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THE VOICE OF CONTROL LINE  
AEROMODELLERS FROM  
AROUND AUSTRALIA

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Number 108



Produced by the Victorian Control Line Advisory Committee

March 2007  
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**Copy Deadline for next issue is:  
Wednesday March 21st 2007  
PRODUCTION SPECIFICATIONS**

Please remember when submitting copy that if you have access to a PC, or suitable typewriter you can save me retyping by giving me your items pretyped, and please use a good black ribbon for best reproduction. **Best of all is to send it on a 3.5" disk as a Windows Write, Word for Windows, or as an ASCII TEXT FILE or use Email**

Contest results should be tab delimited, ie use a single tab between each column of results, if submitted by disk or email. This makes formatting much easier on the editor.

Email address:- [hbailey@optusnet.com.au](mailto:hbailey@optusnet.com.au)



## COMING EVENTS



## COMING EVENTS



### C.L.A.S. (NEW SOUTH WALES) CONTEST CALENDAR 2006

#### VICTORIAN CONTROL LINE CONTEST CALENDAR 2006/2007

MAR 25	<b>FAI Team race, Mini Goodyear,</b> Vintage Combat, Vintage A T/R, Classic B T/R	CLAMF
MAR 25	Diesel Day	KMAC
APRIL 6,7,	VMAA Control Line State Championships	CLAMF
APRIL 8	VMAA Control Line State Championships	KMAC
APRIL 9	VMAA Control Line State Championships	CLAMF
APRIL 22	Fun-Fly Day	KMAC
MAY 27	Classic Stunt Competition	KMAC
JUNE 24	(up to) 2.5cc Day	KMAC
JULY 22	Yeoman Trophy F2B Stunt Competition	KMAC

Events will be flown in order of printing.

Events in **Bold type** will be flown over hard surface

**CLAMF** Frankston Flying Field, Wells Rd, Seaford  
(Melway 97J10), 10.30am start  
Contact :- G. Wilson (03) 9786 8153,

**KMAC** Stud Rd. Knoxfield (opposite Caribbean Gardens)  
(Melway 72 K9) 10.00am start  
Contact :- Peter O'Keeffe (03) 9753 3442  
[kmac@aanet.com.au](mailto:kmac@aanet.com.au)

**Please note that for 2007, the KMAC club has decided that all events on the fourth Sunday of each month will be organised and hosted by KMAC only - no other clubs are involved in running events on the same day at the KMAC flying field.**

**CLAG** Contact :- Graham Keene (03) 51924485  
Details of venues can be found on web site  
[www.clagonline.org.au/home.htm](http://www.clagonline.org.au/home.htm)

#### NOTE -

The third Sunday of each month is the regular "**Brimbank Club Day**"

### CLASII CALENDAR 2006/2007

Flying has continued on Saturdays at the Leichhardt Park flying site ( UBD Map 232 R1)

John D. Taylor,  
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DATE	CLUB	EVENT
Mar 3/4	MDMAS. (Mitchell Hill Fields, Muswellbrook)	2007. HUNTER VALLEY CHAMPIONSHIPS
Mar 11	KMFC	Competition Practice and Club Racing
Mar 11	Werrington. Venue TBA.	F2B Aerobatics and Classic Stunt
Mar 10/12	MASA. Venue TBA.	S.A. C/L State Championships. (Adelaide Cup Weekend).
Mar 25	SSME	Phantom, Vintage A, Vintage 1/2A and Bendix
Apr 1	KMFC	1.6cc Combat and Slow Combat
Apr 21	KMFC	CLUB STUNT (Novice)
May 19/20	MDMAS. (Mitchell Hill Fields Muswellbrook)	VETERANS' GATHERING
May 27	SSME	F2B Aerobatics
Jun 3	KMFC	Palmer/Aldrich Classic Stunt and CLUB STUNT (Novice)
Jun 9,10,11	CLAS. Venue to be confirmed.	CLAS. NSW C/L STATE CHAMPIONSHIPS
Jul 8	KMFC AGM,	2.5 Stunt, Club Racing and Slow Combat
Aug 5	KMFC	F2B Aerobatics and Novice Stunt.
Aug 11	KMFC	CLUB STUNT (Novice)
Aug 26	SSME	Slow Combat (Bonus points for WW2 Style model).
Sep 9	KMFC	Classic Stunt, Vintage Stunt, Club Racing, Slow Combat, SWAP MEET
Sep 29	KMFC	CLUB STUNT (Novice)
Sep 30	SSME	F2B Aerobatics
Oct 14	KMFC	Gordon Burford Day, Club Racing
Oct 28	SSME	Phantom, Vintage A, Bendix T/R, Vintage 1/2A
Nov 3	KMFC	CLUB STUNT (Novice)
Nov 4	SAT (Kelso Park)	F2B Aerobatics
Nov 11	KMFC	Vintage T/R, 1/2 A, A and B.
Nov 18	NACA (Gateshead H.S.)	Classic Stunt & Cardinal Stunt. (I. Smith Ph:024975 2292)
Nov 25	KMFC	1.6 and Slow Combat, Club Racing
Dec 2	Doonside. Venue TBA	F2B Aerobatics

Dec 9	KMFC	Christmas Party and Fun Fly
Jan.2008	CLAS. <i>(Details to be advised)</i>	
	CLAS. CITY OF SYDNEY CHAMPIONSHIPS	
DOONSIDE -	(Doonside Model Flying Club) - Kelso Park North, Panania.	
KMFC -	(Ku-ring-gai Model Flying Club) - St. Ives Showground, Mona Vale Rd, St. Ives.	
NACA -	(Northern Area Contest Aeromodellers) - Gateshead H.S., Pacific Hwy, Gateshead.	
REMAC -	(Ryde Epping Model Aero Club) - Peter Board HS, Wicks Rd, North Ryde.	
SAT-	(Sydney Aeromodelling Team) - Kelso Park North, Henry Lawson Dr. Panania.	
SSME -	(Sydney Society of Model Engineers) - Model Park, Luddenham Rd, Luddenham.	
WMFC -	(Werrington Model Flying Club) - Entrance to flying site @ cnr. Landers & Walker Sts, Werrington.	
MDMAS -	(Muswellbrook District Model Aero Sports Inc.) - Mitchell Hill Field, New England Hwy, Muswellbrook	
COMSOA -	(City of Maitland Society of Aeromodellers) Raymond Terrace Rd, Metford.	

### Western Australia 2007 Control Line Calendar

Date	Club	Event
Mar 17 2pm	CLAW	CLAW race day F2C & F2F
<b>Mar 31 11am</b>	<b>CLAW</b>	<b>Goodyear, Classic B, Bendix</b>
Apr 15 2pm	CLAW	CLAW race day F2C & F2F
Apr 21 1pm	Lumen Christi	Tarmac Stunt
May 5 1pm	Lumen Christi?	Vintage Combat
May 19 2pm	CLAW	CLAW race day F2C & F2F
<b>May 26 1pm</b>	<b>Lumen Christi</b>	<b>F2B Aerobatics</b>
Jun 9 2pm	CLAW	CLAW race day F2C & F2F
<b>Jun 30 10am</b>	<b>CLAW</b>	<b>F2C rnd 1,2,3. F2F</b>
<b>Jul 1 10am</b>	<b>CLAW</b>	<b>F2C rnd 4 &amp; final, Vintage A</b>
Jul 14 1pm	Lumen Christi	Vintage Stunt
Jul 22 2pm	CLAW	CLAW race day F2C & F2F
Aug 12 2pm	CLAW	CLAW race day F2C & F2F
Sep 1 12pm	Lumen Christi	The Tarmac Day
<b>Sep 8 11am</b>	<b>CLAW</b>	<b>Vintage Combat</b>
Sep 16 2pm	CLAW	CLAW race day F2C & F2F
Oct 13 2pm	CLAW	CLAW race day F2C & F2F
<b>Oct 27 1pm</b>	<b>CLAW</b>	<b>Open Combat</b>
Nov 10 2pm	CLAW	CLAW race day F2C & F2F
<b>Nov 25 10am</b>	<b>CLAW</b>	<b>Combined Speed</b>

Events listed in normal type are Club events.

Events listed in **bold** type are State events.

Contact Trevor Letchford for further information.

ph - 089 342 2625 mob - 0439 956 846

## F2B: Fabrication of piston rings for Stunt engines. By Joe Supercool

Yet again folks, I return to the subject of restoring the old ringed stunt engines from the 60's and 70's. These include the Enya 45's and Super Tigre 46 plus other capacity engines from the same manufacturers. Some of these motors were quite poor from new, while others, like the ST46, had great reputations, but of which there was the occasional "Friday night special". Whatever, I have a bunch of them and have slowly been getting them to run properly.

Where I have been really slow, is in realising that the individual rings must be fitted to the cylinder using lapping techniques. Once you have the cylinder bore right, you are not finished! If you have purchased a ring, no matter from whom, you then have the problem of whether the ring actually fits your cylinder, including whether the ring gap is "correct": whatever the latter means!

Here is my Enya 45 6002 story. As reported previously on this site, Richard Morrow did wonders for me in honing my new Enya 45 6002 sleeve. After this, the motor ran fine, at least until the public display day at Whiteman Park. Out of 4 flights, I got in 3 really nice motor runs, but on a hot Sunday afternoon, the wretched thing would not start. Luckily, Peter White was flying adjacent to me, thus masking my embarrassment.

It was apparent that the motor would not start hot, even from just the sun shining on it. Not good: was this another piston/cylinder problem? Well, I reckon all problems are piston/cylinder ones, unless proven otherwise; so I started to think about pulling the motor down, yet again. However, fate stepped in, for once, smiling upon me!

We received an invite to Stumax's wedding in Sydney: this was too good an offer to refuse, so we booked on Virgin and were off out here: Perth, the most isolated city in the world. Not only that, but Andrew Heath had organised some Acrolap barrel-laps for me: they were arriving in Bowen Mountain about the same time, so we could kill at least two birds with one stone.

But it was better than that. Andrew knew I had a new lathe, so out of the blue he says "Stu, would you like to see how to make piston rings?" Do pigs have bums? Is Britney an airhead? Would I? Hell yes! So down to his workshop, for an education in technique you could die for.

But did I need a new ring for my gallant old Enya? Only one way to find out, I pulled it down and measured the ring gap. Would you believe .013"? It should have been about .003". Could this be where the compression was disappearing? Andrew showed me an ST60 he had fitted with a new ring. It had compression like a Rothwell diesel. I was astonished. By the way, to measure ring gap, you need to remove the ring from the piston, then insert the ring into the bore: feeler gauges complete the method. The ring may be correctly "squared" with the bore by nudging it into place with the piston skirt.



### Measuring ring gap with feeler gauges



### Measuring ring-gap with feeler gauges



Closer examination of the Enya ring was interesting. No doubt about it, this was a well made item. The seat against the sleeve was excellent. The seat against the piston groove was bright and shiny, while the pressure side was dark from the hot gases. Ring tension was good: it was only the ring gap that let me down, not least because we had re-honed the sleeve, no doubt increasing the bore by a small amount.

Nevertheless, it was time to make my own ring, matched to the sleeve in my particular engine. Andrew has agreed to reveal his secrets, so fasten your seat belts, this is an exciting ride.

First off, you need some cast iron rod. Blackwoods supply a grade of Meehanite numbered "4E". All sorts of funny metallurgy there: but this grade is the one to use. I popped it in the chuck, then machined the inner diameter to 20mm, the outer diameter to 22.27mm. That outer diameter was the best I could do to make the sleeve just slide onto the latent ring. In other words, the ring is machined to exact size, then parted off to exact depth, in this case 1.00mm.

### Machining ring to exact size



### Machining ring to exact size



The ring can now be slid down into the bore: if you have done it right, this is a very close fit. Of course, you can't get it onto the piston yet: the ring has to be "cracked" and opened out. I'd heard of this "cracking" process before: guys were wrecking 2 out of every 3 rings they made, as the cast iron, being brittle, is contrary to handle. But Andrew had this licked. First you made a slight nick on the inner side of the ring. The ring was then mounted in a vice, with the nick hard up against the jaws. I use a precision vice with smooth jaws, which style jaws avoid marking the ring. This gave a nice stress concentration, so that with the overhanging ring held neatly in the jaws of a shifter, the snap would occur exactly as desired; with a minimal amount of bending back and forth. In my case, it was once forth and once back, by the smallest of deflections, lo; there was the crack. I hardly knew it had happened!

### Cracking ring using shifting spanner



With the crack formed, an attempt was made to again place the ring in the sleeve. This failed. Evidently, there is distortion of the metal at the crack, which prevents the ring from closing to its original diameter. So the next trick is to clean up this distortion, then set the ring gap. A piece of carborundum paper (wet-and-dry) of about 1200 grade (Andrew used 2000 grade, doubled over to dress both sides of the gap at the same time. This gives a better seal) is inserted into the gap, then worked back and forth a few times. The ring probably still won't go in, so the abrasion is continued by trial and error until the ring just goes in. At this point, you need to decide what width the gap should be. A rule of thumb exists: the gap should be .003" per inch of bore diameter. I don't know where this came from, so it's an area for experimentation.

### Ring gap adjusted using 1200 abrasive



I recall an article in FM by Larry Scarinzi, referring to the ST60 in his "Blue Angel" stunter. Evidently the weather was hot at the US Nats that year: he thought his overheating problems were related to ring gap being too close. Quite possibly, so that is something to watch.

Next step is intended to tension the ring. The idea seems to be that the ring must mechanically press on the cylinder walls to provide the seal. This is achieved by inserting a spacer into the ring gap, in order to force it open. By heating the ring to either red heat or, in my case, 500C, for stress relief, then the ring takes a permanent set. Andrew has an electric oven top, on which one of the elements glows red hot. The ring plus spacer is placed on this element, the element allowed to heat briefly to red emissivity, then allowed to cool in air.

Most probably, red heat also causes the cast iron to harden further. I do not have such an oven, so I bought an electric hot plate from the Supermarket for \$40. The smaller of the 2 elements was 800 watts: regrettably, it would not glow red hot as I had hoped. Instead it got to only 350C, the maximum setting on the thermostat. As it happened, this thermostat could be "adjusted" by simply altering its upper-limit detent. This got it up to 500C, which was worth a try. The temperature stress-relief range for cast iron is 450 to 550C, so this was at least promising.

Andrew sets the gap after heat treating. He uses red heat, so I guess that is better in case the heat changes the dimensions of the ring in any way. With the milder 500C treatment, the gap seemed to be the same after heat treatment. Regrettably, I forgot to measure the final gap; too late now.

### Ring opened and set on spacer



### Annealing ring to set ring tension



My first attempt using a 2mm spreader, lead to a space of 1.12mm: the ring returned partially to its original shape. A second attempt with a 3mm spacer gave a space of 2.16mm, which was taken to be acceptable. The ring did not have the same "springiness" as the original Enya ring, but there was no going back now. Only time would tell if the ring temper was OK for use over time. The clever thing in all this is that the ring, when compressed to load it into the cylinder, retains accurately its original circular shape.

This completed the ring, except for some de-burring to remove rough edges that would catch on the piston during reassembly, or else score the sleeve. The ring went onto the piston with no problems, even though I had increased its width from the original 1.02mm to 1.13mm. Care is needed here to avoid excessive bending of the ring, thereby introducing a new, unwanted, permanent set. I do it by inserting one end of the ring gap into the piston groove, then attempt to use this as a lead to "winding in" the next piece. Seems to work. My camera hates doing close-ups; otherwise I would include a photo.

Well it all went back together, so it was on to the test bench for 30 minutes bedding in. The ring developed some nice rub marks during this time. Testing of the hot compression as soon as the motor stopped suggested that a considerable improvement had been made with the seal.

In a howling Easterly gale, at about 33C, the "Heart of Gold" leapt out of the stooge, a bit lean, but otherwise sweet. Engine had started first flick from a venturi prime, so I was pretty happy with that. Second flight was a first flick start, no prime, after sitting in the sun! Well, one Swallow doth not a summer make, but that looked like a pretty good result to me.

My thanks to Andrew Heath for sharing his secrets: also for giving me some Meehanite to make the ring. By the way, if Bowen Mountain is not paradise, then its only one short hop away!



# F2B: “Heart of Gold” Gyroscopic Precession.

*By Supercool*

[Before I start, you might like to look up “gyroscope” in Wikipedia]

Test flying and trimming of the “Heart of Gold” F2B flying wing stunter has advanced to the point where the model could be flown in a contest. It has been flown with ST35C, STG21/40, STG21/46, Enya 45 6001 and Enya 45 6002 engines. The lightest engine, the ST35C was flown with the engine as far forward as permitted by the engine mounts, but still tail heavy. Turns were extremely tight!

A problem appeared during outside squares. The model wanted to yaw in and float on the lines: not good! Peter White suggested this may be a problem related to the gyroscopic effect of the propeller, a problem previously corrected by Al Rabe, using a movable rudder. Hmm, sounded good, but my model has no fin or rudder!

I was puzzled that the gyroscopic yaw problem was so bad on the “Heart of Gold”. The lack of a fuselage and fin possibly meant that there was little in the way of yaw damping: that, plus the low moment of inertia, seemed to make the flying wing model more susceptible to this problem. But what to do about it?

First I reviewed the little I know about gyroscopes. Back in an early Zaic Yearbook (Model Aeronautic Year Book, by Frank Zaic, 1951-52: also Model Airplane News, April, 1950, by Don Foote) there were diagrams of the effect of forces on gyroscopes, so I drew on that for my own movable rudder on my first “Rivets” F2B, back in 1968. The first thing to realise is that gyroscopes are weird. When you push on them, they don’t just tilt over in the direction you push them! Rather they tilt over somewhere else, which is rather unnerving! The reaction force takes place 90 degrees later in the direction of rotation, which takes some getting used to.

For example, on a model, down elevator produces a reaction force that makes the model want to yaw in: up elevator makes the model want to yaw out. High RPM and heavy props make the reaction force stronger. This seemed to be what I observed on the “Heart of Gold”, so it was apparent that the elevator was causing the problem. Well, I could hardly leave the elevator off: having no flaps or fins to start with, this could become an uninspiring model!

Being a proof-of-concept model, I have no hesitation in cutting pieces off it to correct a problem, so the logical thing to attack with the knife was the trouble-causing elevator. My first thought was to yaw the elevator hinge line. By moving the port side of the elevator forward, that would induce a yawing force, out on down and in on up. (you gotta fly stunt to follow that mish-mash) (hey, my spell-checker thinks “gotta” is a real word!).

I ran this idea past Peter. Hmm, could work. But a week later I was in Sydney for the wedding of Stumax, with a chance to drop in on mountain-man Andrew Heath. I ran the idea past him, and was amazed to discover the Russian F2D guys were already doing this: nothing new under the sun there. Then I considered tilting the whole elevator: this would do the job too. But both methods required rather more hacking than my lazy mind could handle. I needed something easy, you now, just one slash and the job done!



Then it came to me: bend the port elevator down. One slash, some epoxy left over from making a prop and the job done! I guessed the angle, slashed and glued, then next morning off to the field. Not so much a “Rabe Rudder”, more a “Supercool Slash”. Honour and Advancement, here I come!

After a week of high heat, wind and humidity, the day dawned cool, calm and overcast: no blinding sun. Perfect for testing. The mighty Enya 45 6002 purred into life first flick, and off we went, roo poo flying everywhere. Damn, wish there was some wind; I’m flying into my own turbulence. Now for the outside squares. Yes, yaw cured! I’m definitely a genius! Think I’ll tell Ricky Ponting how to bat! I even felt like hugging Shane Warne! How sick is that!

Now you will notice I have been circumspect in my language re assigning this problem to gyroscopic precession. There is another effect which behaves in the opposite way, the so-called “P” effect. Up-elevator pitches the nose up, with the result that the prop blade on the inner disc gets to a higher angle of attack, while the inner blade gets an increased angle of attack. The net result is yaw in on up, yaw out on down. If you are lucky, the “P” effect can cancel the gyroscopic precession.

I have noticed that during an outside square turn, the model first yaws out, then back in rather more strongly. It is as though the “P” effect operates first, then followed by the reverse gyroscopic effect. More work is needed here.

## F2B: Gyroscopic force calculation *by Supercool*

Well Hells Bells, even I am shocked. My last article on the “Heart of Gold” ezy-build precision F2B stunter covered mods necessary to control gyroscopic precession. In my usual “cut and paste” style of modelling, I made no attempt to calculate the gyro force. Like I don’t know how to. So I just experimented with the “Supercool Slash” and fixed the problem.

If only I had turned the page. Page 50 of Frank Zaics “1951-52 Model Aeronautic Year Book” has the gyro formula:

even a worked example! Just in case the formula is wrong, lets give credit to the original presenter of this formula, D. J. Cameron, from the 1938 Zaic year book.

Lets not waste time. Here is the formula. Skip the maths if you want. But be prepared for a shock!

With  $W$  = mass of the prop in pounds (lbs)  
 $N$  = RPM of prop  
 $V$  = speed of flight in MPH  
 $r$  = radius of prop in feet  
 $X$  = distance of prop from the C/G in feet  
 $R$  = radius of turn in feet (say, square corner)

Then the gyro force  $F$  (in pounds) is given by:

$$F = .00043 \times W \times N \times V \times r \times r / (X \times R)$$

where x means multiply.

This is all a bit messy, still in the old (but gold) Imperial units: we might need some conversion factors. Here they are:

1 pound (lb) = 0.45359 kilograms  
 1 MPH = 0.44704 metres per second  
 1 foot = 0.3048 metres

Now lets try a calculation for my glorious "Heart of Gold" precision F2B flying wing.

$W$  = 22 grams mass for a Supercool 11X8.5.  
 We gotta make this into pounds.  
 So  $W = 22 / 1000 \times 0.4539$

$N$  = 8000 RPM for my mighty Enya 45 6002

$V$  = 60 MPH  
 $r$  = 11 / 12 / 2 prop radius in feet  
 $X$  = 6.5 / 12 for Heart of Gold prop-to-C/G distance in feet  
 $R$  = 5 feet for F2B square turn rules

Then  
 $F = .00043 \times (22 / (1000 \times .4539)) \times 8000 \times 60 \times (11 / (12 \times 2))^2 / (6.2 / 12 \times 5)$   
 = 0.776 lbs  
 = 12.4 ozs

This means that when you give full-up to do a square turn, there is effectively a lump of lead on the nose weighing 12.4 ozs trying to yaw the model out, with the same amount trying to yaw it in on down-elevator. Yikes! The "Heart of Gold" weighs 43 ozs and here we have a force corresponding to 29% of the weight of the model trying to yaw it about in the square turns! Can't be true!

Well, that's OK, it isn't true. The gyro force is there alright, but it is to some degree counterbalanced by the "P" effect (thrustline offset during turns) mentioned in my previous article on curing gyro effect (the self-called Supercool Slash).

Nevertheless, it would appear that high RPM and heavy props could be a problem. On my Eather "Firecracker", the model requires heavy use of elevator when using massive props, like the injection moulded APC and Bolly props. These latter props are twice the weight of my Supercool "petal" style F2B props.

Perhaps this is why I see so many experts using wooden props or lightweight Eather carbon props. One day they will wake up and use the Supercool F2B props!

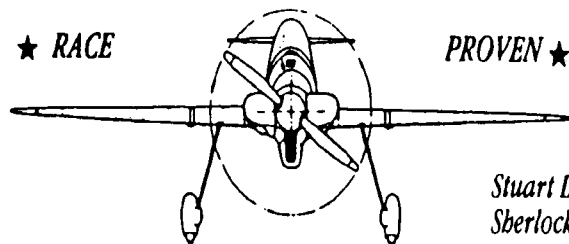
So for all you thinkers and tinkeres out there, here are some sleepless nights for you!

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F2C11 6.4 X 6.2

F2C12 6.4 X 6.3

F2C13 6.4 X 6.4

F2C14 6.4 X 6.5

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*First in Racing*

F2C11 to F2C14 now with Suzuki low Re, high Mach airfoils

## 1000 LAPS IS A LONG WAY!

A few weeks ago Lance Smith and I had a day long session with the Classic B fleet testing up to half a dozen examples of the new Brodak 25R.

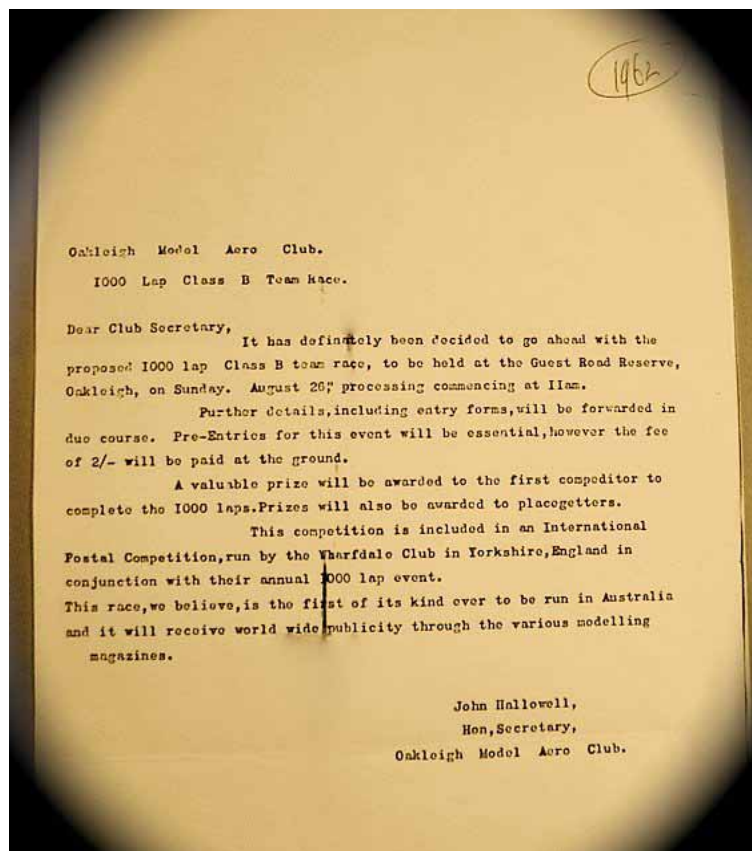
During the day, we must have flown over 1000 laps with Lance's model and various others from the Hallowell/Baddock Classic B fleet.



This brought back memories of 1962 when, as secretary of the Oakleigh MAC, we ran the first ever 1000 lapper down under. It was all organized by correspondence. In those days, trunk line calls to England cost a King's ransom and were out of the question. Makes you appreciate the ease of communication today with free video phones anywhere in the world using Skype and, of course, the ease of email.



Here is a copy of the original document from 1962, hand typed on the dining room table on my mother's antique typewriter. It was sent out to other clubs to notify them of this special event.



Those were heady days...and my recollection of the event is it was very successful with the English teams having a narrow win over the Aussies.

They are still flying 1000 lap races in England today. Not only for B Class but other events as well. Do pilots over in England thrive on pain and suffering? Wouldn't want to cop a typical Australian summer flying day temperature of 30-40c.!

I recall reading on the Barton site where ex pat Aussie Duncan Bainbridge was considering flying TWO 1000 lappers in the one day!! Actual time in the middle can vary, but most races are won under the hour mark. The 2006 Wharfedale race was won by Toogood/Ward/Toogood in 50.52

Lance Smith has recently supplied an Alan Barnes modified Enya SS30 to Adrian Moore for the annual Wharfedale 1000. Enyas have long been the standout motor in this event. We await with interest to see this years results.

With Class B racing pilots down under getting older every day, I'll be surprised if we see one in the near future. That's unless we can train the likes of Murray Wilson and Colin Ray to fly two models, one in each hand... I'll even volunteer to be CD!

John Hallowell.  
VH 1984.

# City Of Sydney Vintage Racing 28 January 2007

By Aircscrew

Glorious summer weather heralded the commencement of the 2007 racing season in NSW. The attendance was somewhat disappointing with 5 teams assembling for the hostilities. The flying surface (actually the landing surface) was brilliantly prepared, with a good well mown grass coverage, unlike previous years mixture of sandy patches and ankle deep soft spongy grass.

After the odd stray aerobatics pilot was despatched and the circles marked, it was time for the obligatory lie session and practice flights.

Vintage A ran A & B divisions alternatively, and this arrangement seemed to work very well and heats moved smoothly and quickly.

## Division B

Fairall/Ardill, in their new FAST<>FARTS livery, against Summersby/Linwood. On the evidence shown, this young bloke can really fly, and once the subtle arts are absorbed I can see another very capable young pilot. The FF's were able to record their best time for several years, thanks to some very sound equipment and better times beckon once the Handsome Young Hero learns the difference between landing and crashing!! No such education is required for Tom Linwood, who put in a creditable performance with a model that was well down on power. Unfortunately power failure (means the motor broke) prevented the Summersby/Linwood team from competing over the longer distance, so the FF's took away the winners' Laurel and a Hearty handshake.

Team	Heat 1	Heat 2
Fairall/Ardill	3.53.00	4.56.69
Summersby/Linwood	4.14.56	4.37.50

## Division A

Kerr /Owen, Rothwell/Nolan and Simons/Hoggan had their Voodoo's to do battle on the day.

Heat 1 saw Rothwell/Nolan fastest, with Simons/Hoggan almost matching with Kerr/Owen slightly off pace. A landing mishap put Simons/Hoggan out for the heat.

Heat 2 was a beauty, all models going hard, and the pilots having to earn their keep. Andy's heart monitor telling him that his training is paying off. It's great to see good pilots working with fast gear and a good clean race was the result.

The final was set to be breathtaking, and not just for the pilots. At the GO! all three models jumped into the air like spawning salmon leaping in a cold mountain stream. The pilots working hard in the hot weather. Close racing like this is very often won in the pits and so it was in this case with a missed catch being the difference between winning and 2nd



place. In the end less than 7 seconds covered 1st to 3rd. Simons/Hoggan scored the 1st win of the season by less than 1.5 seconds from Rothwell/Nolan, with Kerr/Owen coming in 3rd.

Team	Heat 1	Heat 2	Final
Simons/Hoggan	46 laps	3.31.65	7.08.44
Rothwell/Nolan	3.24.75	3.18.25	7.10.34
Kerr/Owen	3.51.06	3.36.50	7.15.40

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## Maris Dislers reviews the Cyclon JAK 09 for CLAMF Aerosports

### Engine Review – Cyclon JAK 09

Maris Dislers

#### *A new 1.5cc diesel*

The 1.5cc model engine size has had a long history in competition circles, despite being overshadowed by the 2.5cc engines needed for competition in most International control line classes. Perhaps for this reason competition classes for the 1.5's have tended to be less intense and engines have enjoyed a longer tenure of competitiveness. Aside from Half-A Team Racing, which has retained a small kernel of interest and has created some gorgeous "tool room specials" for the event, the main competition outlet has been Half-A Combat. This class has been very popular in South Australia and Victoria, as well as the UK and New Zealand over the years, perhaps because a PAW 149 or good Taipan Series 66 diesel was all one needed to be competitive.

Earlier engines of modern type, like the CTAH and CS have come and gone. The new 1.5cc diesels from Fora in Ukraine are now joined by the JAK09 from Cyclon Engines of Novosibirsk, Russia. A number of Cyclon JAK 09's have been imported into this country, thanks to the attractive bulk purchase discounts available. We set out to find out just how good this new engine really is.



## Sizing up the goods

As we've come to expect from this company, the Cyclon JAK 09 is a first class piece of work. In particular, the satin finish on the superbly cast crankcase gives it a look of quality more akin to a digital camera than a model engine. Perhaps with crash-resistance in mind, the lower crankcase profile is smoothly contoured. The engine has generous cooling fins and the rearward facing exhaust discharges via an outlet tube with 8mm I.D. This is angled in the usual manner to make side-winder mounting in a combat model more practical. The engine has no machine screws in its construction, which helps to keep weight down to 94g, or 99g with muffler.

The general design is more conventional than some of the Cyclon F2D engines, but the general layout suggests that it is intended for mini-F2D models that can accommodate the rear exhaust arrangement. In usual F2C manner, the threaded aluminium cylinder head has a 7mm dia. push-pull contra piston, adjustable with a 5mm Allen key. A pin-spanner with 2.5mm diameter pins spaced 20mm apart is required for head removal. The aluminium cylinder is of the drop-in sleeve type with a wall thickness of 1.25mm. The finish on the hard chromium plated bore is excellent. Examination after one hour's running showed no sign of distortion or out of roundness. The conventional three-port Schnuerle porting is somewhat mildly timed – exhaust 138 degrees, transfers 116 degrees and boost 111 degrees.

The piston is shaped internally to prevent unwanted rearward movement of the conrod when running. This presents a problem for disassembly, as there is insufficient space with the cylinder removed to disengage the conrod from the crankpin. Alexander Kalmykov recommends the use of an L-shaped lever applied at the big end of the conrod to do the job. Never the less, it is not something to be done without a genuine reason.

The hardened steel crankshaft has a 4mm dia. crankpin. Owing to the conrod removal problem, it was not possible to see whether or how the crankweb is profiled to counter-balance the reciprocating parts. The gas passage is a very generous 7mm diameter, which by necessity is angled at the back away from the crankshaft axis, to clear the conrod and retain adequate strength for the 10mm dia. main journal at the intake port. The intake opens 24 degrees after BDC and closes 50 degrees after TDC, giving intake duration of 206 degrees. The crankshaft journal is reduced to fit the 5mm ID front ball bearing and is threaded M5 for the aluminium prop nut. A regular glowplug spanner fits both prop nut and backplate spigot. The prop driver seats on a tapered collet and its rear edge is recessed slightly into the crankcase to minimise the ingress of grit.

The venturi insert is of the peripheral jet type, but quite unusual, as the two jet holes (facing fore-aft) are located around 5.5mm away from the spraybar location. An annular fuel chamber of significant volume, formed by a deep and long groove in the insert's outer wall, connects the spraybar and jets. The air intake is a long hole of 2.5mm diameter, with a shallow flare at the top and slight chamfer at the bottom. We believe this venturi is intended for Half-A Team racing work, where fuel economy plays an important work. The value of the particular design remains a mystery, but might perhaps have a bearing on starting in the inverted position.

## On the test bench

Alexander recommends a fuel with 10% oil content. We opted for a more conservative brew consisting of 15% castor oil, 30% ether, 55% kero and 1.5% added DII. This suited the engine well enough and as the JAK showed only gentle tendencies towards overheating, a fuel with lower oil may well be perfectly safe and add a few more RPM.

As is normal now with top-shelf equipment, there was no particular need for running in the engine, although we took it a little easy for the first 15 minutes. The first series of tests were made without the muffler. This made exhaust priming simple enough, but it was not found necessary. Choking or a carburettor prime worked well. While it would not be a problem in a side-winder or inverted position in a model, filling the carburettor's fuel chamber in the upright position during tests was a bit of a pain. This of course made starting less reliable. Aside from this, the JAK was not particularly fussy for starting, either hot or cold, but cannot be regarded as foolproof in this respect. There was no need to adjust compression, but opening the needle a bit from the very leanest running setting was necessary for reliable restarts and some care was needed to prevent flooding when cold.

I found the response to mixture setting too coarse. Perhaps the NVA was originally designed for the Cyclon F1C or F2A engines, which use a lot more fuel than the JAK? By contrast, compression adjustment is very fine compared to engines with contra pistons of "full-bore" size. As mentioned earlier, the engine does not suffer from overheating, but over-compressed settings do drop power output and cause the engine to run dirty. Adjustment for peak revs was not easily discerned by ear and it was therefore best to set the needle just short of a lean misfire and wind up the compression, while monitoring revs with a tachometer. Final tweaking of the needle would optimise the tune.

The range of compression adjustment available in the head made it possible to load the engine down with large propellers without needing to add head shims. It would pull an APC 9x4 prop quite happily, despite this being some way below its truly useful running range. The main observation was a tendency for the engine to surge owing to fluctuations in mixture supply. This got progressively worse as speeds went up. No amount of adjustment of mixture or compression would eliminate this and the problem. While tolerable with a 7x4 prop on board, it was quite acute at the top end of the speed range. This aggravated engine vibration, which was noticeable around 17,000 RPM, becoming severe around 20,000 RPM.

Fuel consumption was checked with a Graupner 7x4 prop and a "safe" mixture setting. It took the JAK over five minutes to empty the 24ml fuel tank. The engine was surging in its usual way between 15,400 and 16100 RPM. Noise level was 94 dB (A) at three metres from the exhaust.

A second series of tests were conducted with the muffler in place. Spot readings with APC 7x3 prop registered a drop from 99 dB (open exhaust) to 93 dB (muffled). RPM checks indicated little or no loss of power across the useable

speed range and starting was not greatly affected.

The session concluded with mixed feelings. This engine certainly has a high power output, but did not deliver it in a smooth, consistent manner. The recommended Seryogin F2D prop (163mm diameter and 93mm peak pitch) seemed an impractical choice owing to severe vibration and erratic running.

### A significant improvement

We've experienced problems in the past with some venturi designs having single or multiple surface jets, which for a number of reasons can be less effective (despite theoretical advantages) than the traditional spraybar in a tube type. We were particularly suspicious of the long parallel section of the throat. As an experiment, a venturi insert of conventional internal profile was made to fit the JAK 09 engine. It has four jets located at the spraybar level, a bell-mouth inlet and 45 degree chamfer below the jet area. The original 2.5mm diameter choke size was retained.



*"The venturi on the left is the standard Cyclon item. The one on the right is my custom design, as detailed in the test."*

The new venturi's effect on running characteristics was remarkable. The surging problem was eliminated and (perhaps because of its less restrictive shape) the custom venturi added around 600 RPM with the larger prop sizes. Furthermore, the ability to get a consistent setting essentially allowed the engine to run smoothly beyond its vibration period between 18,000 and 20,000 RPM. So the engine changed from an apparent 0.3 BHP unit, peaking around 18,000 RPM, to a livelier peak power of 0.35 BHP in the 20,000 – 23,000 range. The engine ran very sweetly with the Seryogin prop spinning at 23,000 RPM, presumably just as Mr Kalmykov intended. The effect can be seen clearly when comparing the lower power curve in the chart (original venturi) with the middle curve (custom venturi).

Similarly, the drop in torque was reduced significantly with the custom venturi such that the JAK 09's torque levels dropped by only 10% per 1000 RPM to 15 oz-in at 23,000 RPM.

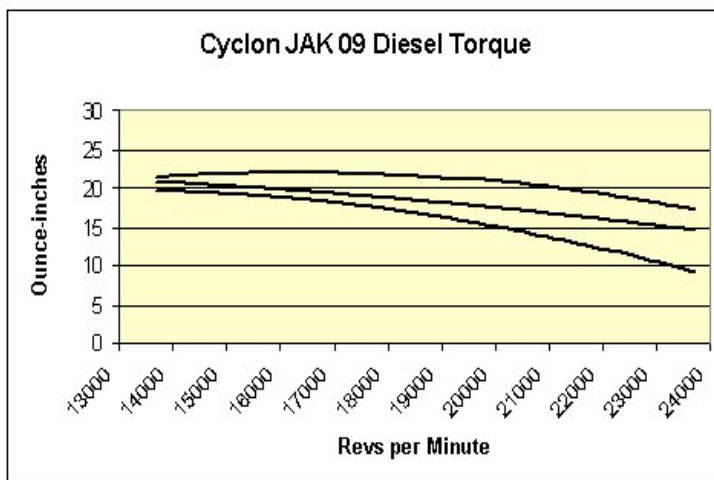
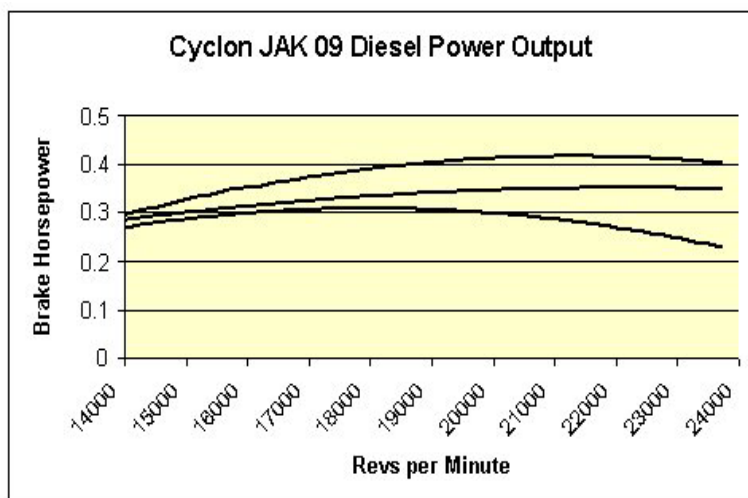
## What about using a larger venturi?

With all that free-breathing potential, it is likely the standard JAK 09 is held back in the interest of fuel economy. Alexander reckons they use a 4mm diameter choke for combat. This seems excessive based on our experience with similar engines, so we bored out the custom venturi to



A third series of tests showed that the engine retained good suction with the enlarged choke. By continually opening the needle, the engine was able to draw fuel up from a lower level of 38cm. That sounds a lot, but might easily be needed if the fuel pickup is significantly outboard and rearward of the carburettor in flight and high G-forces take effect. Flight test will be needed to confirm the practical maximum carburettor size for combat.

The larger carburettor's effect on power output was to arrest the decline at higher revs. In fact, the JAK 09 in this configuration gained 20% more power and is able to deliver 0.4 BHP or a little more anywhere between 19,000 and 24,000 RPM. Needless to say that this is the highest power output recorded by us for a 1.5cc diesel. For reference, a really good PAW 149DS can deliver 0.25BHP and recent tests of a CTAH 09 diesel gave a figure of 0.32BHP. The torque curve (uppermost of the three on the chart) shows that nice little rise at medium speed, to around 23 oz-in at 16,000 RPM. This is the highest torque level of all the 1.5cc diesels we have tested. Most fall into the 17-20 oz-in range.



## Conclusions

A check of the engine after testing showed all to be in perfect order. There was no appreciable change to the "fits", which bodes well for a long life (providing no dirt gets inside). Some carbon build up was evident, suggesting that attention to detergent additives or other means of keeping the engine cleaner inside would be a good idea.

In its as-delivered form, the JAK 09 did not entirely live up to expectations. We experienced an unnerving mixture surge that made high speed running almost impractical. Note that this may possibly only occur with the engine mounted upright, when the "head" between fuel entry in the venturi insert and the elevated delivery jets has maximum impact. It is safe to assume that Alexander had good reason for designing the venturi in this way (although that reasoning is not apparent to us). It may well work perfectly with the engine mounted in the anticipated sidewinder or inverted arrangement.

A substitute venturi of different shape cured our problem, allowing the engine to show its true potential. Perhaps the test engine is an exception, but if others exhibit the same symptoms, then a relatively simple solution is at hand. The JAK is a real fuel miser. Especially with the standard venturi, you get a lot of running from a half-litre of fuel. The JAK 09 diesel is not the easiest engine to mount or cowl in a racing model, but given its good manners and very high power output, this engine will surely find a home in racing models. We've recently heard that Russia has a Junior team racing category for 1.5cc diesels, which might explain the recent emergence of such engines.

Conventional wisdom is to use a nylon propeller in the one model per bout Half-A combat event. Our tests gave 17400 RPM with Kavan yellow 7x4 prop and almost the same figure with Taipan white nylon 7x4 prop, both with the larger venturi. At full diameter, this prop would not allow the JAK to work at its best in the air. It would be running right in the middle of its vibration zone and fall short of its peak power output. Unfortunately, commercial prop sizes go down in one-inch increments. A 6x4 nylon prop would be too small and probably too weak anyway. So the best prospect might be a 7x4 prop trimmed as needed to bring up the revs- say 19,000 RPM on the ground. The Seryogin F2D prop appears to be too small for the job. An older F2D prop from 20 years ago (if you could find one) would probably be just the ticket.

It may seem strange to have a muffler on board a 1.5cc diesel engine, but it really should be used. It weighs only 5



grams and this muffler does not appear to adversely affect power output or starting. However, the noise reduction is nowhere near that of modern "sport" engine mufflers. It is a simple push fit onto the exhaust stub and in all our tests the muffler stayed in place without any support at the back end. A simple retainer on a model would still be a good idea. A proper clamping arrangement that allowed firm attachment to the engine's exhaust stub would have been a lot better. As expected, noise went up with revs. The muffled engine, running with the Seryogin prop produced a peak noise level of 97dB (A) at three metres in diesel form and 101 dB (A) in glowplug form. Oh yes. The JAK 09 can be run as a glowplug engine.

*Engine priced at under AUD\$200*

*Available from Cyclon Engines*

*For more information - send e-mail to  
clamf@ozemail.com.au*

**Watch for a report on the glow version next month.**



We finally got to have our Feb speed comp originally set for 11th but was blowing a gale, so we postponed till 18th but as it was forecast for 38 degrees, we then went for the 25th of Feb which was OK.

A good turn out for a club comp more than Nats. get, our aim is to have "serious fun!!!!".

Thanks to Fiona and Graeme Wilson we had our barby lunch.

We were only comp flown on the day. All sorts of classes were flown; Vern finally got another s/h Enya 30 after waiting for nearly a year for a new crank for his old motor. I flew a sort of "Pink Lady" model for my TWA 15; it went great until the pan cracked.

Kim Wareham and Steve Hacking flew AME .049 profile models, where as my AME in the Vulcan proceeded to do wingovers out of dolly again and wreck props.

We have gone to 42 feet lines for this class same as in USA etc. We were on 35 feet but rotation speed was to high for novices, so time is now over 10 laps per half mile. This is not a National event just SA and Vic fun event.

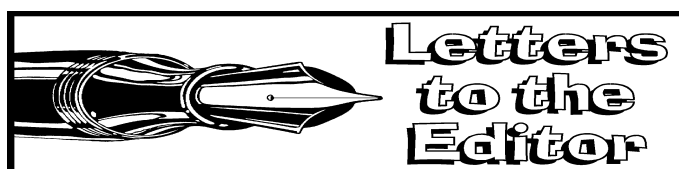
There are enough events now with good rules to fly.



*The Editor will be relocating back to his Melbourne address at the end of March.*

*Newsletter contributions for the next edition should be sent in using the current contact information.*

*Future contact information will be published in next months Newsletter.*



**Here is a recent email that was sent to the Editor.**

*Harry;*

*Pardon the intrusion, but I just happened to stumble on the ACLN archives on the internet. A wonderful treasure trove of information. I have enjoyed dozens of them and continue to glean insights and info every time I read them.*

*I know web space and bandwidth costs money. I don't want a hard copy - the .pdfs are fine and I can print here until I kill every tree in the US. But, I would like to contribute to show my appreciation.*

*Is there a simple way from the US that a person could make a contribution to the ACLN to acknowledge the wealth of knowledge presented and help defer web costs?*

*V/r*

*Bob Kruger*

*Thanks Bob, appreciated sentiments!*

*The Editor responded to Bob accordingly.*

David Shackelford got some good times in with his e-bay purchased Nova Rossi, He now needs to optimise props / fuel comp etc, then the times will come down.

No speed comps are on the contest calendar until the Vic State Champs so if any of you guys want another comp day or testing day lets get together and burn up some alcohol....

Robin Hiern.....

Pos	Name	Class	Engine	Flight 1	Flight 2	Flight 3	Fastest	Km/h	%
1	R Hiern	Class 1	OS 12	14.36	DNS	DNS	14.36	250.70	99.72%
2	N Wake	Class 1	Novarossi 12	14.67			14.67	245.40	97.61%
3	N Wake	Class 5	Novarossi 21	15.12	14.65		14.65	245.73	95.70%
4	V Marquet	Vintage Proto	Enya 30	38.58	37.93	38.42	37.93	152.75	94.91%
5	R Hiern	Vintage 2.5 1957	Os max -2-15	22.60	22.98		22.60	159.29	89.38%
6	D.Shackelford	Class 5	Novarossi 21	16.69	16.56	16.21	16.21	222.09	86.49%
7	V Marquet	Classic Fai	COX 15	NF	18.89	20.03	18.89	190.58	75.17%
8	R Hiern	Classic Fai	TWA 15	N.E.Laps	19.30	22.14	19.30	186.53	73.58%
9	K Wareham	1/2A	AME .049	22.20	NF		22.20	130.49	72.25%
10	S.Hacking	1/2A	AME .049	24.14	DNS		24.14	120.00	66.45%
11	N Wake	Vintage Proto	FROG 500	59.99	57.88	55.52	55.52	104.35	64.84%
12	K Wareham	Midge	PAW	NF					0.00%
12	R Hiern	Class 2	Novarossi 21	NF	NF	DNF			0.00%
12	R Hiern	1/2A	AME .049	N.F	NF				0.00%

# Adelaide Aeromodellers F2B and Novice Stunt 2007, February 3rd 2007



For the first time in weeks reasonable weather was forecast, albeit for 38 degrees C maximum. The breeze was light and variable until about 2 pm so the dreaded Unley Rd turbulence didn't affect competitors too much although most entrants suffered a 180 degree direction change at least once in their flight.

## F2B Aerobatics

Leon Baird did not take long to dust off the cobwebs after a long absence from Stunt competition. Leon's Classic Yardstick performed very well despite not quite optimum engine settings. Those not used to seeing sheet wing stunters perform were surprised at how much the wing flexes in manoeuvres.

Greg Roadknight arrived late due to work commitments and would no doubt have scored better had he not had to rush his set up and preparation. His o/d Prowler is much happier now that the Enya 6001 45 has replaced the 5224 35.

Peter Anglberger flew his ex John Leditschke FW190 and is now pretty much 'at one' with the model after 50 or so flights

Place	Entrant	Model / Motor	Round 1	Round 2
1.	Peter Anglberger	FW190 / ST 46	850	869
2.	Leon Baird	Yardstick / Enya CX21D	782	795
3.	Greg Roadknight	Prowler / Enya 45	777	718

## Novice Stunt

There was a very close tussle between Mal Dyer and John Witzke for 1st place, Mal being the victor by a mere two points. Both flyers continue to improve with each competition. New member John Barbara enjoyed his first ever competition flying the 'Basic Flight' pattern.

Place	Entrant	Model / Motor	Round 1	Round 2
1.	Mal Dyer	OD? / OS LA25	333	351
2.	John Witzke	Tutor ARF / OS LA46	322	349
3. (Basic)	John Barbara	FliteStreak / OS LA25	178	151

Thanks to Bob Edgecombe for judging both events, Greg and Anne Roadknight for catering and those that turned up to enter/help out.



Novice: L to R: Mal Dyer, John Witzke, John Barbara



F2B: Greg Roadknight, Peter Anglberger, Leon Baird



# Mike's Racing Products

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All above available to suite external bellcrank.	



Lance Smith recently obtained a F2CN model from Mike North in England. He has sent in this flyer from Mike of some of the racing goodies that he makes. These products not mass produced and are manufactured on a cottage industry basis so if you wish to place any orders you must be prepared to wait your turn.

Email Mike at :- [mikednorth@fsmail.net](mailto:mikednorth@fsmail.net)

Mike North  
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Coleorton  
Leicestershire  
LE 67 8HF  
UK

Fibreglass tank 15cc + filler valve	
Top fill for bottle or back fill for pressure.	£20.00
As above with valve type cut off fitted, (when available)	£40.00
4 Engine studs for use with kit.	£3.00
4 Engine studs + 2.5mm cap heads & tap	£5.50
Wheel	£4 ea
Maz wheel	£8 ea
Safety prop nut for Nelson	£5
Exhaust deflector for R/E Nelson	£5
Team Race Handle	£20.00





# Shop Talk

This may not be news to some people, but we have been told that Aero Flyte has gone out of business. Cheap imports have forced the local business to close. A big hole will be left where C23 and Dope used to be. Let's hope someone can resurrect these products.

There have been recent concerns in the U.K. regarding the use of APC 7x5 props for team racing as there have been reports of blades breaking during use. APC have made extensive investigations into these concerns here is the outcome of tests conducted by APC.

APC have conducted tests (x-ray etc.) on some of these damaged props. They expressed some concern at the use that these props were being put to as that particular prop (evident by the thinner hub) were designed for smaller IC motors (1.5cc or thereabouts) plus electric motors.

Whilst the rpm that you are using them at is at least 40% lower than the safety figure quoted they were not designed for starting with the sort of clout that they are given in team race. Drilling out of the hub to accommodate the spinner nut you are using and the subsequent extra stress may well also have aided these failures but the blades showed quite clear stress caused by the whack given when starting the motor. APC have been informed of the popularity of that particular pitch and diameter of prop in Goodyear etc. and they have designed a new prop to accommodate you. The first of a batch of those props should soon be available in the UK and will be put to the test.

What is quite clear now is that these thin hubbed props should not be used - it would be bad for the sport if someone was hurt using them and I think we can count ourselves very lucky that it has not happened to date. If you know of others that use them but do not have access to this information please ask them to refrain from even practising in team race with them.

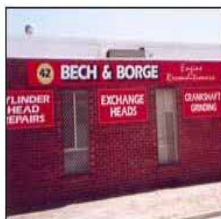
Jim Hatch

## Contact

Bech and Borge Engineering Pty Ltd (ABN 36 006 187 506) can be contacted as follows:

Phone	(03) 9544 8600
Fax	(03) 9540 0609
Address	42 Carinish Road, Oakleigh South VIC 3167
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I have 4 boxes of Vintage "1980" or earlier "Scandinavian" high quality model boat brass fittings, for 4 different boats.

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Unfortunately I will have to announce a price increase for my **first pressing pure castor oil**.

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## WA State F2B Championships

26th May

Lumen Christi College,  
TARMAC club field Gosnells.

for more information or to register your interest please contact myself or Peter White. This event counts for points towards selection for WC2008 in France.

Regards ..... Trevor Letchford.

[\[mailto:tletchfo@bigpond.net.au\]](mailto:tletchfo@bigpond.net.au)

The photographs of the Nationals that were published in last months edition were only a small proportion of the ones that the editor received. Many more can be viewed at.

<http://www.vicstunt.com/>

go to Aerobatics then Nationals then at the bottom of the right hand column 2006 Albury Wodonga go to "Other" photo's/reports.

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**INVITATION**  
**QUEENSLAND 2006/2007 CONTROL LINE CHAMPIONSHIPS**

The Aeromodellers of Logan City Inc. as the organizing club on behalf of the Model Aeronautical Association Queensland Inc. takes pleasure in inviting you to enter the following events to be held at the club's facilities adjacent to Chetwynd Street, Loganholme Qld 4129 over the long weekend of 5<sup>th</sup> to 7<sup>th</sup> May (COMBAT) and weekend of 12<sup>th</sup> -13<sup>th</sup> May 2007 (TEAMRACE, SPEED & AEROBATICS)

As usual event priority will be Junior, then FAI, National and Queensland events respectively. With the exception of Junior events, only those for which **five (5)** or more fully paid entries have been received on or before the closing date will be scheduled. Sufficient entries for competition to take place must have been received by the same closing date for Junior events to be held.

Trophies will be awarded to the top three (3) placegetters in each event. Entry for Junior competitors will be free for Junior Rat, Junior Combat and Junior Aerobatics (F2B). Juniors entering any other events will be charged \$5.00 each per event. Entry fees for Seniors will be \$10.00 each per event. Team racing \$20.00, \$15.00 or \$10.00 per event depending on the category of each team member. Each team member entering must complete a separate entry form. A one-off administration charge of \$20.00 will be levied on each Senior competitor. Juniors are not liable for any Administration Charge. F2A / F2D fuel will be available to those who require it at \$10.00 per litre. Kindly indicate your requirements below.

**Cheques, money orders, etc are to be made payable to the Aeromodellers of Logan City Inc.**

All **fees** together with a **completed entry form** and **stamped, self addressed business size envelope** must be lodged on or before the **closing date of 6pm, 6th April, 2007** with :-

The Registrar  
**QUEENSLAND 2006/2007 CONTROL LINE CHAMPIONSHIPS**  
**c/o 2-24 Appaloosa Court**  
**MUNRUBEN QLD 4125**  
**Telephone: (07) 3200 1308**

EVENTS	RULES	Name and AUS. No. of other team entrant	FEES PAYABLE
F2C TEAMRACE	FAI		
JUNIOR RATRACE	NATIONAL		NIL
GOODYEAR TEAM RACE	NATIONAL		
CLASS II TEAMRACE	NATIONAL		
BENDIX TEAMRACE	NATIONAL		
2.5cc P.B. TEAMRACE	ALC		
CLASS A TEAMRACE	NATIONAL		
CLASSIC 'B' TEAMRACE	NATIONAL		
MOUSE RACE	T/BIRDS		
COMBINED SPEED	NATIONAL	( No. of Categories entered _____ @ \$10.00 each)	
F2A SPEED	FAI		NIL
F2B AEROBATICS	FAI		
F2B AEROBATICS JNR	FAI		
F2D COMBAT	FAI	(F2D Modified/ 2.5cc. Fast or Vintage also eligible)	
JUNIOR COMBAT	NATIONAL		NIL
OPEN COMBAT	NATIONAL		
35' SLOW COMBAT	QLD		
2.5cc SLOW COMBAT	ALC		
F2A FUEL REQUIRED	@\$10.00/LITRE		
F2D FUEL REQUIRED	@\$10.00/LITRE		
<b>ADMINISTRATION CHARGE</b>		(\$20.00 per Senior/Pensioner or \$NIL per Junior)	
<b>TOTAL OF FEES PAYABLE</b>			

I, \_\_\_\_\_ (PRINT NAME) as an entrant in the 2006/2007 Queensland Championships agree to fully comply with all the Terms and Conditions of Entry published in/with this form.

Address \_\_\_\_\_

Postcode \_\_\_\_\_ Telephone No. (\_\_\_\_) \_\_\_\_\_

Date of Birth \_\_\_\_\_ Junior/ Pensioner/Senior AUS No. \_\_\_\_\_

Entrant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Email \_\_\_\_\_



## TERMS AND CONDITIONS OF ENTRY

### QUEENSLAND 2006/2007 CONTROL LINE CHAMPIONSHIPS

#### Lodgement of Entry:

1. Entry is open to M.A.A.A. Inc. affiliated members and must be lodged on the correct form. (It is recommended that each entrant retains a copy of his/her entry).
2. The person entering must sign as the Entrant, indicate whether Junior or Senior and include AUS number. Where a team event is entered, **each team member must submit a separate entry form.**
3. All fees liable and payable must be lodged with an entry or paid before the closing date, namely **6th of April, 2007.**
4. "Late" entries will be accepted until **9:00am 5<sup>th</sup> May, 2007** at the sole discretion of the organizer and **only** for those events fully subscribed by the closing date and/or notified per bulletin.

#### Closing Date for Entry:

5. Entry must be received by **6:00pm on 6th April, 2007** at the address indicated on the entry form (overleaf).
6. Any entry received after that time will be scrutinized for delay in the mailing system and may be accepted or rejected at the sole discretion of the organising club.

#### Payment of Entry Fees:

7. All fees liable and payable must be lodged with each entry or paid separately on or before the closing date, i.e. 6th April, 2007.
8. Fees may be only be refunded where fewer than five (5) entries are received **by the closing date**, except for Junior events. Non-attendance will not be grounds for refund of fees.
9. Event fees are \$10.00 per event for Seniors and Pensioners. Team events will be double. Juniors are \$5.00 for each open event. Junior events are free.
10. Each class or category entered in Combined Speed will attract an entry fee of \$10.00 (Senior) or \$5.00 (Junior).
11. Each team member entering one or more team events must lodge an entry form with the appropriate fees.

#### Minimum Number of Entries:

12. No minimum entry number for Junior Rat, Junior Combat, or Junior Aerobatics as long as competition can take place.
13. A minimum of five (5) entries must be received by the closing date for any other event to be scheduled and held.

#### Entrant/Competitor Responsibility:

14. Each entrant/competitor will be solely responsible for the safe operation of his/her model and equipment whether in **practice** or **competition**, including the following:
  - Pull testing of control system before operation.
  - Wearing of helmets and any other safety equipment, such as wrist tethers.
  - Using only suitable, marked areas for operation, and
  - Complete compliance with the rules and/or regulations for each event entered.
15. Each entrant/competitor will also make him or herself available to assist the organizer in the timely running of the events or by assisting in the conduct of other events.

#### Organiser's Prerogative:

16. Aeromodellers of Logan City Inc. as the organizing club for and behalf of the M.A.A.Q. Inc. of the 2006/2007 Control Line State Championships retains the right to reasonably amend, delete or add to any or all of these terms and conditions per medium of Bulletin and/or Supplementary Regulation mailed to each entrant's address as advised in his/her entry form.