

THE VOICE OF CONTROL LINE AEROMODELLERS FROM AROUND AUSTRALIA

Number 109



Produced by the Victorian Control Line Advisory Committee

April 2007
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**Copy Deadline for next issue is:
Wednesday April 18th 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



COMING EVENTS



COMING EVENTS



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

VICTORIAN CONTROL LINE CONTEST CALENDAR 2006/2007

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
APRIL 22	To be advised	CLAMF
MAY 27	Classic Stunt Competition	KMAC
MAY 27	To be advised	CLAMF
JUNE 24	(up to) 2.5cc Day	KMAC
JUNE 24	To be advised	CLAMF
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

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

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,

Secretary/Treasurer CLASII (Ipswich, Queensland)

Phone (07) 33927679

Email johndt@iprimus.com.au

Notice.

The Editor acknowledges the receipt of a letter of complaint that was sent by the Secretary of The Control Line Aircraft Society regarding an article on the Control Line Aerobatics at the 2007 Albury 60th Nationals that was published in ACLN February Issue 107.

Clarification of the subject matter of this complaint is being sought and has not been made available at the time of going to print.

DATE	CLUB	EVENT
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. (Details to be advised)	
	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.

Hunter Valley Champs

4th & 5th March 2007

Classic Stunt

Only four flyers for Classic, not sure what to do with this event, with a 1.00pm start its hard starting in the midday heat.

Anyway the Nobler was the most popular model with three in total and one loan Accentor flown by Don Keysecker. Motors used were one ST46, two Fox 35's & one LA40.

Two rounds were run using the MAAA listed Classic pattern. So how did the flyers do?

Frank Battam flying his Nobler/ST46 powered combination topped the field, there was one interesting moment at the start of Frank's second round flight, a severe wind gust hit the circle, with Frank at the handle and the model still on the ground, he noticed his F2B Yatsenko model rocking around in the pit area, I believe Frank was in two minds whether to stay or toss the handle and save the F2B model, luckily the gust subsided and Frank chose to stay with the Nobler and complete the flight.

Warren Leadbeatter finished in second spot flying a well built 57 Nobler with a clear finish and colour tissue trim, very nice. His Fox ran a little hard towards the end of his 2nd round flight and stopped abruptly, a tad lean

Don Keysecker was only 11 ½ points behind Warren to take out third spot flying a Brodak Accentor which looks something like a Pow Wow, fly's really nice round's and tracks well, the LA40 was a bit to aggressive at times throughout the pattern which threw Don's timing off on some manoeuvre's.

Wayne Jackson's ARF Nobler has stood the test of time, I have read where some of these model's do not have a long life due to control system failure, not sure if Wayne had replaced his controls, the model turns well and handled the wind, with a Fox 35 up front providing the go forward power.

I viewed a proposed set of rules and explanations in regards to the Classic pattern; this has to be a step forward, as it sets out clearly how a manoeuvre should be flown.

Results

1/ Frank Battam	- 57 Nobler/ST46	583
2/Warren Leadbeatter	- 57 Nobler/Fox 35	421.5
3/ Don Keysecker	- Accentor/LA40	410
4/ Wayne Jackson	- Arf Nobler/Fox 35	376.5

F2B

Travelling up to Muswellbrook early Sunday morning I passed by Bayswater Power Station and a quick look at the steam from the cooling towers showed it was going off at right angles. Not a good sign.

Arriving at the field around 7.30am and a gentle breeze was drifting in, the heat from the rising sun had me thinking Hot & Windy, well the day turned out not to windy, a lot of

Western Australia 2007 Control Line Calendar

Date	Club	Event
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
May 26 1pm	Lumen Christi	F2B Aerobatics
Jun 9 2pm	CLAW	CLAW race day F2C & F2F
Jun 30 10am	CLAW	F2C rnd 1,2,3. F2F
Jul 1 10am	CLAW	F2C rnd 4 & final, Vintage A
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
Sep 8 11am	CLAW	Vintage Combat
Sep 16 2pm	CLAW	CLAW race day F2C & F2F
Oct 13 2pm	CLAW	CLAW race day F2C & F2F
Oct 27 1pm	CLAW	Open Combat
Nov 10 2pm	CLAW	CLAW race day F2C & F2F
Nov 25 10am	CLAW	Combined Speed

Events listed in normal type are Club events.

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

Contact Trevor Letchford for further information.

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Any comments, queries or complaints with respect to any article in this publication should be addressed to the author of the article.

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thermal activity through out the event which made flying interesting, but it was HOT.

Eleven flyers flew in F2B including, one Junior.

Trevor Larsen opened the flying in round one flying an own design MB5, nicely built and finished in a warbirds paint scheme, powered by an LA 46 running the R/C carb rear needle, two head shims and 11x 6 APC, very quiet and ran extremely well.

Noel Corney flew his Illusion model powered by an Enya 45 on pipe, unusual to hear the sound of the pipe run again, seems as though most flyers have moved away from this system, Noel's motor ran well and his reverse wingover to start his first round pattern was a real eye catcher.

Junior Michael Frail piloted his 52 Nobler and FP40 through the pattern with the help of dad Greg calling for him, young Michael shows a lot of promise.

Warren Leadbeatter used a Brodak Vector/LA40 combination which looked good in the air. I felt that the LA40 was bit to aggressive at times and Warren was a little rushed in some manoeuvre's, just need's to tame the LA40 a bit and he will be a force in future comp's.

Frank Battam's, Yatsenko Classic Model and Retro 60 power plant just looks right, sits in the air nicely and turns a treat, the motor run is excellent, with gentle switches from 4 to 2 at times through the pattern and never seems to be working hard at anytime in the flight.

Denver Harvison chose a Cauldron/ST51 powered model to attack the pattern, flew some nice rounds, just needed to open up the size of the manoeuvre's a bit, model also turned well, Denver also explained to me the correct pronunciation of "Cauldron" thanks Denver.

My old flying buddy Gary Brett was the last to fly in RD 1 he used a modified Twister with a Muggleton FP 40, he has flown this model for years and knows it back to front and put in a solid flight.

At the end of Round 1, Reg Towell, Frank Battam and Herb Hanna filled the top three spots.

A quick redraw and round two was away, Herb Hanna's Red Walker Mustang with an R/M 60, found a spot of good air and put in a great flight with excellent corners and rule book size manoeuvre's, the motor sounded much happier this flight after its mounting bolts were tightened.

Wayne Jackson used the ARF Nobler with Fox 35 in F2B as well as Classic, he needed to open up the square manoeuvres, but I was impressed by how well it turned. Must be a light model, at no stage did it stall.

Reg Towell used his OD, Battle Bee/ST46 combination to produce two excellent flights, interesting to see the ST46 back as Reg has been using 4-stroke power. I don't think it would matter what Reg used, it's a pleasure to watch his flying.

Greg Frail used a profile Sukhoi/ST46 powered model to good effect, his second round flight improved by 37 points, during this flight the breeze at least came from the one direction, Greg just needs to get the bottoms down and he to will be a force at future comp's.

So at the end of round two, it was decided by the CD/Judge to only fly two rounds.

It was very hot and the chance of a gusty afternoon change in the weather prompted the decision, no objection from the flyers

Overall impressions:- only 1 attempt and 1 loss of starting points in 22 flights, people came prepared, the standard of flying was good across the board, F2B at the Hunter Valley's has no classes, all fly in the one section, I think that the up and coming flyers can take a lot out of this event and it would be worth their time to view a flight by the top pilots from behind the judges position, just to cement in their minds what a square corner done to the rule book looks like ditto shapes of manoeuvre's.

Thanks to Joan & John McIntyre for tabulation and running for the score sheets.

Thanks also to the flyers from Queensland and Sydney for supporting the event.

Paul Allen, AUS 23305

Results below,

1/ Reg Towell	-	1103 pts
2/ Frank Battam	-	1071 pts
3/ Herb Hanna	-	1043 pts
4/ Noel Corney	-	925 pts
5/ Trevor Larsen	-	895 pts
6/ Greg Frail	-	875 pts
7/ Gary Brett	-	860 pts
8/ Denver Harvison	-	781 pts
9/ Warren Leadbeatter	-	779 pts
10/ Wayne Jackson	-	712 pts
11/ Michael Frail Jnr	-	703 pts

A newsletter subscriber came accross this information printed on his airline ticket recently. It is inserted here for your information.

VIRGIN BLUE

PROVISIONS FOR DANGEROUS GOODS CARRIED BY GUESTS OR CREW (REFERENCE IATA TABLE 2.3.A)

NOTE: 1. Engines. All flammable liquid engines of any type are forbidden to be carried by guests as checked-in or carry-on baggage.

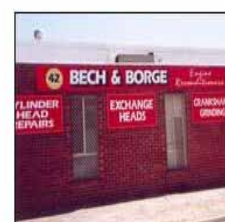
Form No.: AP-002 V2.4 010906

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
Email	enquiries@bechborge.com

Engine Reconditioning Specialists



HUNTER VALLEY CHAMPIONSHIPS

3 March 2007

By Airscrew

Vintage 1/2A

Saturday dawned foggy, but warm and once the fog dispersed racing commenced with 4 teams entered for Vintage 1/2A. First heat saw Potter/Simons drawn against Rothwell/Nolan. Notable was the Potter/Simons role reversal with Hugh doing the get down/get dirty job in the pits, while Grant kept clean holding the handle. Despite this "handicap" they still managed FTD, and Steve Rothwell can only hope that he is among the first to get the anxiously awaited R150. (Will we see an R150 at SSME?) 2nd bout saw Brodie/Kerr evenly matched for speed with Ardill/Fairall, with the Fast-Farts having enough range to need one stop less.

Potter/Simons opted to sit out the next round, giving a three up 2nd heat to determine the remaining places in the final. Unlike Bodie/Kerr, Rothwell/Nolan were able to improve on their heat one time, while a broken prop prevented Ardill/Fairall from finishing.

Vintage 1/2A Final

The three teams were away quickly at the start, with the Potter/Simons Pawprint fastest, while the Rothwell/Nolan Pawprint was able to show a speed advantage over Ardill/Fairall's Wharfedale, which blew in on takeoff from their pitstop. Both remaining teams continued in somewhat slower than usual speed due to the hot, dry conditions. Definitely not diesel weather.

Vintage ½ A Team Race

		Heat 1	Heat 2	Final
1st	Potter/Simons	4.16.96		9.21.80
2nd	Nolan/Rothwell	4.55.90	4.26.72	10.04.25
3rd	Ardill/Fairall	4.44.53	71 laps	63 laps
4th	Brodie/Kerr	5.04.02	5.53.80	

Vintage A

Five teams made the starting line for **Division B** and with the prevailing weather it was clear that fast times were not going to happen, so a big well done to Peter Brodie for screwing a 3.44 out of his model in the 2nd heat.

The **final** saw all teams away on the Go! Ardill/Fairall's Tiger Terror just edging Brodie/Kerr's Voodoo V for airspeed and Ray Buchos' Voodoo struggling despite Rob Owen's best efforts in the pits. Disaster struck at about ¾ race distance with Brodie/Kerr damaged and unable to continue and Buchos/Owen D/Qed. The FastFarts were happy to complete the distance and record a win in this prestigious event.

Vintage A Team Race (B Grade)

		Heat 1	Heat 2	Final
1st	Ardill/Fairall	3.59.18	4.33.09	8.41.50
2nd	Brodie/Kerr	4.09.28	3.44.80	136 laps
3rd	Buchos/Owen	5.06.87	4.16.70	DSQ
4th	Smith/Buchos	4.16.94	6.02.90	
5th	Linwood/Sommersby	4.29.81	5.23.56	

Vintage A Div B Finalists

FAST ♦ FARTS



Vintage A (Division A)

Three teams assembled for the premier racing event on the calendar, and with Grant Potter wearing the CD's hat, Ray Harvey manned the pits for Hugh Simons. Steve Rothwell / Darryl Hines and Andy Kerr /Richard Justic completed the lineup.

In the heat all teams were away well from the start, but the hot dry conditions affected the models performance and all teams seemed happy to conserve the equipment for the final.

The Final

The call to start was followed by much silence as the usually reliable Rothwell/Hines model wouldn't start, Harvey/Simons' model turned over and Justic/Kerr failed to explode into the air. But soon the peace was disturbed and albeit somewhat tardily, racing commenced. Once underway the centre was no place for sissy's as the racing was on in earnest, even the CD into the action.... "Whipping Warning..." "Blocking Warning" In the end, despite a slow start Rothwell/Hines won by a narrow margin from Harvey/Simons and Justic/Kerr filling third.

Vintage A Team Race		Heat 1	Final
1st	Rothwell/Hines	3.17.90	7.10.75
2nd	Harvey/Simons	3.30.00	7.17.35
3rd	Kerr/Justic	3.49.44	7.42.15

Hunter Valley Championships

Combat Results

Slow Combat

1st	Bob Fisher	WWWWW
2nd	Robert Owen	WWLWL
3rd	Phil Pool	WLL
4th	Rod Smith	LL
5th	Goran I	LL

F2D Combat

1st	Robert Owen	WWWWW
2nd	Mick Comisky	WLWL
3rd	Rod Smith	LWWL
4th	Ryan Comisky	LWL
5th	Brian Burke	WLL

Announcing the new MAAA Control Line Forum

Successful administration of control line matters by the MAAA C/L sub-committee relies on broad consultation and good communication. We believe that this can be improved significantly through the use of the internet. To this end, I have set up an internet chat group, so that all interested MAAA members can follow proceedings and have a say.

The new forum does not replace the existing arrangements relating to voting on proposals. Formal voting will still occur through the State Associations. Rather, the new forum should prove invaluable in the discussions leading up to proposals, so that we get the best outcomes.

The group can be accessed at <http://groups.yahoo.com/group/maaacontrollineforum>

Membership is free and open to any current MAAA member. Just quote your name and AUS number and I'll arrange membership. This is a restricted forum, so we should avoid unwelcome auto-registrations from spammers. I also reserve the right to ban people who do not use the forum in a civil way or for unintended purposes. We've had a similar forum running nicely for several years for SA C/L stuff. It has proven invaluable in rapidly spreading information.

There are a number of topics already "on our plate" such as

- Vintage and Classic Stunt Rules
- Vintage A Team Race lines proposal
- Team selection for World Champs – method and progressive point scores
- Use of safety straps on control handles for Australian competition classes

I urge all those with an interest in the administration of our favourite activity to participate in this new venture. You don't need to have a lot to say. You are also welcome to join if you just want to keep abreast of developments. With a little input when it matters, we all stand to benefit from the outcomes.

Maris Dislers MAAA CL Sub-committee Chairman

Here is a photo of the new R150 together with the R250 for comparison.

This new engine is a replica of the Mk1 Oliver Cub.

They are \$340 and deliveries look like starting early in may.

Steve Rothwell.



2007 SOUTH AUSTRALIAN CONTROL LINE STATE CHAMPIONSHIPS

RESULTS

FAI TEAM RACE

		rd 1	rd 2	rd 3	rd 4	final
1.	R.Fitzgerald/M.Ellins	3:17.26	3:17.78	3:17.81	3:14.16	6:35.91
2.	G.Wilson/L.Smith	4:27.31	dnf 54	4:31.11	4:19.19	8:18.59
3.	M.Wilson/M.Poschkens	4:15.99	3:46.78	4:16.28	3:38.39	dnf 105

F2F TEAM RACE

		rd 1	rd 2	rd 3	rd 4	final
1.	R.Fitzgerald/L.Smith	4:41.19	4:07.84	dns	dns	8:42.63
2.	J.Hallowell/M.Poschkens	4:19.67	dnf 32	dns	dns	8:57.30
3.	M.Ellins/P.Cameron	dns	dns	4:55.34	4:24.92	9:02.87
4.	G.Wilson/M.Wilson	4:46.42	4:46.88	4:39.19	4:35.59	

CLASSIC B TEAM RACE

		rd 1	final
1.	J.Hallowell/R.Fitzgerald	3:15.95	6:50.96
2.	G.Wilson/M.Ellins	3:35.98	7:03.74
3.	M.Wilson/L.Smith	dnf 33	dns

VINTAGE A TEAM RACE

		final
1.	J.Hallowell/R.Fitzgerald	7:11.97
2.	M.Wilson/L.Smith	7:13.75
3.	G.Wilson/M.Ellins	dnf 119

FAIAEROBATICS

- 1.Murray Howell
- 2.Joe Parisi
3. Mark Ellins
4. Frank Battam
- 5.David Simons
- 6.Peter Anglberger
- 7.Bill Swan
- 8.Leon Baird
- 9.Greg Roadknight

FAI COMBAT

		1	2	3	4	4	pts
1.	Peter Norrie	W	W	B	D	W	3/0
2.	Greg Pretty	B	L	W	D	L	1/2
3.	Leon Baird	L	L				0/2



COMBINED SPEED

	rd	rd 2	rd 3	km/h	%	class
1.Maris Dislers	14.38	14.20	dnf	253.52	86.90	FAI
2.David Shackleford	dnf	17.22	dnf	209.05	81.41	5

F2B: Automatic line-tension compensation.

By Supercool.

Ever had that floating feeling? You know the one: you've just entered the outside loop of a vertical 8 and the line tension has vanished: or you're battling the wind and turbulence in the overhead 8, and the model is in free-flight!

Wouldn't it be great if a giant hand reached out of the clouds to pull the model tight on the lines again? You betcha it would! What you need is an automatic line-tension compensator, right there on the model! Here is how to get one!

The usual ways of controlling line tension are engine offset, extra speed, line rake and fin offset. These all affect yaw. During manoeuvres you may try differential flaps, extra tip weight, moveable rudder, etc.

But the truth is this: none of these really work. Roll out and yaw give you rock and roll in the squares, not at all nice. Speed is good, say 4.6 seconds per lap. But who wants to fly that fast, like in diving for the outside square entry! This is an intractable problem.

The best solution I have seen to date is in the old Thunderbird. This model worked well with lots of rudder offset and forward lead-outs: even so, this model like to fly fast, not so good slow. This is how it worked. The rudder tried to yaw the model out, while the lead-outs tried to yaw it in. Slack lines meant that the rudder won out, so that the model could yaw out, restoring line tension. Well and good, but not as positive as I would like.

Recently, the problem has arisen in my "Heart of Gold" F2B flying wing. No fin, so I couldn't use the Thunderbird trim. Engine offset did next to nothing, and I didn't want the huge yaw of raked back lead-outs. The model was simply too light in overheads. I could have speeded it up, but I'm too old and slow for that. So what to do?

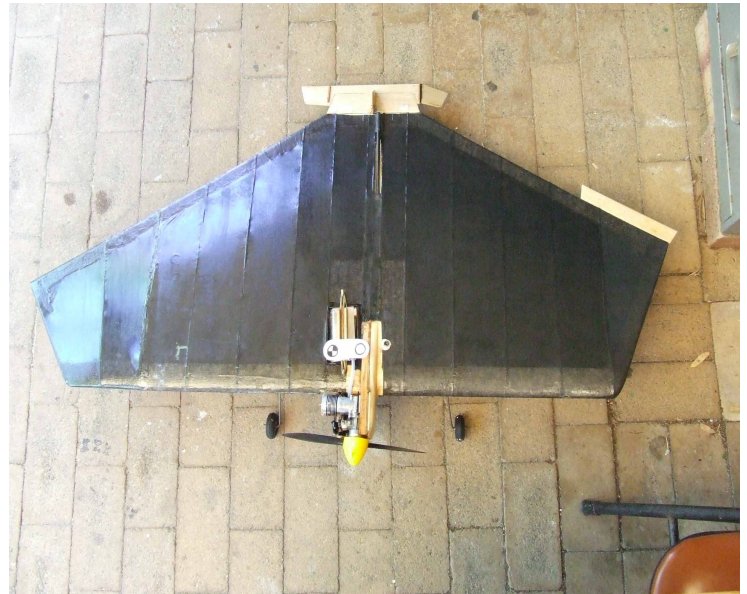
The classic set up is to make the inboard wing a bit longer than the outboard wing. After all, the outboard wing is flying a bit faster than the inboard panel, so it needs to be a bit shorter, an inch or two. A bit extra on the inboard panel also gives you a bit of roll out as well, which is nice in moderation.

But where is the Centre-of-Gravity? Well it is usually back about 30% from the leading edge. Yes I know that, but where abouts is it laterally? Looking at the model from overhead, where is it now? Well it's usually in the fuselage, pretty close to the thrust-line. I mean, that's where we want it, because that's why we add tip weight, to get it there! Hmm, where is all this leading?

Well folks, that's the wrong place for it. If you want automatic line tension compensation, that's the wrong place.

Think in these terms. The outboard wing panel 75mm longer than the inboard panel. Extra wing tip weight to

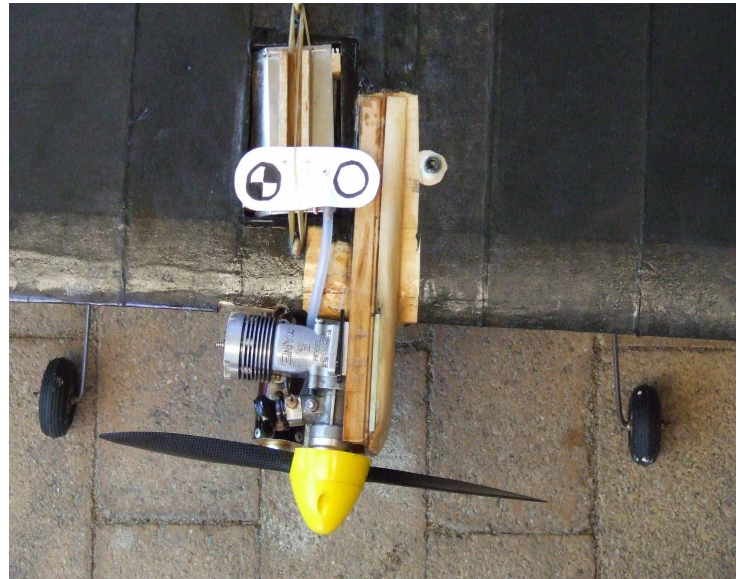
balance the lift of the two wing panels. The C/G moved 25mm away from the thrust-line, even outside of the fuselage! Yikes, heresy, PAMPA will burn you at the stake!



Here is the "Heart of Gold", so modified. Note the extra 100mm added to the outer panel, making that panel 75mm longer than the inner panel. See the extra lead sticky-taped to the leading edge of the extended tip. Don't blame me for that, Dick Gibbs made me do it!

Above the tank, you can almost see the change in C/G so produced.

Too old and blind to see that? Ignore the trim tab on the left panel; that's an out-of-whack trim-compensator!



Now can you see it? The old C/G is the open circle, right on the thrust-line, where it did no good at all apart from giving level wings when upright and inverted.

The new C/G has the two black blade segments. It is 25mm out-board of the thrust-line, where it has magic properties. The tip weight has been chosen to balance the wing lift from both panels, preventing roll-out. But that same amount of tip weight has moved the C/G away from the thrust-line by 25mm, just what I wanted.

But why would I want that? Well, it is a law of physics that free objects rotate about their C/G. The engine thrust-line is

now offset from the C/G, meaning that we have introduced a yawing moment which was absent previously. In other words, engine thrust is now trying to yaw the model out, thereby increasing line tension.

The model will continue to yaw until the lead-outs, which also have a yawing moment about the C/G, try to pull it back. These moments at some point will be equal and opposite, at which point the angle of yaw is fixed in space.

If we have the lead-outs well forward, as in the old Thunderbird, then the yaw is a bit less than for more swept lead-outs. So, big deal?

Well here is where it gets interesting. Say we lose some line tension: then the inward yawing component provided by the lead-outs is reduced. The offset thrust-line yawing moment then dominates, so that line tension is restored as the model yaws out!

How neat is that! Automatic line-tension compensation! Here is another photo to show how good is my new Fuji S5600 digital camera.

Check out that lovely F2B prop on the Enya 45! Bet you would love to have one of those! Only \$35 from Supercool hisself! Should go well with the offset C/G on your next stunter. That's right, the one with the longer outboard wing and heavier tip weight!

Bet you're not game! Oh, I forgot to say, this all really worked on my test flights. The extra tension gives extra precision, without the blinding speed of our top F2B fliers.

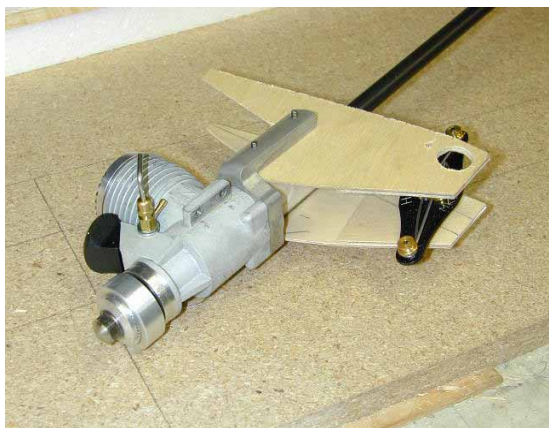
Addendum:

I have received some response to this article, which goes to show I have not lost my capacity for self-delusion, which is encouraging! I repeat the responses below without {many} changes.

From Preston:

I do visit your website regularly, of course. Phil Cartier, an old combat flier, made much the same point about wanting the CG outside the thrust line. I wanted to achieve this, along with getting the centerlift right, by keeping the wings the same length, but increasing the chord of the inboard tip. Also by moving the engine slightly inboard, and adding a bit more tip weight.

I'm not sure how clear it is, but look at the pictures here.



Nelson sells a magnesium back plate/engine mount that many people use. I've rotated it 180 degrees, which serves to shift the thrust line inboard 1/2 inch (bringing it 1/4 inch inside the centerline versus 1/4 inch outside!). Otherwise, the engine points straight ahead and the leadouts are set well forward. Unfortunately, I smashed both examples pretty quickly, before arriving at any conclusions about the flyability. I'll have to build some more!

(I stole the idea of the larger inboard chord from Howard's Son of Snort.)

From Bob:

Well, what you have done is just get REALLY good thrust offset. Angling is good, but only when the engine is way out in front of the CG. With the CG that far forward ("Heart-of-Gold" 160mm prop to C/G), it would take a huge angle to get the same thrust moment arm about the CG. On a long nose stunt airplane, an angular change will be a lot more effective.

I have not thought about CL issues much. Have not flown it since I first got decent RC equipment 35 years ago! OTOH, I think you need to sort out the two effect on the line tension. First is the centrifugal force from the plane, but you also have the air drag on the wires. When the lines go slack, the first term goes to zero, but you still have the drag, which gives an inward yawing moment.

Supercool-eats-crow:

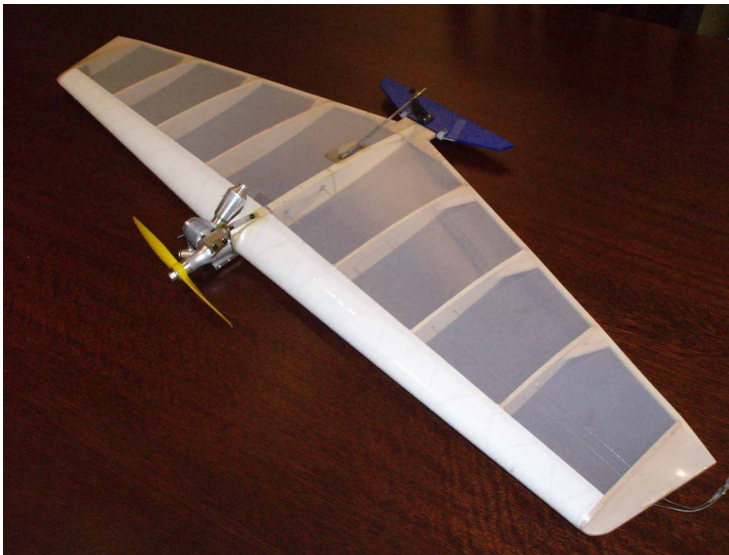
As I said, age has not diminished my powers of self-delusion. So I dragged out the old Firecracker, to see how much side thrust I needed. With a nose moment of 400mm, I needed 3.6 degrees of side thrust to get 25mm at the C/G. That is still less than I have on the "Heart-of-Gold".

That is quite a lot of offset: I think the model construction would need to plan for that angle. I only got that angle in the photo by hanging the engine off of one bolt!



Robert Owen reviews 1/2A combat plane from Moldavia

This is the second generation of 1/2A planes from this maker. The first batch flew very well with a variety of power sources but none really made it shine until the Cyclon TYR engines became available.



The Test Aeroplane

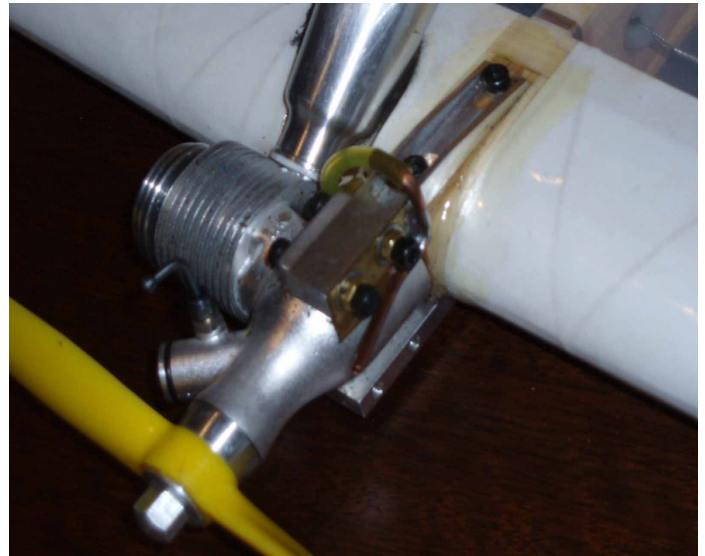
On first inspection it appeared to have slight intrust drilled in to the centre rib/engine mount causing some concern. Based on prior experience extra epoxy sealing was applied to the covering joint area around the engine mount to prevent any diesel fuel seepage, as this eats away at the foam very quickly.

A brand new Cyclon JAK in standard trim with muffler was mounted. The only modification was to mount on the inside of the engine bearers a vent pipe and connect it to the tank overflow to make filling the tank easy. All tests and flights were made with the same fuel as Maris Dislers used in his bench tests.

What a delight to fly, it required slight trimming to suit my style of flying, a very small tail weight and 4mm taller elevator horn fitted. Take off was very similar to the F2D's, no tension for the first one to two meters then lots of tension all over the sky. If we can get Cyclon to machine a small amount of out thrust in the engine mounts they will fly quite well in windy weather.

I made two venturis as per Maris's description, one at

2.6mm and 3.0mm finding an improvement with each change then staying with the 3mm for the rest of the testing. With 4 flying sessions over two weekends it was noted that it did lean out in inside turns and richen in outside turns, a needle setting was easy to find that gave a good run overall without slowing down in the outsides or crackling to much on the insides.



Prop Testing

I tried my largest F2D prop, ground rpm was 23.2K. It sounded sweet but was inconsistent in the air with a notable vibration on the control lines (Airspeed was approx 25/10). Next was a Graupner 7x4 soft prop only trimmed for balance, ground rpm was 15.8K with the comp backed off and airspeed was approx 26/10. The engine held tune very nicely and it unloaded in the air to an estimated 18K to 19K rpm. This was an easy set-up as the props are cheap and not likely to break in a collision with the ground. No finger protection was required as with the F2D prop, flights were handed out to anyone who wanted one, on one occasion indecision saw the model hit inverted, I simply picked it up and one bash of the prop saw it in the air again much to everyone's amazement.

These models are constructed in the same manner as modern F2D airframes and have the same properties, strong, light and sweet to fly. Loops almost as small as F2D models are possible without too many hiccups from the suction fed engine.

These airframes will give people the ability to fly any manoeuvre provided the engine run is reasonable and I have seen many 1/2A engines with more than enough grunt to pull these airframes.

My Concerns

These models and engines meet the current rules for this event. If one was to change the set-up to inboard chicken hopper tanks, allowing much larger venturis and use optimum glass props, we will very likely see rotational speeds greatly exceeding current F2D speeds (24/10). With the event of newcomers watching having the thoughts "I cannot do that" instead of "I would like to try that" and start to loose existing competitors that do not have these engines.

I believe this is an entry-level event and as such performance increases should be limited. I would like to propose that a restriction of 3.0mm max venturi diameter and a commercially available plastic type propeller be used with this engine only. I would hope this is discussed at the Victoria State Champs.

2007 VMAA CONTROL LINE STATE CHAMPIONSHIPS

CONTEST CALENDAR

FRIDAY APRIL 6	OPEN PRACTICE – CLAMF, FRANKSTON- 9.00AM OPEN PRACTICE – KMAC, KNOX – 9.00AM F2C TEAM RACE RD'S 1 & 2 – CLAMF 2.00PM F2F TEAM RACE
SATURDAY APRIL 7	OPEN PRACTICE – CLAMF, FRANKSTON – 8.30AM F2A RD 1 – 9.00AM F2C RD 3 F2A RD 2 F2C RD 4 F2A RD 3 F2C FINAL VINTAGE STUNT (STATIC 9.00AM) KMAC, KNOX VINTAGE STUNT (FLYING 10.00AM) KMAC, KNOX F2B OPEN PRACTICE – KMAC, KNOX COMBINED SPEED – Hard Surface - CLAMF (AFTER F2C FINAL) ½A COMBAT
SUNDAY APRIL 8	F2B, NOVICE & JUNIOR AEROBATICS – KMAC, KNOX - 8.30AM VINTAGE A TEAM RACE – KMAC 8.30 AM CLASSIC B TEAM RACE (AFTER VINTAGE A) COMBINED SPEED – Grass - (AFTER CLASSIC B) F2D COMBAT (AFTER CLASSIC B)
MONDAY APRIL 9	MIDGE SPEED – CLAMF, FRANKSTON – 8.30AM 1/2A TEAM RACE GOODYEAR MINI GOODYEAR (If time Permits) SIMPLE RAT RACE (If time Permits)

FOR FURTHER DETAILS CONTACT GRAEME WILSON – 97868153, MOB 0408034722.

Racing at the South Australian State Champs.

F2C in Sth Oz was low on entries this year but high on the fun factor. As usual, it was first event on the card and provided exciting racing, finishing with a new Australian record of 6.35.91 by Rob Fitzgerald and Mark Ellins.

Mark Poschkens had Murray Wilson on the handle. They showed good practice form and are not far away from posting a really good heat time. Mark has come a long way in team race in a very short time.

Was good to see Lance Smith having a go with gear bought from Ian Thompson in WA. He was learning more about F2C with every heat and in the end was catching competently. Later, when he broke a canopy, he was going to withdraw. However, Lance was convinced to repair and continue. He said later...

I did enjoy the final, thanks John for talking me into it. Its just a shame that that Mazniac is so touchy on tuning, its fast when on song but goes hard at the drop of a hat. I guess I am leaning something about motor tuning!

The final provided a stage for one of the very best teams in the country to strut their stuff and show yet again they are truly world class with a record breaking performance.

Classic B was a disaster for the RAM prop users!! Three of these propellers threw blades in the extremely low 11% humidity and high 38c heat. I broke the shafts on two OS FP25's as the broken props took their toll. I counted myself very lucky not to have lost any models.

Lance Smith relates: *My RAM prop that failed was new. The SA Champs was its first outing, it lasted 2 x 56 lap practice laps and blew at 33 laps during the first heat of Classic B. It was carefully balanced before running on my commercial balancing*



rig.

I was concentrating on the first heat, watching the model very closely to see if the overheating problem in practice was going to come back, the engine was sounding very rich going into the wind and relatively normal coming out of the wind. I wanted to try and win Classic B this time, so I had my eye right on the model on lap 33. It had about 1/4 of the circle to go to get back to my position when it all happened in an instant. I was hugely surprised to see a big red explosion of painted balsa fragment emanate from the front of the model as the top cowling, complete with engine and tank, ripped itself from the crutch and departed rapidly from the rest of the model complete with mounting bolts and cap screws. The front cowl and engine plate snapped off from the pilot/tank end just as it left the model and I saw the engine departing as a dark blur towards the circle end of the clubhouse high in the air. The tank cart-wheeled off into the pits under the awning and was easy to find. The model lost all its momentum and just seemed to flutter down to the ground leaving a red "chalk" mark to accurately indicate where it "landed" on the hard circle. I knew immediately it has sheered a blade which had in a millisecond changed the engine's true moment of rotation somewhere outside the fuselage from where it normally is kept.

After the race Murray located the engine and the front cowl on the road verge, motor seemingly untouched, needle still straight and set in its original position. One half of the prop still remained on the crankshaft, the other half was found just behind the wreckage on the circle

When I got home and opened up the back plate I found the inside the crankcase bits of red painted balsa chips the engine has breathed in in its final moments before stopping but luckily no sign of any South Australian dirt or sand. The motor had a very lucky escape, not a scratch. The rest of the model, well thats a combination of bad physics and racing.

Back to the racing... with just 3 entries, one heat was flown to determine segment choice for the final. John Hallowell was flying the Flying Purple People Eater which was very ably pitted by the gun South Oz crew of Rob Fitzgerald and Mark Poschkens. They were fastest with a 3.15.95 using a borrowed engine. They were lucky to fly at all as Lance Smith produced an LA 25 from his box of tricks to replace the damaged FP's. As Lance's model was broken, it was just a two up final with the winners 3 stopping the 140 laps in 6.50.96. Second were Wilson/Ellins 7.03.74.

Vintage A had just 3 entries, but high quality racing and a nail biting, super close finish. At the gun, Hallowell/Fitzgerald were slow off the mark with the Dimpled Dumpling and the other two R250's suddenly were about 6 laps up. I remember saying to Murray and Graeme... "Hey guys, if any of you can think of a way for me to make up six laps, please let me know" Predictably, there was no response, just silence... The only sound was the howl of three R250's at peak flying revs on the circle's perimeter.

Then bad luck suddenly struck the Wilson/ Ellins team as a loose tank pipe caused their retirement. Murray's Voodoo 1 was doing very well on a two stop final strategy. The Voodoo 1 made 64 and 72 laps during the race. However, on the last pit stop, the model kangaroo hopped something awful and Lance fumbled the catch, losing about 5 seconds and the race. I think Lance felt like Hershell Gibbs when he dropped Steve Waugh and the World Cup... Meanwhile,

Rob Fitzgerald's catches and starts were like a magician using sleight of hand... so fast, they could hardly be seen. Even David Copperfield would have been impressed. I'm sure Mark Ellins was. With 3 stops, we made up those six laps and scored a narrow win by less than 2 seconds from the fast finishing Murray and Lance.

Not long now to the Victorian State Champs at Easter when a larger entry will provide even more intense Vintage A team racing. Just about all teams have got their R250 engines now, so racing really will be extremely close. Steve Rothwell now has some extra goodies available for the VTR enthusiast. This includes the long awaited mounting plates and shutoffs. The shutoff fits on the back of the mounting plate. It is also possible to buy an Allen key style compression screw and spare venturis of different sizes other than the 3.8mm supplied. Prices are extremely reasonable. Contact Steve direct for details: smrpl@ozemail.com.au

F2F really was a good event. Mark Poschken's Nelson was quick and reliable and Fitz and Lance had extra speed. Paul Cameron's racer was fast and pitman turned pilot Mark Ellins was not giving an inch in the middle. It was a recipe for an exciting race with Lance excelling in the pits, providing his pilot with safe catches and speedy restarts. In the end, extra speed made that vital difference and Rob Fitzgerald used his home ground advantage to perfection, winning again to make it four out of four team races on the weekend.



Lance said later: *The pilot maketh the race. All credit to Rob Fitzgerald for putting the model in my hand exactly where it should be each time to give us a win. Fantastic model, fantastic engine and a world class pilot. I very much enjoyed the SA Champs.*

I'm sure we all did. Many thanks to Greg, Maris, Wendy and Rosa for their help in organizing the flying and refreshments. Much appreciated.

John Hallowell
VH 1984.

Rob Fitzgerald (white shirt) on his way to claiming a new Australian F2C record.





Vintage A T/R finalist at the S.A. State Championships

REPORT: Hearn's Trophy Stunt Competition Feb 25th 2007



Victory Snatched With A Third-Round *Blinder!!

Well, the forecast for the Sunday was not too bad... a top of 24 degrees and 10 to 15 knot winds...

The reality was a little different as it turned out... but more of that later. The Knox Model Aircraft Club flying field looked very nice on the Sunday morning. It had been mown earlier in the week and with a little rain during the previous few days, it looked in good condition considering that our country is experiencing one of the worst droughts on record. The KMAC crew were busy setting up computer equipment for tabulating scores, rolling out the club BBQ for the sausage sizzle lunches and putting out signage by the road to encourage visitors to drive in and view the activities. A free-standing sign with KMAC brochures was also set up in front of the pavilion for interested spectators.

Just before 10am, a Pilots Briefing was called by Contest Director, Peter Rowland, entry fees paid and the draw of competitors announced for the Hearn's Trophy Stunt Competition for 2007. This particular competition has a glorious history with a stunning list of talented winners' names displayed around the base of the trophy, beginning from way back in 1947. The competition format consisted of the usual 3 rounds... 2 before lunch-break and 1 after. Scores were going to be posted quickly on the leader board inside the pavilion by our KMAC score tabulator, Frank McPherson, who also volunteered for similar duties at the recent Nationals in Albury. Frank expertly handled the computerised scoring calculations for all stunt events throughout the Nats and is to be commended for his

contribution to the smooth running of this essential element of the competition... and Frank didn't even fly at the Nats! PJ Rowland has configured a computer program to enable scores to be quickly entered and calculated accurately and it's this program that has been used by Frank at both the Nats and local KMAC stunt competitions... thanks, PJ! Judges for this event were Andrew Frith and Kim Laughton who are regular judges of KMAC stunt competitions. Judges take on a demanding role with scoresheets in hand, sitting or standing out in the open at the flying circle, with long periods of concentration while assessing the pilots' manoeuvres and we thank Andrew and Kim sincerely for these duties that they volunteer to undertake.

ROUND 1:

Col Collyer drew first flight before the judges and put up his Nobler with OS FP35 engine power. He felt the needle setting was a little too lean even considering the windy conditions that he had to overcome and he scored a 782 as a result. Mark Ellins, campaigning his Grinham-built Jazzer with Stalker 61RE also had to contend with the wind and he flew very well to score 1060. Doug flew his new Hot Dog in slightly calmer and more favourable conditions and his score of 1070 just edged out Mark for top spot in this round. Sean Frith, one of our up and coming Junior flyers, flew his profile model with OS FP25 power but had engine run issues due to a problem needle valve assembly. He persevered and came through with a score of 632. Craig Hemsworth fired up his Russian design, KA10 with Stalker 51RE up front and also experienced some relatively calmer air for his flight. He had a smooth flight and posted third in this round with a score of 1029. Dave Lacey was next, flying his Sukhoi profile with OS LA46 power. Dave put in a couple of flights on the practice circle adjacent to the competition circle to become more familiar with the windy conditions and fine-tune his engine for the best stunt run. Dave is a regular competitor at KMAC stunt competitions and he and his wife Vera make the trip down from Ballarat... a couple of hours north-west of Melbourne.

KMAC has recently made some changes to the way the club hosts Competition Days by ensuring that a Practice Circle is available for competitors to use in just these situations. Stunt models are usually a large size and expensive in dollars, as well as time and effort to build. A properly tuned engine stunt run is important not only to maximise one's chances in competition but to minimise the possibility of a crash, particularly in windy conditions. In fact, 3 of the 7 flyers in the competition made use of the practice circle for a variety of reasons related to improving their performance in the competition. Col Collyer used the practice circle a few times to try to improve his engine runs. In fact, he had such an erratic engine run in the third round that he waved off his flight and, out of consideration to the flyers following on, Col moved across to the practice circle to run out the tank. Junior flyer, Sean Frith, also used the practice circle to put up a couple of flights to become more familiar with a better flying model loaned to him by Kim Laughton for the third round. Sean's old stunter, although a great practice model for a beginner just getting into stunt manoeuvres, has a ¼ inch thick solid sheet wing which was not the most aerodynamically efficient wing configuration. These show a tendency to stall in any manoeuvre other than smooth big loops with high airspeed.

ROUND 2:

The wind increased and became gustier during this round. All competitor performances in this round reflected the worsening conditions with reduced scores. Doug top-scored again in this round, with Craig following close behind

by a mere 2 ½ points. Mark's score dropped away a little (978) but he was still well in contention at third place.

John Goodge, from the Gippsland club CLAG, unfortunately arrived a little late for the first round and he entered the competition in this second round with his Lew McFarland Shark 45 with a Stalker 51 Rear Exhaust engine for power. John scored a commendable 786. The windier conditions became a problem for Sean's model, especially in the overhead manoeuvres. He did a great job of maintaining line tension during his flight by backing up during stunts to somehow keep the model under control. Col had more engine run problems and his score of 125 told the story. In fact, none of the flyers had a good time score-wise in this round. As it turned out, the scores from the first and third round were to be the best available to go towards their averaged final scores to determine the rankings for this competition.

With thanks to Jenny and Debbie for preparing and cooking the food, a BBQ lunch of sausages was available for hungry visitors and a half-hour lunch break was called. Many are not aware that KMAC is always strictly compliant with all Knox City Council's food handling guidelines to ensure that the cooked food is appropriately prepared, cooked and served to visitors at the field, which of course is leased from the KCC. So if you're standing in line waiting for your food and the ladies are recording thermometer readings of food, please be patient... it will be worth it!

ROUND 3:

Gusty winds continued.... Col, as stated previously, had a very rich engine run when the model turned inverted and he wisely waved off the flight to save his model for another day. Mark, with a score of 1040 for this round, commented that the wind was changing direction which was supported by the judges having to move around in response to the new wind direction. Doug copped a few more wind gusts than he'd like and he scored a 1023 for this round. Sean, flying a borrowed Oriental Profile with LA46 engine up front, had a couple of flights on the practice circle with it. He then took this Kim Laughton loaner into the competition, though this was only the third time he'd flown the model. Sean posted his best score of the day (663) which was excellent considering he had a short engine run which saw him completing the square 8s just before the engine quit. Sean has progressed rapidly with his father's (Andrew) expert guidance and it was only late last year that we were watching him beginning to fly lazy eights and inverted stunt manoeuvres. John Goodge had a great second flight in this competition and posted an excellent score of 928 as a latecomer to this event. John shows a lot of promise as a serious contender in future stunt competitions.

But the outstanding flight of the day belonged to Craig Hemsworth who lit up the scoreboard with a blazing 1085. Craig put in a smooth masterful flight to give himself the edge when all scores were tallied in this round. He didn't have it all his own way as the engine cut just at the end of the 4-leaf clover and he had to glide the model around for the required 2 laps before he could finally set it down to land! With this blinding third round performance, could Craig successfully snatch victory from the other contenders to stand proudly as the new face on the winner's podium?..

RESULTS:

The 3 rounds of competition were completed by 2pm and scores totalled up ready for the presentation in the KMAC pavilion soon after. Mark Ellins had edged out Doug Grinham for second place with a mere 3 points difference

between the two competitors. But it was indeed Craig Hemsworth's brilliant 3rd round score that cemented his winning position in this Hearn's Trophy stunt competition for 2007. He took out the honours with a winning margin of 7 points ahead of his nearest rival. Congratulations, Craig! Contest Director, Peter Rowland, made the presentations to the first three place-getters and thanked both the judges and the score tabulator for their services on the day. Peter has put in over 20 years of service as a committed and valued KMAC committee member and he has been our capable CD for a number of years. The club acknowledges and appreciates the great work and effort he has put in to the club in both these roles over the years and would like to extend our heartfelt thanks for a job well done on both counts, Peter!

A teacher from a nearby Secondary College arranged a visit with me on this particular day and our KMAC members also assisted him in determining the necessary requirements of suitable engines and models to enable interested students at his school to participate in control line activities at the school. KMAC's membership numbers may increase further with a number of juniors joining in the near future. A close relative of the late Bill Crawford, one of the founding members of KMAC, also came down on the day with a selection of control line balsa, engines and other equipment for sale from Bill's Estate. There will be more control line items for sale at the next KMAC monthly event



Above:- Craig Hemsworth holds the Hearn's Trophy. Mark Ellins on the left and Doug Grinham on the right.

Final Placings and Scores for the 2007 Hearn's Trophy Stunt Competition:

FIRST	Craig Hemsworth	1057.625
SECOND	Mark Ellins	1050.375
THIRD	Doug Grinham	1047.125
FOURTH	John Goodge	857.25
FIFTH	Dave Lacey	747.5
SIXTH	Sean Frith	648
SEVENTH	Col Collyer	496.25

*Origin/meaning of the word 'blinder' – from www.dictionary.com

British Informal. [Origin: 1580–90] a spectacular shot or action in sports, esp. soccer: *He played a blinder.*

Peter O'Keeffe / KMAC – Scoresby, Victoria

This is a **SERIOUS WARNING!**

Lance and I have been using RAM 8 x 6 props on the Brodaks and OS 25's with our Classic B's since last November without a hint of trouble.

However, at the Sth Oz State Champs last weekend, all that changed!

Between us we had 3 RAM prop failures, one causing serious damage to a model. The other two broke the shaft and rod of OS 25's. The blades sheared off at the hubs. We put it down to the changed atmospheric conditions from Melbourne, with the high heat (38 Deg C) combining with extremely low humidity.

So our advice is to use the tried and proven APC 7 x 7's on the Classic B's, at least for the time being.

Ken Maier also threw both blades from a RAM 8x6 on his Fox 36 Open Combat model whilst flying in Melbourne!

Beware!

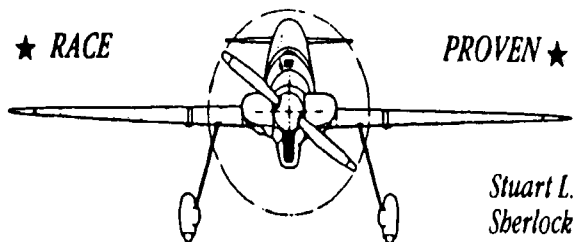
Best regards,
John Hallowell

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For Sale

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Contact:- Ray (07) 3879 0740

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

The price is now \$38 per 5 lts including container effective immediately.

Std Postage in Victoria is \$7 inclusive of packaging.

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Email: combtkid@hotmail.com

FOR SALE - Ramrod Vintage Stunter brand new - never flown but ready to fly with brand new Merco 35 motor (never run) \$350.00.

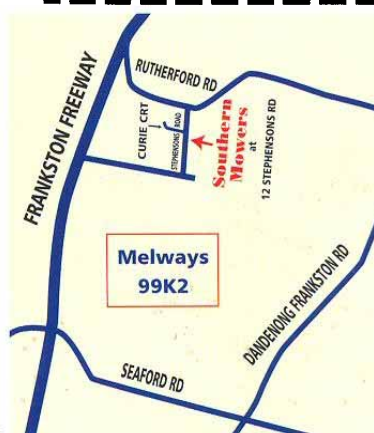
Also for sale Karisma Stunter with Enya 45 motor - excellent condition - ready to fly \$200.00

Contact Brian on 0400170649

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26th May

**Lumen Christi College,
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This event counts for points towards selection
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Regards Trevor Letchford.

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