



# PROP TORQUE

**COMMITTEE:**

<b>PRESIDENT</b>	Peter Kidson	6394 4380
<b>V.PRESIDENT</b>	Merv Cameron	6344 5614
<b>SECRETARY</b>	Gerry de Groot	6369 5284
<b>TREASURER</b>	Nigel Keefe	6344 6079
<b>CD</b>	Geoff Hays	6344 1920
<b>EDITOR</b>	George Carnie	6398 2141
<b>Committee</b>	Andrew McEntyre	6384 1048

L.M.A.C., PO Box 1204, Launceston Tas. 7250

Kevin Hay's immaculately presented Pitts Special seen here at the Scale Day held on August 17.



Official Newsletter of the...  
**LAUNCESTON MODEL AERO CLUB Inc.**  
VOLUME 12

# SEPTEMBER

# 2002

# Super Winter Specials

NEW FROM ZN LINE - HYDEAWAY & ENIGMA



## HELICOPTER KITS

NEXUS 30	\$420
JR HELI'S	
VENTURE 30 ARF	\$ 950
VOYAGER 30	\$985
VOYAGER50	\$1055
VIGOR50	\$1900
RACTOR 30	\$840
XCELL 60	\$1600
MOSQUITO	\$790
MILLENNIUM2	\$2250

## POWER KITS

### TRAINERS

HUSTLER 3	\$95
CLASSIC ARF	\$135
SEAGULL 40	\$158
CHALLENGER	\$160
CANARY	\$149

### SPORTS & SCALE

ATLANTIS	\$270
MIDGET MUSTANG	\$499
CMPRO LARK	\$358
VMAR ROULETTES 811NCH	
	\$595
SWALLOW 90	\$430
SEAGULL STEARMAN	\$322
MIDWEST G202 KIT	\$467
FORCEWOLF 190	\$415
AIRSALE CHIPMUNK	\$175
SEAGULL LOWWING	\$150
FAIRCHILD PT19 ARF	\$215

### DESERT AIRCRAFT

DA 100	\$2290
DA 150	\$2990

## ENGINES



### 2 STROKE

46 SIZES	
MAGNUM 45	\$170
THUNDER TIGER	\$170
SUPER TIGER	\$198
GMS 47	\$165
YS 45	\$345
OS 1A46	\$125
OS 46FX	\$209
OS 50 SX	\$299
OS 10FP	\$99
OS 10LA	\$115
OS 15LA	\$125
OS 25LA	\$145
OS 25FX	\$200
OS 40FX	\$190
OS 61FX	\$405
OS 91FX	\$445
OS 140RX	\$840
OS 160FX	\$590

### 4 STROKE

OS 26	\$313
MAGNUM 30	\$235
MAGNUM 52	\$289
MAGNUM 54	\$335
YS 53	\$440
OS 52	\$410
OS 70 SI	\$505
OS 90 SI pump	\$649
YS 91	\$785
OS 120SE	\$761
OS 120 SII	\$790
SAT10 72	\$460

### TURBINES

JET CAT 120	\$5300
J6100EAGLE	\$4500

### HELI ENGINES

OS32 SX	\$280
OS50 SX	\$321
OS91 SX	\$535

## GLIDERS

DAW DRAGNETTE HLG	\$122
FKV GILLETTE	\$350
SALSA HLG AILERONS	\$229
SKYHAWK	\$319
MULTIPLEX MILAN	\$799
AMD SU35	\$291
BROLGA 2	\$68
STARLITE	\$1550
COHEN	\$900
NYX	\$1899
MINI ECLIPSE	\$499
DAVE'S AIRCRAFT WORKS	
ME109, P51 ETC	\$165

## ELECTRIC FLIGHT

WINGO	\$185
ALLIANCE	\$230
FIREBIRD XL	\$199
MULTIPLEX TWIN JET	\$260
KAVAN PRO JET 1	\$165
DAW STAUDACHER	
EPP	\$123
ALBATROSS	
2M ARF	\$210
ELECTRON Q	
2M AILERONS	\$370

## LOADS OF GEAR

### SPEED CONTROLLERS

SHULTZE	
SLIM 20	\$72
SLIM 40	\$102
SLIM 55	\$145
HACKER CONTROLLERS	
FROM	\$130

### PROPS

APC, BOLLY, MASTER AIRSCREW,  
RAM, TOP FLITE, MENZ, GRALPNER

### VIDEOS

ENDLESS LIFT	\$59
PRO AERO TOV	\$59
LEFTEZTE2000	\$55

## NEW ARRIVALS



HACKER ELEC MOTORS  
AERONAUT  
FKV MODELS  
MK ACCESSORIES  
BVM ACCESSORIES  
WREN TURBINES  
R.F.M. PROPS  
KAVAN KITS & ACCESSORIES  
SLIMLINE MUFFLERS

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Web: www.perthrc.com.au Perth RC Models and Hobbies 454 Newcastle Street, West Perth, WA 6005



## **CAPTAIN'S REPORT**

**Peter Kidson (03) 6394 4380**

**p.kidson@microtech.com.au**

Hi once again, I hope all is well with you.

Enclosed with this edition of Prop Torque will be a letter from Gerry regarding 'Another' insurance increase. The letter will explain everything in detail but I'll just give you a quick outline. The MAAA were given a quote for this years insurance premium which by the time it was ready to be renewed had gone up by about a \$114,000. No small figure to say the least. That extra cost was passed on to the clubs in the guise of a levy. The sum was \$13.50 per member.

The Committee at LMAC decided to carry a substantial amount of the cost, (\$10.00) with the TMAA footing the rest of the bill. This cost was to be passed on to you the member when our fee's would be due next year. Unfortunately the insurance cover the MAAA got did not extend to member to member. After consultation with other States it has been agreed that the clubs should have this additional cover for safety's sake. Thus the extra levy.

The letter will have detailed what is needed.

Please be aware that the club cannot afford to fund this extra cost. We need your support.

Now on to brighter things. On the 9th of September after our usual Committee meeting we held our first club night. If at this point you are saying, "I didn't know anything about it", then you are quite right because we told no-one. It was after all just a trial of the room, a response from the Committee and also the evening as a whole.

The night went really well. Basically it's meant to be an information night. For an example, Gerry De Groot brought in a glider kit for us to peruse over. His question's were, how and what do you skin bare foam wings with?. Merv Cameron gave us all an insight into the do's and don'ts of skinning wings. George Carnie brought in an ARF kit of a Stearman Biplane he was going to convert from

*(Continued on page 4)*



## Prop Torque..... September 2002

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I.C. to Electric. We chatted, drank coffee and bragged about our daring do's at the field and I for one look forward to next month's club night.

This time you are all invited to come along, if you have a model you think the member's would be interested in then bring it along. Don't be afraid to ask questions, somebody will know the answer. I may even try to finish the questions that the Doc asked about mixing channels and how to land.

The whole Committee is very keen to see club night go well. So if you don't attend I'll have to send the Blue's Brother's round, if I can get them out of the Cub.

So come on up and in the now immortal words of our mate Dave Jacobs, "It's great to be in a club".

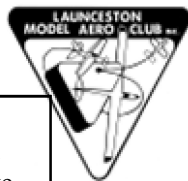
The venue is at Gill Waddle's place on the second Monday in the month so the next night will be the 14th of October at 8.00 pm.

I thought I may just tell you a funny story about two mates now called the Blues Brother's. For the scale competition held at our field recently I had decided to enter my Super Cub, but I needed pilots to give an authentic feel to it. Arriving at my mum's favourite shop which is Chicken feed, (it's got to be a good shop because my mum lives in England and it's the first place she goes when she gets here), Anyway I searched high and low for a pilot or two. Bingo!, (yeah! she likes that as well) I found what I was looking for,

Pilot's by the handful. Now, some were dressed in orange, Hum!, some were dressed in yellow, (at least they would match in colour). They looked kind of, well, fluffy!. Then just at the back I could hear my name being spoken, "Pete, Pete, pick me, pick me". There at the back were some of the toughest men I have seen, Roughly shaven, Muscles, hand grenades, the lot. Picking up two of them I went to pay and after parting with \$4.00 for both I went home to play.

Now, I'm not quite sure what the correct scale my Cub is but it looked at first glance my newly acquired pilot's would fit right in. "If only you could bend at the knee's!", I said to them.

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There's only one course of action if you have to fit into a tight space when you can't bend at the knee's. (I think this may have been said by Douglas Bader). That's right take em off!. I picked up the first one and headed for the bandsaw. I'm sure his expression changed as we got closer. Slowly lifting up his arms, (I needed them on him), I turned his head so he couldn't see what was about to happen, more to the point I didn't want to see him looking at the stupid grin I'm sure I was wearing.

Anyway I now have two pairs of legs for sale, One owner, you know the sales pitch, only used on Sundays. George Carnie gave them the title of Blues Brother's. Sylv bought me 4 more of the little blighter's but they're hiding somewhere. Can't think why!. See you at the field, (I hope).

Pete....

*Mmmm have you seen the movie Toy Soldiers Pete? If you haven't, it is the one where the toy action men come to life and revolt against their cruel owners. (I'll loan it to you) I'd be locking the remaining ones in a steel cabinet and keep one eye open when you go to bed at night!! (Ed.)*

It says pull down  
with your right  
thumb NOW!



See over  
for the  
result....





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@%# What happened Merv!!

I dunno Pete... I think I had the page upside down????



### SECRETARY'S REPORT

Gerry de Groot

Ph: 0417 536 200 (BH) or 6369 5284 AH

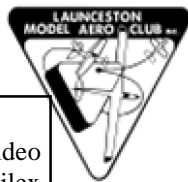
[gdegroot@vision.net.au](mailto:gdegroot@vision.net.au)

Hello All.

Here are the key points from the September committee meeting, held on 9<sup>th</sup> September, 2002:

- Heading the list is yet *another* insurance rise, this time to cover claims between members. However, the Committee decided that LMAC cannot possibly absorb the latest rise (it has already done this once this year) - so there is a letter enclosed explaining the situation and asking for a further \$10. (Had we tried to absorb this levy, the club would be asking for financial trouble. )

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- Geoff Hays our Railex coordinator needs to borrow a video recorder and monitor to show flying videos for the Railex display. Can anyone out there help? Let a member of the Committee know if you can help.
- LMAC would like to welcome new member **Allan Sewell** from Longford. Allan has been around aeromodelling before, and is trying his hand at an electric glider. If you see Allan at the field, please make him feel welcome.
- The MAAA Executive has now approved 10kHz frequency spacing for radio control. However, the lack of a qualified testing station and the strict controls and procedures that have been imposed on both equipment and testing stations means that LMAC has opted not to progress this matter for the time being. It is a case of the advantages being outweighed by the disadvantages.
- We have not received any further information on the new CASA rules regarding heights, etc. However, we have been reliably informed that the LMAC field is entirely within controlled airspace. We are therefore under an obligation to fly in a responsible manner at all times.
- The Committee noted that the last competition day involving three types of flying (FF, OT and Scale) was an outstanding success. This was due in no small way to our CD, Geoff Hays, for ably running the three activities and keeping track of scores, etc. (There's a rumour going around that it was also something to do with the weather.) Our thanks go to Geoff for a job well done.

That's all for now. Until next time, happy flying.

***Gerry de Groot***



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# From the Editors

George & Kerry Carnie  
"Glenhaven" 50-62 Fairtlough St Perth 7300  
e-mail: [gcarnie@tassie.net.au](mailto:gcarnie@tassie.net.au)

Hello to all.

Unfortunately not much to report from the Editors desk this month, a touch of ill health (and a dose of bad weather) has kept me away from the field for a while. Hopefully the medical "experts" will work things out and I'll be back in time for the good weather to arrive.

My apologies to John de Groot for missing him out of last month's year-to-date table. As Geoff says "errors seem to find us when we don't want them to". To assist, please have all material, including members advertisements, to the editors no later than the 3rd Monday of the month. This allows any information from the Committee meeting on the second Monday of each month to be passed on to members whilst it is still current and provides more time to put the magazine together and (hopefully) eliminate any errors. Any material received after this date will be included in the following month's magazine.

As a reminder, next months material is due by Monday, October 21. Due to the committee meeting being on October 14, this will make next month's magazine a little late.

Until next month..

*Put a spark in your life—Fly Electric*  
*George & Kerry*





## Contest Directors Report

Well as I put pen to paper the rain is pelting down but I must say that we have had some good days for model flying lately.

I do not have much to report on this month as we have not had our next scheduled event yet. That is to be held on, weather and wind permitting, Saturday 21st and will quite possibly have been run and won by the time you receive this edition of Prop Torque.

The details I have outlined in last months report so I will mention the October contest is to be a Thermal Glider, Round 1 on Saturday October 19th at 9.30am, the usual rules to be applied.

Last months points totals after 7 contests omitted John DeGroot's placing in Division B which actually puts him in 4th place at this stage with his win in last months Free Flight event, our apologies John for the omission.

Also a printer error left off at the foot of the page, Tony Gray's 4th place in F/Flight, errors seem to find us when we do not want them to. You will be aware no doubt, that I have the task of co-ordinating our State display at Railex this year. I will be needing a small group of helpers to help me set up this on the Friday November 8th and also to help man the display during Saturday and Sunday. Saturday times are to be 9am—6pm and Sunday will be 9am—3.30pm.

We will need models to exhibit and mostly they will need to be hung from the roof of the building (inside of course) so I would like to hear from any members who would like to be involved in our display at this popular event.

Please contact me on 6344 1920 or 0408 559 206 to -

A. Help set up

*(Continued on page 10)*



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- B. Help man the table for some of the time Sat and/or Sun
- C. Supply models for display

Let us make our contribution to the overall event worthwhile. So please give me a ring of what you can help with.

Well that's about it for now.

So as always....Happy Landings All. (I need some)

*Geoff C.D.*

Contest Scores 2002-2003					
POINTS TOTALS After 7 Contests					
Division A			Division B		
Contestant	Contests Entered	Points	Contestant	Contests Entered	Points
P. Kidson	4	388.22	A. McEntyre	4	423.99
K. Hay	4	373.67	G. Carnie	3	271.67
G.Robertson	3	330.00	D. Jacobs	2	209.61
			J. de Groot	1	110.00
			P. Haworth	1	103.43
			G. de Groot	1	95.44
			K. Gray	1	88.90
			D. de Groot	1	87.10
			B. Nye	1	45.66
			R. Cooper	1	29.74



# Electrasite

## **Gearboxes**

Now why would anybody of sound mind and spirit want to burden his pride and joy with a clunking, rattling mechanical contraption such as a gearbox? Such a silly question, everybody knows! Do you? Why not?

Oh well, stay with me for a while then, as some things need to be explained first.

It is all based on our constant desire for power, we are aiming for a maximum efficiency motor with maximum mechanical output, however note that the two are not equivalent. A motor's rotational shaft speed or RPM is constant regardless of load if the voltage is constant. The voltage constant 'KV' is usually expressed in the units of RPM/VOLT. That constant is unique to the motor and is a direct result of the way it is constructed and with what materials. Thus a motor with a KV of 4750, for example, will try to rotate at 33,250 RPM if 7 Volts were applied, it will try its best to turn at that speed and under high load may burnout in such a vain attempt.

Motor current is proportional to load torque, an ideal motor if allowed to run free will draw no current, on the other hand, a stalled motor produces no mechanical power and all electrical power is then converted into heat. Maximum mechanical power will be produced when a motor is loaded until the RPM is reduced to half the NO LOAD RPM (shaft run). At this load the motor will only be 50% efficient which means that half the power will be converted into heat, way too much for us! So we must compromise a bit and aim towards better efficiency instead.

Motor efficiency varies depending on the type of motor and the strength of the magnets, a ferrite motor may be around 65%, a Cobalt motor could be around 80%. At best efficiency the RPM

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may not have dropped more than 20% from its NO LOAD RPM, and is then still very high (26,600 in our example) taking into account that we must transform the torque and RPM of the motor through the use of a propeller.

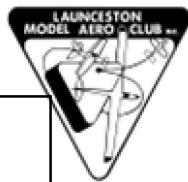
The power absorbed by a prop is controlled by 3 factors; RPM, Diameter and Pitch. The propeller transforms the torque into thrust and RPM into speed for your model. A propeller with large diameter and small pitch will have low efficiency but produce high static torque, inversely a small diameter and large pitch has high efficiency but low static torque, such a selection may have a pitch speed which is supersonic but insufficient static torque to get the model rolling. It is all a compromise and most of all you should consider a pitch speed that is adequate for your model. Also note that at almost all useable speeds you should never want a propeller with a pitch to diameter ratio of less than 0.5, e.g. 16x10 (0.625) = OK, 16x6 (0.375) = NOT OK

For a specific motor the torque/RPM available may not coincide with a suitable prop for your model, this is where the benefit of using gearboxes comes into effect. Gearing does not increase motor efficiency but allows a motor to turn a larger diameter prop at slower RPM. Thrust will be increased but the flight speed reduced. If you can bring the pitch speed inline with the maximum speed of your model, you will have achieved a more efficient system. Note that gearing only improves propeller efficiency if the direct drive propeller has a pitch speed that is much higher than the actual flight speed of the model.

### **Absorbed power**

As an example, a 10x6 at 15,000 RPM absorbs 1070 Watt but if gearing down 3:1 you can up your prop to a 20x10 for the same power use. Imagine the torque! Admittedly the pitch speed has decreased from 90,000 inches/minute to 50,000 inches/minute, which may be insufficient for the type of model flown.

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## **Gearbox types**

Gearboxes come in many shapes, some are tailored to suit specific motors, others are a generic type with basic instructions like “Any problems, don’t call us, we’ll call you”.

Common types are; single belt drive, quiet but with a large offset between motor and gearbox shafts; both shafts rotate the same way. Single gear drive, noisy but with smaller offset, motor rotation needs to be reversed and timing adjusted unless motor was purchased as a reverse-rotation motor. Multi gear drive, noisy, sometimes no shaft offset, motor rotation stays the same. Planetary gear drive (epicyclic), quiet, no shaft offset, no motor bearing side load, motor rotation stays the same (but an expensive gearbox!)

## **Things worth considering**

### *Mating of gearbox and motor flanges*

Motors can have a protruding front bearing housing with may prevent flush mounting.

### *Fixation method and fixation pattern*

The boltholes may not match in diameter/thread and location

### *Gearing ratio*

Is the gearing ration you want available in that gearbox type and/or supplier?

### *Gearbox strength*

Is a plastic gearbox strong enough, do you need an all-metal one?

### *Motor modifications required?*

An over-long motor shaft may interfere with the gears; the shaft may need cutting back.

### *Gearbox size and shape*

A large or long gearbox may not fit the model

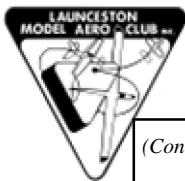
### *Gearbox shaft diameter*

A matching middle part or spinner assembly will be required

### *Gearbox shaft offset*

Is the gearbox shaft in-line or offset, is the offset too big to fit the nose area

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### *Motor timing*

Will the gearbox shaft turn in same or reversed direction from motor shaft? Can you adjust your motor timing and sense of rotation if required?

### *Pinion gear*

Will it fit your motor shaft? Is it an interference fit or held with grub screws, do you have a suitable gear puller to remove the pinion at a later date?

### *CG change*

Fitting a long nosed gearbox tends to shift the CG backwards, some model kits are sold or have suggested modifications to suit either direct drive or gearbox drive.

### *Nose length*

When you use a gearbox, you will have a longer propeller, will the propeller clear the wing in its folded state?

### *Suitable controller*

Large folding props are prone to hub damage when subjected to high torque, a suitable controller will pace the acceleration from motor off to full motor.

### *Gearing selection*

When selecting a gear ratio, try for values that are not exactly divisible, that way the gears will wear more evenly. e.g. If selecting a 3:1 ratio as 10 teeth pinion and 30 teeth main gear, p1 will always mesh with m1, m11 and m21, p2 with m2, m12, m22, etc., the wear pattern would become unique. A simple method is to select a prime number for either of the gears.

Jacques Wakae

[jlwakae@bigpond.com](mailto:jlwakae@bigpond.com)



# FOR SALE

## **CLOUD CRUISER** Old Timer with documentation

- 2.2 metre span.
- Saito 65 4 stroke—estimate 10 flights old.
- Easy stable flyer; a real beginners model.
- On board glow.
- Hitec Rx and servos.

Sell “as is” complete. Just plug in your 36 mHz crystal and go fly! Or less radio, less motor—***Your Choice!***

## **SAITO 150 (25cc) 4 STROKE**

- Not yet run-in.
- With or without On-board glow and props.

## **MAGNUM 120**

- As New condition.
- With 2 mufflers—1 Pitts style

***Realistic Offers on all items will be considered***

***Merv Cameron 6344 5614***



Prop Torque..... September 2002

# FOR SALE

Time to clear out the hanger a bit – any or all of the following for sale – too many planes and not enough time (flying gliders more at the moment):

**Multiplex Twinstar** – Foam twin engine electric, 1400mm wingspan, twin speed 400s, finished to look like US Coast Guard plane. 8xRC2000 pack, 4 servos (2 standard & 2 micro), ESC. Great flyer, able to do basic aerobatics. Just add receiver & fly. **\$250.00**

**Buzzard Bombshell** – Old timer, 1750mm wingspan. Expertly converted to electric by Jacques W. Astro 15G motor, 12 x 1900SCR battery pack, 2 x servos, Jacques W ESC, JR 4ch receiver. Just add Rx xtal & fly. Wonderful flyer, floats around marvellously. **\$475.00**

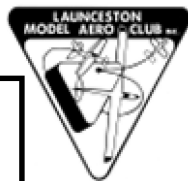
**Sig LT25** – built-up balsa trainer, 1550mm wingspan. Built as electric, ND10 motor, 4:1 superbox, 14 x RC2400 battery pack, 3 x JR511 servos, Jacques W ESC. Just add receiver and fly. Very stable flyer yet ample power to do basic aerobatics. Ideal for your bronze wing, completely reliable power. **\$475.00**

**J3-Cub (Great Planes .40 kit)** – Well built by Jacques W as an electric, 71” wingspan (about 1/5 scale). Astro 40G motor, 20 x Sanyo 2100 nimh battery pack, 2 x JR E381 servos, 2 x JR coreless servos, Orbit 50 opto-coupled ESC. Flies very realistically, needs scale detailing. Several minor prangs properly repaired (dumb thumbs on take-off). Cost many, many \$\$\$\$ to have built, but price is **\$700**. Again, just add receiver & Rx pack

**VMAR Cessna 182** – currently being converted to electric, 4 x JR E381 servos, Jeti 30/3 Phasor brushless motor and 70-3P Opto ESC, Modelairtech H500 beltdrive. Needs completing (not a real

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(Continued from page 16)

lot to do), very nice kit overall which will turn out very well.  
Total cost to date over \$985, but buy the gear, get the plane for nothing **\$735** (Planned to use 14 cells, pack separately negotiable)

Set of floats, well built, suit probably .60 size aeroplane **\$25**

**Contact Peter Haworth on 6327 3634 AH,**

e-mail: phaworth@bigpond.net.au

Open to sensible offers, will also re-price depending on equipment required

211 Coningham Rd Coningham Tasmania  
PO Box 87 Snug 7054

Contact Greg on 0362679069 or fax  
0362679061

E-mail: gjengland@bigpond.com



In Stock: Albatross Glider 2m ARF \$209

Mega Motor Mini 7E for 7 cell glider 10X6 prop 35 amps \$219

New cells Sanyo 4/5 FAUP 1950 mah 38 grams \$9.95

GWS Tiger moth park flyer \$209

GWS Stick Fuselage version \$89

GWS Cub park flyer \$89

GWS Zero park flyer , painted green, \$119

SJPROPO Speed control 50 amp, 6-12 cells, bec \$104.95

Speed 400 6V motor with speed control (8Amp) bec \$59

Also able to order entire range of the Wemotec EDF products so if you don't find it on our web site ask.

Visit our web site [www.ozeflight.com.au](http://www.ozeflight.com.au) for catalogue and secure on-line ordering.

Credit card facilities available (Visa, Master and Bankcard).

Contact us for all your electric sport flying requirements.



## Prop Torque..... September 2002

Don't Forget—Badges are available for sale. Price \$10.00 (incl. 2 stickers).

Contact Kerry, George or any Committee member if you require some.

Show your support and buy one.

### Coming Events



DATE	EVENT	DETAILS	TIME
Sep 29	Pattern Comp	NWAM	9:30am
<b>Oct 19</b>	<b>Thermal Glider (1)</b>	<b>LMAC</b>	<b>9:30am</b>
Oct 27	Glider Day	NWAM Don	9:30am
Nov 9	Scale Day 2	NWAM	9:30am
<b>Nov 16</b>	<b>7 Cell Electric Glider (2)</b>	<b>LMAC</b>	<b>9:30am</b>

“**BOLD**” text denotes LMAC events

Contests to be on the day specified. If weather is not suitable, then the next day, Sunday. If that too is not suitable then the event is cancelled and we move to the next contest scheduled.

“Club Day” is the first Saturday in each month.  
 “Cafe Symmons” will operate each Contest Day and Club Day.  
*(Please come along to both these events. These are important fund raising events for your club . Ed.)*

## **CHEAP CHEAP CHEAP**

### **T-34 MENTOR**

- 95% Assembled
  - Semi-scale aerobatic trainer
- perfect for beginners who have mastered the basics of flying

**WAS \$256.58**

**NOW ONLY \$189.95**

### **P-51 Mustang**

>90% assembled

Comes with pre-installed retracts with compartments fit for standard servos, pre-painted wing tips & cowling.

**Was \$456.85 Now \$290.00**

\*Limited stock for these great specials

### **Just Arrived:**

1 Litre Bottles of Nitro and Castor oil

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118 -120 Brisbane St  
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Email: [dleonard@birchalls.com.au](mailto:dleonard@birchalls.com.au)

# Candid Camera



Greg Robertson with his latest design Excel, the XL-10 Electric glider.

Kevin Hay doing some "damage control" to his Duster. Watched over very closely by his daughter Paige.



Mike Adams with his well presented twin electric Canadair.