in the preparation and flying on the day.

With the breeze picking up we decided to finish off the Tomboy's with an all in duration "last down wins" After his duel with the large feathered bird it was fitting that Max W had a win for the day. Final time 9 min 30 secs just edging out Greg R with 9 min 15 secs - well done Max!

Results

Electric "Tomboy" 1st Greg Robertson 2nd Max Wiggins 3rd Jacques Wakae

I C "Tomboy" 1st Peter Allen 2nd Kevin Hay 3rd Tony Gray

Old Timer Duration

The Old Timer event followed the Tomboys with 3 rounds of duration flown. Regular competitors Jacques W (Buzzard Bombshell), Kevin H (Powerhouse), George C (Kavan Phoenix), Tony G (Lanzo Bomber) were joined by Merv C's new model, a superb Baby Buzzard powered by an unused 60 year old ED Comp special diesel. I have to say "drama" as the order of the day with a rather bizarre 1st Round. Merv's unflown BB also decided to settle into some rather erratic 3D manoeuvres after take-off, missing destruction by "that much" a couple of times before lots of transmitter tweaking enabled a settled flight. Tony G's Lanzo

climbed away very nicely, gaining nice height and distance when Tony decided to adjust his sunglasses then somehow proceeded to fly "another model" with the inevitable result – Lanzo down. Wait there's more! Anxious to retrieve the Lanzo from the top paddock Tony decided to drive his car to retrieve the model. Unfortunately when reversing out a very nasty crunching sound echoed across the field. Tony's favourite Cardinal had met a sad end under the rear wheel of the Gray station wagon! After all that the rest of the competition ran quite smoothly. A tight contest emerged between George C and Jacques W after the first two rounds so it was game on for the final round. Unfortunately Jacques had a short battery run in the final leaving the consistent George C the winner for the day.



1st Place: George Carnie 2nd Place: Jacques Wakae 3rd Place Kevin Hay

A super fun day enjoyed by all – well perhaps not by Tony! As usual Alice, Kerry and Faye provided us with a most enjoyable lunch, thank you so much. Thanks also to John Moody for helping with CD duties

Next Tomboy event HMAc at Richmond after Easter, date to be advised

Will Deal

THERMAL GLIDER & LEG DAY - February 26

By George Carnie

Due to inclement weather (can we write a report here in Tasmania without mentioning the weather – it doesn't appear so!), the scheduled Thermal / LEG Glider event was postponed from the 19th to the 26th of February when fortunately, the weather was a "little" more kind. The rain had gone but the wind gradually increased throughout the day.

Whilst the weather was more favourable, the "gods" were still not looking after us. First problem was the winch – the first of the Club winches was brought out, only to find that the last user had left the line in a condition that resembled a "birds nest"! However some persistence by Max Wiggins, ably assisted by Ian Campbell saw the tangle unravelled and rewound on the spool as it should have been last time. Whoever left it like that must remember that Club property is member property and should be looked after as if it was your own. Next the elastic brake restraining strap was found to have perished and fortunately the 2nd club brake strap was intact and the brake was repaired. With the winch now operational we were ready to go – or so we thought. The Club's brand new deep cycle battery was brought to the winch line and found to be near flat! (Task = delegate someone responsible to ensure no repeat). Greg R brought his to the line to get things under way.

THERMAL GLIDER

Only 4 entrants this time; Kevin H had a prior fishing commitment (hope you caught plenty Kevin!) and Richard Cooper had almost but not quite got his Gentle Lady repaired. So the entrants were Greg R, (Own Design) Dave J (Own Design), Terry P (Algebra courtesy of DJ) and George C (Silent Dream).

The competition got under way and it was decided, due to LEG commitments) to fly 6 minute durations. The first round scores were George C 3m34s (13.8m from the spot), followed by Terry P 3m02s (zero landing) and then Greg R 2m28s (zero landing). Sadly Dave J had a launch problem and his OD veered heavily on launch and crashed. Dave suspected a warped wing. Bad luck Dave. Showing the usual sportsmanship and despite Terry P's offer, Dave insisted Terry continue to fly Dave's back up glider, the Algebra.

The second round got under way and Greg had decided to try a smaller wing on his glider to gain better penetration as it was windy and thermals were not massive. This made a difference (nice to have spare wings Greg!). Greg managed a 5m33s flight and landed 9m from the spot. Terry P was next and achieved a time of 2m42s. Lastly was George C and I was lucky enough to find a few thermals and managed a maximum score 6m00s and a spot landing, This brought proceedings to an end with the final results 1st George C, 2nd Greg R and 3rd Terry P.

LIMITED ELECTRIC GLIDER (LEG)

7 entrants for the LEG event, which was a good turnout. I t could have been more but we couldn't coax Max W or Doug C to enter with their Hobby King "AXN Floater"

http://www.hobbyking.com/hobbyking/store/uh_viewItem.asp?idProduct=8359 Whilst they don't look as though they would be competitive, the climb rate and thermalling ability was quite impressive for such an inexpensive model.

The first round was very tight and eventually won by Ian Campbell 301pts, followed by Greg R 300pts, Terry P 299pts, George C 298pts, Jacques W 293pts, Geoff H 205pts and Dave J 148pts.

The second round was again tight at the top, won by Greg R 314pts, followed by George C 313pts, Ian C 303pts, Jacques W 296pts, Geoff H 258pts, Terry P 236pts and Dave J 135pts. (Dave struggled as

he was using his backup brushed motor Spirit and with the windy conditions just did not have the climb rate he needed and decided to retire at this point).

The final round of the day was after lunch and the wind had not eased. This was a bit eventful for George C as during his climb the prop and spinner decided to part company with the model and a frantic eye was kept on the glider and the spinner/prop as it pirouetted to the ground. Fortunately keen eyes watched where it fell and with the ground support of Merv Cameron, Jackson Oliver was able to locate the prop. Thanks Jackson! Losing the prop meant finding thermals and staying in them was vital. In the end the round was won by Ian C 310pts, followed by Greg R 305pts, Terry P 294pts, Jacques W 289pts, George C 284pts and Geoff H 276pts.

After dropping the worst score for each competitor, the final places were 1st Ian C, 2nd Greg R and 3rd George C.

Interestingly, the average components for all 3 rounds were the key to the result. Motor Time, Landing Points and Overall Time Deviation. I've prepared a table to highlight these –

Entrant	Motor	Landing	Time +/-
Ian Campbell	10.7	18.3	3.0
Greg Robertson	12.0	21.7	3.3
George Carnie	8.7	11.7	4.7
Terry Pearson	16.0	10.0	10.3
Jacques Wakae	10.3	8.3	5.3
Geoff Hays	30.0	6.7	30.3
Dave Jacobs	47.0	0.0	111.5

What can we glean from these results given that Ian C was the winner?

1. The shortest average motor run time was George with 8.7 secs, followed by JW on 10.3 and then Ian C on 10.7sec
2. The best landing was Greg with an average of 21.7 points (25 maximum), followed by Ian C on 18.3 and the George on 11.7
3. The closest to the 5 minute maximum time was Ian with 3.0 secs followed by Greg on 3.3 sec and then George on 4.7 sec.

Importantly Ian was 3rd in motor time, second in landing and first in closest to the time limit. He won because he was consistently in the top 3 for all facets. Obviously there are other factors that influence the final result i.e. whether the combination of these factors resulted in a win in the round and the dropping of the worst round. In past years I ran the Australian Electric Flight Association's Postal LEG competition which included pilots from as far as Scotland and evident, in order to win was the need for closest to the 5 minute time limit and the best landing score. The shortest motor time is not that important if you can't hit the spot! Until next time – don't be frightened to compete it's all a bit of fun and you'll be a better pilot as a result.

George

Final "Normalized" scores were as follows -

OPEN		NORMALIZED			
Entrant		1	2	3	TOTALS
1	Ian Campbell	1000	965	1000	2000
2	Greg Robertson	997	1000	984	1997
3	George Carnie	990	997	916	1987
4	Terry Pearson	993	752	948	1941
5	Jacques Wakae	973	943	932	1916
6	Geoff Hays	681	822	890	1712
7	Dave Jacobs	492	430		922



Thermal & LEG Competitors

L-R George C, Ian C, Jackson O (standing in for Dave J) Greg R, Terry P, Jacques W and Geoff H

EVENTS CALENDAR	
<u>Date</u>	Events
March 5th	Club Day
March 19th	Scale Day
April 2nd	Club Day
April 16 th	<u>Proposed Thermal/LEG</u>
May 7th	Club Day
May 21st	TBA
June 4 th	Club Day
June 9 th	AGM
June 18 th	Tomboy / Old Timer

Note: Starting times: - Except where noted----- 10 AM
This Calendar is subject to change that will be notified as required

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