*** VALLEY FLIER ***

NEWSLETTER OF THE LATROBE VALLEY MODEL AERO CLUB
(INCORPORATED IN VICTORIA. REGISTRATION NUMBER A0001822M)
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MAAA website is at www.maaa.asn.au

January 2020

COMING EVENTS :

WEDNESDAY	JANUARY 1	New Years day - No General meeting
SATURDAY	JANUARY 4	Indoor flying at Grey St School in Traralgon 2-5pm
SUNDAY	JANUARY 5	Club Flyday at LAKE NARRACAN
SUNDAY	JANUARY 12	General Flying at all sites
SATURDAY	JANUARY 18	Indoor flying at Grey St School in Traralgon 2-5pm
SUNDAY	JANUARY 19	General Flying at all sites
SUNDAY	JANUARY 26	General Flying at all sites (Floatplane Day)&(Australia Day)
SATURDAY	FEBRUARY 1	Indoor flying at Grey St School in Traralgon 2-5pm
SUNDAY	FEBRUARY 2	General flying at all sites
WEDNESDAY	FEBRUARY 5	Monthly Meeting at LV Airport after a Twi-Fly at Lake Narracan - 8.00pm start
SUNDAY	FEBRUARY 9	Club Flyday at LAKE NARRACAN & Combat Classic round 3 at 12.30pm
SATURDAY	FEBRUARY 15	Indoor flying at Grey St School in Traralgon 2-5pm
SUNDAY	FEBRUARY 16	General flying at all sites
SUNDAY	FEBRUARY 23	Col Cliff Memorial Trophy at Lake Narracan – 11.00am start.

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MEMBERSHIP & FEES: Membership for the 2019-2020 year is now underway and as of today we have 54 paid up members. Breakdown is 26 Senior, 15 Pensioners, 5 Associate, 3 Life & 5 Indoor only members.

Pressies Preamble,

Hi guys,

By now the fuzziness should have cleared and noise levels should be a lot more acceptable plus grand kids and or great grand kids would have been appeased and back in their parents environment, so now it's time to get the big boys toys out and enjoy what's left of your time off, if you are on holidays. The only drawback will probably be the weather, and with the extremes of wind and total fire bans being the norm for this time of year you will have to take every opportunity that presents itself.

The Club Christmas meal went down rather well (pardon the pun) with 30 members and partners tucking in with a few bevies to wash it down, the company was good the food was good but a bit lacking in socialising due to the club atmosphere rather than a totally private event as we have had in the past. Not to worry two out of three is not bad.

In closing I would like to wish everyone a Happy, Safe and Prosperous New Year and peace and tranquillity within the Club.

Cheers.....Chris.

Minutes of LVMAC General Meeting - December 2019

1 **Date:** - 4th December 2019

2 **Meeting Started at:** - 20:02 hrs

3 **Attendance:** -13 members. They were: - Ash Bence, Graeme Blackman, Geoff Bruerton, Bill Webb, Chris Davenport, Wayne Lewis, Mick Gunn, Brian Adams, Paul Mitchell, Rex Mitchell, Phil Mohr, Godwin Bugeja & Steve Tilley

4 **Apologies:** - Ian Partleton, Bill Reid, James Blackman & Stephen loft.

5 **Visitors:** - Nil

6 **New Members:** - None

7 **Confirm Minutes of the previous meeting held on 6th November 2019:** As per the Newsletter
Moved: Wayne Seconded: Rex Carried

8 **Business Arising from the Previous Meeting:-**
8.1 Club Rules – The Rules committee are still having discussions. A draft should be available in the near future. Wayne will send the draft out for comments when it's done.
8.2 The Bluerock Boat Trailer has been brought up to scratch and has now been registered and will be taken back to Bluerock after the floatplane day in January.
8.3 Christmas meal. – Chris reported that we had 39 names for the Christmas Meal at the Moe RSL on Sunday 1st December. Only 30 showed up which was a little disappointing. As far as I know everyone thought it was a good meal at a good venue.

9 **Flight Proficiency:** - Nil.

10 Correspondence in :

10.1 Email from Latrobe City confirming a booking for room 3 at the Moe Library on 20/11/19
10.2 Email from Graeme with modifications to the Draft Minutes (5/12/19)
10.3 Email from Dirk K to do with finding lost batteries at the fields (5/12/19)
10.4 Email from Mick Gunn with modifications to The Draft Minutes (17/11/19)
10.5 Email from VMAA Secretary – Instructors course at P&DARCS & NFG (19/11/19)
10.6 Email from Dirk K requesting a donation to John Patrick (20/11/19)
10.7 Email from VMAA Secretary – VMAA November GM Minutes (21/11/19)
10.8 Email from Dirk K requesting a replacement tarp for the Warragul Mower (19/11/19)
10.9 Email form Latrobe City about a new system –"Grant Guru" (27/11/19)
10.10 Email from :Latrobe City re- Acquittal form due 15th December (1/12/19)
10.11 Email request for a display at a Scouting Event at Lardner Park 21 to 23 February'20 (1/12/19)

11 Correspondence Out :

11.1 Draft November GM minutes to Committee (8/11/19)
11.2 Email to Latrobe City to book room 3 at the Moe Library for a Committee meeting (8/11/19)
11.3 Final November GM Minutes to committee & reminder of meeting (17/11/19)
11.4 Meeting Minutes 20th November to Committee. (27/11/19)
11.5 Valley Flier Newsletter to members &VMAA Secretary (28/11/19)
Moved: Wayne Seconded: Ash Carried

12 Business Arising From the Correspondence:

12.1 Mick Gunn started a discussion regarding what is correspondence in as he thinks that his emails should not be included as "correspondence in" as it was a reply to club internal emails regarding the draft minutes that Wayne had sent out that needed modifying.
The discussion was "does all internal emails constitute correspondence in or just what I sent"!
The discussion lasted several minutes with Wayne stating that as the new secretary he was doing things differently and thought he was just being efficient, so was including all emails in as correspondence in. Wayne also said the throwaway line if you don't like the job I am doing as Secretary I will resign and hand it to you.(Mick) Wayne said he will try not to be so efficient and these emails will not be included in the future !

12.2 Lost Batteries - Wayne read out a letter from Dirk Kurpershoek about lost batteries at the fields and the procedure to find them. Lost Lipo's are a potential fire hazard and every effort to retrieve them must be made at the time of the loss. There was some discussion on the matter and a note is to be put into the next newsletter with a suggestion the batteries should be fixed into models so they cannot come out during flight. All lost batteries should be reported and an extensive search made to retrieve any lost batteries. If the battery is not found, there should be a written report on how, when, where, why, who was involved and what effort was made to find it.

12.3 Latrobe City Acquittal form for the LN Container – The meeting Authorised Eric to finish off the Electronic paperwork on the New LN Container as he started it and has all the required information. The form is due by 15th December and will be done this week.

13 Treasurer's Report: The treasurer tabled the monthly report for November 2019:-

Financial Statement:

Previous Balance 30/10/20: -	$	5,457.79
Income: -	$	20.00
Expenditure: -	$	223.63
Available funds 30/11/19: -	$	5254.16
Commonwealth Bank Term Deposit: -	$	47,434.03
Bendigo Bank Term Deposit: -	$	5,093.90
Term Deposits total:-	$	52,527.93
Petty Cash in hand:-	$	16.83

The Bendigo Bank Term Deposit was renewed on 26/11/19 and was rolled for 3 months at 1.45%.

The Treasurer moved that the report be accepted**.** Seconded by Brian and carried.

14 Lake Narracan Committee: - nothing to report.

15 Relocation Update: - Static and ongoing.

16 Safety: - No reports

17 General Business:

17.1 Donation to John Patrick for use of his land at Warragul - The meeting authorized Dirk K to give a $100 donation from the Club.

17.2 Replacement Tarp for the Warragul mower – The meeting authorized Dirk K to purchase another Tarp. It was suggested a bigger tarp folded and possibly silver rather than a blue one.

17.3 The meeting authorized reimbursement to Steve Tilley for expenses to do with the mowing and upkeep at the Bluerock site. Steve to supply receipts.

17.4 A suggestion was made to change the starting time for Nitro, Petrol & noisy Electrics on Saturday mornings to 8.00am instead of 9.00am There were not many members in favor of this suggestion however, Graeme B is going to speak to the EPA and see what they think.

Action - Graeme

17.5 Graeme B suggested that we should start having syllabus items at the meetings again. Everyone thought that was a good idea so if YOU have some expertise in doing something to do with modeling please put your hand up and we will put it in the program. Some suggestions were foam wing cutting, vacuum forming, batteries, covering, special tools & engine tuning.

Action – All Club Members

17.6 Graeme B mentioned that the Bracken Fern and Tea Tree at No Pine is a problem. The Gate is too small to get any sort of plant in there to do something so Graeme is going to approach the lease holder (Andrew) and see if we can put a bigger gate in as well as leaving the small gate for normal access. Bill Web said he could supply a bent 10'gate. Once that is sorted we may be able to get a tractor or bulldozer to do some clearing.

Action – Graeme

17.7 Bill Webb commented on the handwash pump not working in the LN Dunny. There was a dead mouse stuck in it years ago and we couldn't get access to replace or unblock the lines so it's not working. Hands can be washed at the tank.

18 Bent Wheel Award: - There were no nominations this month.

19 Bomb Award :- There were 2 nominations this month

a. Wayne for crashing the Club Walrus when doing a loop too low.
b. Steve Tilley for sending an apology text to a home phone number instead of a mobile. On a previous occasion Steve had tried to send photo's the same way !

The Winner is Wayne

20 Show & Tell: -

20.1 Graeme showed a 60 Sportster from a Tony Cincotta kit that is ready to cover. Balsa model with foam sheeted wing and turtledeck. Phil Mohr purchased the model.

20.2 Phil Mohr spoke about looking for "Pilot Kits"on Ebay for the last 5 years. He has a bought a couple already and has just bought one from America which is an Attacker 28. Phil thinks there may be issues with the postage as he had to get a 3rd party involvement, so it will be interesting to see the result. The Pilot Models factory in America burnt down many years ago.

20.3 Rex Mitchell spoke about an incident with his OS .46 powered Beagle. It did some unusual things with the throttle in flight and went off the air on touchdown and only the nose wheel was damaged. The problem was found to be a broken wire in the switch. A very lucky result for Rex on this one !

20.4 Chris showed some motors that are for sale and have come from Mike Young's collection.

There was a Mills .75cc, an OS H.40, an OS.19 and an AP.15. Chris also had some socket head servo screws for sale at $25.00 for a packet of 25 screws and 25 washers.

21 **Program Dates:** - as per the yearly program.

21.1 Club Sausage Sizzle day on Sunday with the Combat Classic round 2 at 12.30

21.2 Club Floatfly Event on the Australia Day Sunday – 26th January

21.3 Graeme noted that there is no Indoor Flying on Saturday 21st December

22 The next General Meeting is scheduled for the Wednesday 5th February 2020 at 8.00pm.

23 **Meeting Closed:** 9.25 pm.

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http://www.maaa.asn.au/images/pdfs/forms/Form-016-POWER-BRONZE-SILVER-WINGS.pdf

http://www.maaa.asn.au/images/pdfs/forms/Form-017-POWER-GOLD-WINGS.pdf

http://u.b5z.net/i/u/10194601/f/Flight_Intruc/Part_5_5_-_Description_of_Gold_Wings_Manoeuvres.pdf
(read in conjunction with the MAAA Bronze, Silver & gold Wings Sheet as there are manoeuvres that we do not do, included in this pdf)

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INDOOR REPORT 7th December 2019

Apologies were received from Mike and Jason

Gary had a World War I day with his Sopwiths and Fokkers while still airing the Canards and Spacewalkers

Mal had his Tello and the JJRC - X11.

Geoff had a 1st – First ducted fan to fly at our indoors!! He managed to get a Sabre look alike with a 2S powered ducted fan to get around the hall. He also had a collection of homebuilts and a Microstick

Ash had a day on the ground deciding to give Wayne a good selection of pics to choose from for the Newsletter. He still provided the coffee and bikkies

Bob was keen to get back flying after the scroll saw duties and had a Mavic Mini JJRC CX11 and the Tello. He also raced around with the Dash EV Buggy.

James had a busy day flying with the Extra, Yak 54 and Spacewalker.

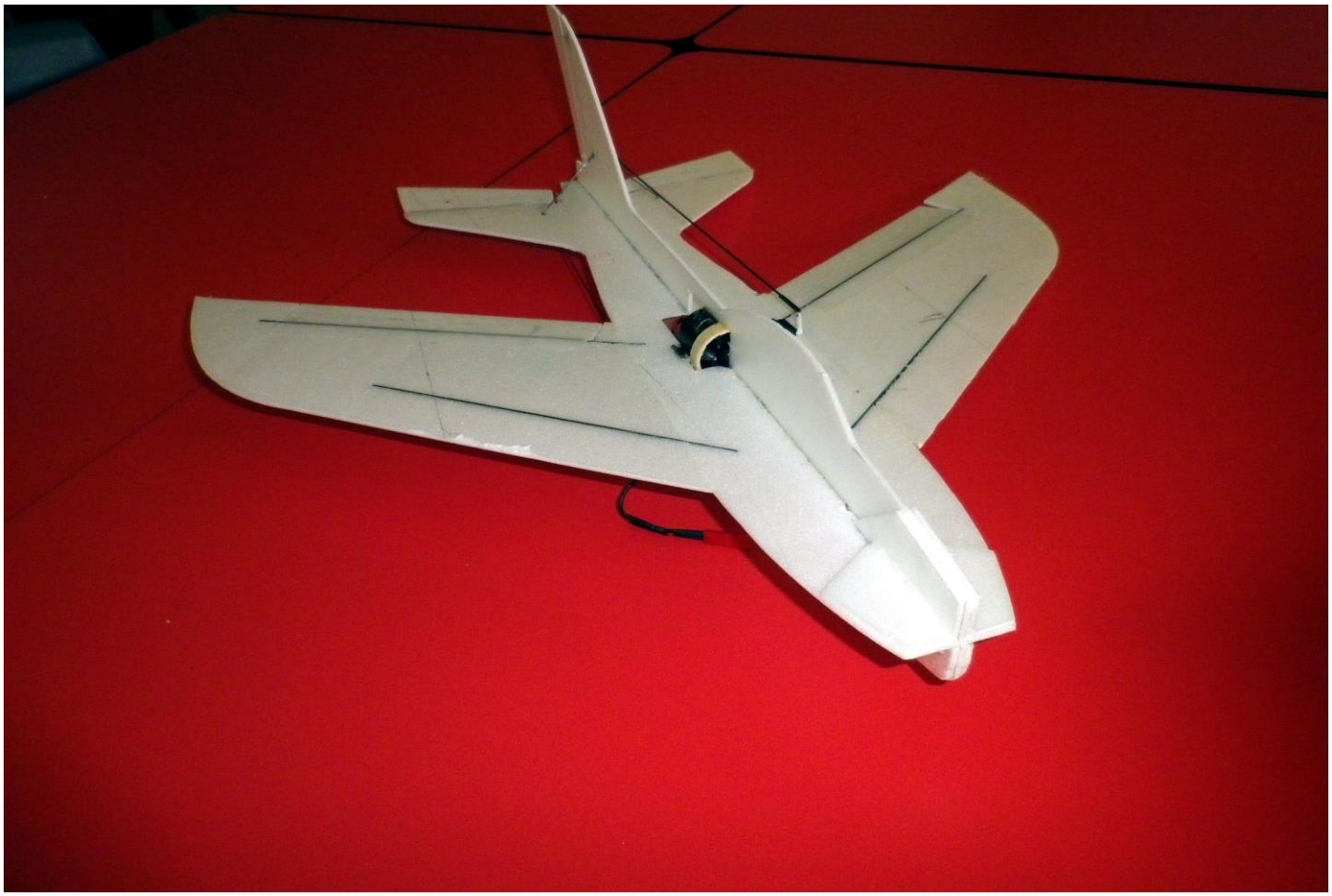
Fred again had the Skybugs and Spacewalker but he had plenty of chat time with lots of info to pass on.

Graeme flew the Skybug but mainly did repairs for the day.

Due to the Hall floor being resealed and needing a week to dry there was no other flyday in December but we will be back there on January 4th.

I would like to thank all indoor flyers for attending during our flydays in 2019 and to let them know how much their comradeship and assistance has been appreciated.

If it was not for your efforts to turn up and your great friendships, our skills would not have improved and without all the chats we have, imagine the information on our hobby and environment we would have missed!!



Above – Geoff Bruerton's indoor ducted fan Below -

Lost Batteries – You would have read in the minutes about lost batteries at the fields and this is a reminder that lost Lipo's are a potential fire hazard and every effort should be made to the time of the loss. There was some discussion on the matter and this reminder was to be put in the newsletter.

The main suggestion was that the batteries should be fixed into models so they cannot come out during flight and therefore would not be lost. If the battery is lost due to a crash and an extensive search cannot find the battery it should be reported to the committee and there should be a written report on how, when, where, why, who was involved and what effort was made to find it. This would be to cover ourselves should some incident occur at a later date.

The main problem with batteries would be batteries catching fire in a crash so make sure you always have a fire extinguisher handy !

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Club Flyday - Sunday 8/12/19 at Lake Narracan

At last a decent day for flying ! It was a great day and 15 members and 4 wives attended. Those flying made good use of the perfect conditions and it was warm and sunny with some cloud moving through at times and the wind was a light Easterly that got up to 10km/h after lunch. The windsock had really thrashed itself to death over the last windy weeks and a new windsock was put up.

Linton McPhail was there with his 6yo Grandson, Logan and flew his Phoenix 2000 Glider and a smaller Super Kinetic Glider. There was quite a bit of lift around so Linton was having long flights without using much battery power.

Glen Neal flew an EDF powered flying Wing Jet for the first time and it needed a small packer under the motor to get it flying straight and level. Glen also flew his electric Sparkler.

Wayne Lewis flew his S1500 Stick, 2 electric Gunnfighters, the Sabre Gunny and gave Paul O a few flights on the Club Walrus on Buddy Box. Unfortunately the Walrus went off the air and went vertically into the drain.

Barry Medd flew his Apprentice and Mini Apprentice and I think they both have the SAFE technology.

Chris Davenport Flew his Phoenix 2000 glider, the Tundra and the Skipper of the grass and then flew the Nexstar on which the engine

Eric Spratt flew his CrazE Wing, his S1500 Stick, another homebuilt stick and that all went well. He tried to fly his Klingberg wing but that didn't go well. The wing flies well once airborne but isn't the easiest to launch and that's where the model failed on this occasion.

Paul Mitchell flew a new Sbach 342 with an OS55AX engine pulling it around and this Phoenix Model flew very nicely. Paul was very happy with it. Paul also flew his FunCub and gave Paul O a flight on the buddybox. Paul also assisted with the Sausage Sizzle Lunch.

Rex Mitchell flew his OS46AX powered Escape, his Spitfire and an electric foam Super Cub

Paul O'Bryan had 2½ flights on the Club Walrus until it went off the air and crashed. He has been doing well so he then had a go on Lofty's S1500 Stick, keeping up high as there was no buddybox and he then had a flight with Paul M on buddybox with the FunCub.

Geof Bruerton had a car full of electrics. The Pawnee, the Pixie Major, a small Sky the Elephant Biplane, a Fokker triplane, the Lancaster with a dolly that wouldn't run straight on the ground so the model didn't get to fly on this day,

Ian Partleton had his S1500 Stick and had an engine failure on take off with his 30cc powered Ultimate Biplane and it was only slightly damaged but wasn't flown again on this day.

Godwin Bugeja flew his Liddle Stick with an OS40FSR engine and his ASN electric Glider and also flew his Tundra off the Lake.

Brian Adams flew his FunCub on floats off the lake and his OS55AX powered Calmato low wing model and had 3 SPADS in the car for the combat

Stephen Loft flew his S1500 Stick and let Paul O have a go on the sticks of this model and Paul did very well. Lofty also flew his Great Planes Stik and ass9isted with the Sausage Sizzle lunch.

Bill Webb arrived for a social visit and wasn't feeling too well so didn't stay for long. He didn't even want a Snag !

We also had Ian's wife Robyn, Lofty's wife Patrina, Godwin's wife Julie & Rex's wife Theresa having a look at the days activities. It not very often these day we see wives at the these days field !

Thanks to Lofty, Patrina & Paul for doing the Sausage Sizzle Lunch

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Above – Pauls Sbach 342 with an OS55AX engine

Above – Godwin and Brian had these floaties on the Lake

Don’t forget if you use the rescue boats you must wear a PDF or life Jacket

Above – Glen and his Ducted Fan Combat Wing

Combat Classic Event 2

It was disappointing that only 3 members took place in this event but because of the excellent conditions it was decided to go ahead and fly with 3. Wayne and Ian were flying Gunnfighters and Brian was flying a SPAD. (made from coreflute)
Round 1 saw Wayne get a cut on Brian and there was some real action in this round.
Round 2 saw no cuts and a few close calls and then Ian's gunny went off the air and crashed. Ian had no backup so was out.
Round 3 saw Brian cut off half of Wayne's streamer and 30 seconds later cut the rest of Wayne's streamer.
Round 4 was quite furious but with only 2 models it was hard to get a cut and there were no cuts.
Final scores were…… **Brian first on 850 points**
Wayne second on 800 points .
Ian third with 430 points.

Overall Points with 1 Event still to be run ……

Wayne	1550
Ian	860
Mick	850
Brian	850
Dave	800

Wayne & Ian are the only ones to run in the 2 events

The Next Combat Classic Event in programmed for Sunday 9th February 2020 at 12.30pm

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Brian, Ian, Wayne and Chloe just had to get herself in the pic

Club Stickers & stuff……

Wayne now has some large club stickers that go on the inside of glass windows and they are for sale at $2.00ea. He also has the new Club Cloth Badges for Sale, at $8.00 each, Metal Badges for $5.00 each and White Stickers for .50 cents each and Club Caps @ $15.00 .

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As we move into the warmer weather :

No flying on Days of Total Fireban in the West and South Gippsland District.
First on scene at Lake Narracan please open the Container so that the Fire Extinguishers are available.

Current Fuel Situation –

If you need Nitro Fuel See Roy who is keeping some 4 lt bottles of 10% fuel in the Container. Failing that, you will need to get it from Toyworld in Traralgon. Toyworld has given us a good price for buying in bulk so 10% nitro is $40 for 4 lts. That's $10 off RRP.

So you will need to plan ahead. Don't let yourself run out as there may be a time when there is no fuel available at the field.
Remember to take your Club ID card to Toyworld Traralgon and get you 10% discount.

The price may be going up in the next batch that Roy gets !

Sausage Sizzle Roster…… It was decided that we should have a Sausage Sizzle Roster for our Club Flydays. Following is the roster so have a look and if the dates don't suit you please contact Wayne ASAP. Hopefully you will get a reminder in the preceding newsletter and possibly an email reminder on the Friday before. If you can't make it it's up to you to find a replacement to swap with

5th January 20		Wayne Lewis	Eric Spratt
9th February 20		Ivan Walker	Ian Partleton
8th March 20		Dave Lewis	Mick Gunn
5th April 20		Rex Mitchell	Paul Mitchell
10th May 20	Mothers Day	Sausage Sizzle ??	
7th June 20		Glen Neal	Bill Reid
5th July 20		Geoff Bruerton	Ian Heafield
9th August 20		Brian Adams	Stephen Loft
6th September 20	Fathers Day	Sausage Sizzle ??	
11th October 20		Dave Theideman	Julian Zhu
8th November 20		Godwin Bugeja	Godwin Bugeja
6th December 20		Roy White	Linton McPhail

As you can see above both Mothers Day and Fathers day are on club flydays. The Meeting will need to decide whether we should change these sausage sizzle days to the week before, week after or not have them at all..

Warragul Christmas Gift

A number of LVMAC members enjoy using the Warragul field. This is located on a farm property owned by John and Shirely Patrick. John makes his living raising beef cattle so every now and again we have to put up with extra hazards on the strip - hooves taking divots out, cattle on the strip and on one occasion even a hay bale.

John is a nice guy and lets us use his land for no cost. It has become our practice to chip in and buy John and Shirley a little something for Christmas. Now as John and Shirley are not drinkers or have a particularly sweet tooth, we have settled on nuts of which both are particularly fond.

In the past when quizzed on what he would like for Christmas John in true farmer style replied "hay". So he got an assortment of chocolate coated nuts instead. Nevertheless this got us thinking that John does indeed lose out on us having a strip on his land. Being mowed regularly it does not provide grass for either grazing or baling.

So this year we dug a little deeper and with the support of LVMAC splurged $50 on a Christmas card and a significant selection of nuts and $170 toward lost production.

Left picture - Dirk Kurpershoek presenting the cash part of the donation to Shirley Patrick. The Club put in $100 and the Warragul flyers put in another $120.

There is no January General Meeting

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Propeller Basics

The majority of powered model airplanes use a propeller as part of their power system, and electric models are no exception. Some models use a ducted fan to simulate jet flight, and some even use propane or kerosene powered turbines (real jet engines). There are also a very few models that use flapping wings as a source of motive power (known as ornithopters). However, propellers are still the most efficient way to power a model.

What Does a Propeller Do?

In short, a propeller moves air. It converts the torque of its power source (a motor or engine) into thrust, and the rotational speed (rpm) into linear speed. The combination of an electric motor and a propeller turns current (Amps) into thrust and voltage into speed.

There are two values that express the most important characteristics of all propellers: diameter and pitch. The diameter is really the diameter of the circle in which the propeller rotates. This corresponds to twice the distance from the center of the propeller hub to the tip of one blade (for a propeller with an even number of blades, that's just the distance from tip to opposite tip).

Slicing the end off of a propeller blade reveals an airfoil just like that found on a wing. Different propellers use different airfoils. Some modern electric flight propellers have undercambered airfoils. This glow propeller has a flat-bottomed airfoil.

The pitch is a measure of how far the propeller would move forwards in one revolution if it were treated as a screw and screwed into some solid material.

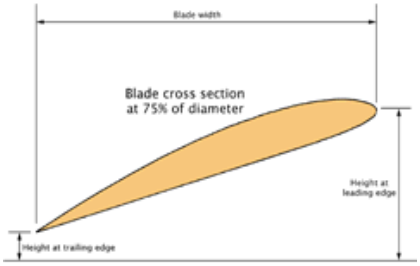
Although the measure of pitch treats the propeller as if it were a screw, one shouldn't think of it as an airscrew (the name of a certain model airplane prop manufacturer notwithstanding). It is really a rotating wing, and if you were to take a propeller and slice it across the blade, you'd see a typical airfoil cross-section.

The size of a propeller is usually expressed in the form *diameter* x *pitch*. For example, an 8×4 propeller has an 8 inch diameter and 4 inch pitch.

As a very rough approximation, the diameter of the propeller controls the thrust produced, and the pitch controls the speed of the air leaving the back of the propeller. In reality, pitch also affects thrust somewhat, but thinking of the two separately helps to envision how propeller changes will affect performance.

Measuring Pitch

Most propellers are labeled with their pitch and diameter, but it is possible to determine both given an umarked prop. The diameter is straightforward to measure of course.



Measurements needed to determine the pitch of a propeller should be taken 3/4 of the way from the hub to the tip.

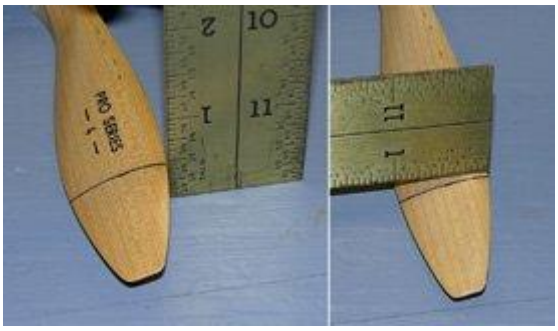
To measure the pitch, lay the propeller flat on a table, measure 75% of the way from the hub to the tip, and draw a line across the propeller blade. Measure the width of the blade at this point, along the surface of the table (i.e. the width of the blade's shadow if there were a light on the ceiling overhead). Next, measure the height of the front and the back of the blade, and compute the difference between these two to determine the height.

The pitch is then given by the formula:

$$pitch = 2.36\ diameter\ height/width$$

There's nothing magical about the number 2.36; it's just 75% of π (pi), because we're measuring pitch at the 75% diameter mark.

The reason we measure pitch at 75% of the diameter is two-fold. Generally, the pitch of a propeller is not completely constant, varying somewhat from hub to tip to optimize it for the different linear speeds at each point along the blade. The pitch at 75% corresponds roughly to the average effective pitch of the propeller. Secondly, the propeller is sufficiently wide at 75% to allow one to get reasonably accurate measurements of blade width and height.



Measuring the pitch of a propeller is easily done on a flat surface with an accurate ruler.

Power Requirements

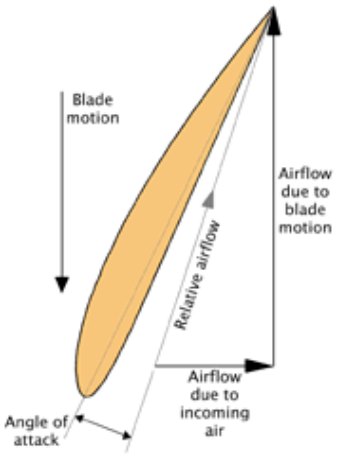
Both pitch and diameter affect how much output power the motor must produce to turn the propeller at a given rpm. The following equation shows the relationship between motor output power (also called shaft power, or propeller input power), rpm, pitch, and diameter:

$$power = k\ rpm^3\ diameter^4\ pitch$$

The factor *k* depends on the units used to express power, pitch, and diameter, and also on characteristics of the propeller such as the airfoil it uses, its overall shape, thickness, and so on. For power in Watts, and diameter and pitch in inches, *k* is about 5.3×10^{-15} for an average model airplane propeller.
This formula tells us a number of things. First, it tells us that rpm is not directly proportional to power. Doubling the shaft power and keeping pitch and diameter the same will only increase rpm by a factor of 1.26 (the cube root of 2).
It also tells us that increasing the pitch slightly will increase the power requirements slightly, whereas a slight increase in diameter will result in a dramatic increase in power needed to maintain the same rpm. For example, going from a 10 inch propeller to an 11 inch propeller of the same pitch would require 1.46 times the power to maintain the same rpm (11/10 to the fourth power). Or, if the shaft power were kept the same, the rpm would drop to 88% of what it was (the reciprocal of the cube root of 1.46 from the previous result).
The fact that pitch affects power requirements only slightly is very important, because it means that we can make small changes in pitch to improve model performance without having to worry too much about increasing current. For example, if we have a model with a 10×7 prop that has good take-off and climb performance, but poor high-speed performance, we can switch to a 10×8 prop and only increase power required by about 14%. Assuming the motor is near its maximum efficiency point, current will also increase by about 14%, say from 25A to 29A. Larger changes in pitch should be accompanied by a slight reduction in diameter to keep the current levels reasonable.
In practice, changing from one propeller to another will change both the rpm and the power. This is because changing the load on a motor shaft will change the rpm, which will change the power required, which will change the rpm, and so on. The motor and propeller combination will find a new operating point at which the shaft power produced equals the propeller input power required. Next month, I'll talk about how motor output power is related to input voltage, current, and rpm, and how this can be mathematically connected to the propeller formula above to predict what will actually happen.

Airflow

As was mentioned earlier, a propeller is really a rotating wing, and as such, is subject to the same aerodynamic effects as a wing. As a propeller rotates, the blades meet the oncoming air. The angle at which this happens is a function of how fast the air is moving towards the propeller and how fast the propeller is turning. If the air were stationary, the angle of attack of a given section of the blade would be exactly equal to the blade angle at that point.



The relative angle of attack of the airflow to the propeller blade depends on the rotational speed of the blade, and the speed of the incoming air flow.

In reality, the air is not stationary, even if the plane is not moving, because the air accelerates before it reaches the propeller. As a result, from the blade's point of view, the air is meeting it at some relatively low angle, which is the blade's angle of attack.
Like any wing, a propeller blade can stall if the angle of attack is too high. This can happen with a very highly pitched blade when moving at too low an airspeed. It is for this reason that high pitch propellers, like a 10×9 or 12×12 often exhibit poor performance at low airspeeds. A plane equipped with such a propeller will often exhibit poor launch or take-off performance, and then come alive once the model is up to speed.
Also like a wing, if the angle is too low, no lift will be produced. A low pitched propeller on a fast plane (for example, 8×3, 12×5, etc.) can get to the point where it produces no thrust (in a dive, when gravity is providing the force to keep the plane moving). In high speed level flight, thrust from such a propeller can drop too low to overcome drag long before the plane has reached its designed flying speed. According to Astroflight's Bob

Boucher, such propellers should be relegated to stirring paint. Of course, this statement was made in the days before slow-flyer models, which often sport very large low pitch props.
For many aircraft, a good compromise is a propeller with a diameter to pitch ratio of about 3:2 or 4:3 (for example, 8×6, 9×6, 10×7, 11×8, 12×8, 12×9, and so on). Such a propeller will become unstalled at relatively low airspeeds (usually below the model's stall speed), and will remain efficient at relatively high flying speeds.
In many full scale aircraft, the propeller has in-flight adjustable pitch, so that it can have a low pitch for maximum take-off thrust, and a higher pitch for optimal cruising efficiency. Some small full-scale aircraft can be fitted with one of three different propellers depending on the need at the time: low pitch for getting heavy loads off the ground but slow cruising, standard for general use, or high pitch for light loads but fast cruising.

Three or More Blades

Most model propellers have only two blades because a two bladed propeller is generally more efficient than a larger propeller that produces the same thrust and air speed. A common misconception is that this is due to the blades operating in each others' wakes, but this is only a small factor. Remember that the air in which the propeller is turning is moving away from the back of the propeller, so the wake from each blade will move backwards too, leaving clean air for the next blade to bite into. A reasonably pitched propeller would have to have a large number of blades before they start interfering with each others' air.
That being said however, a multi-bladed prop does have more induced drag caused by tip vortices (air spilling over the blade tips, just like wingtip vortices on a wing), because there are more tips. So, overall efficiency is lower, in much the same way that a biplane (even one without struts and bracing wires) is less efficient than a monoplane with the same wing area. A multi-bladed prop often has a larger total blade surface area than the equivalent larger two-bladed prop, further reducing efficiency (due to parasite drag).

For best performance, reduced noise, and increased motor life, all propellers should be balanced before use. I use a Top Flite magnetic balancer, which due to its nearly frictionless bearings, will show even the slightest imbalance.

Multi-bladed propellers do have the ability to turn power into thrust and airspeed in less space than a larger two-bladed prop though, which makes them advantageous when ground clearance is an issue (or fuselage clearance for wing or pylon mounted propellers).

Practical Considerations – Balancing

As electric flyers, balancing a propeller is very important. It's important on glow powered models too, but the result of an unbalanced propeller is a lot less apparent, due to the noise and vibration of the engine. On an electric model, an unbalanced propeller is far noisier than a balanced one. Furthermore, an unbalanced propeller wastes power, because it is putting a sideways force on the motor shaft, pushing it against one side of the bearing. It also can also cause the shaft to bend somewhat, which means the motor armature (in a direct drive application) runs off-center, further reducing efficiency.
I use a Top Flite magnetic balancer, and sand material off the back side of the heavy blade as close to the tip as possible (the further from the center you remove material, the less you will have to remove). One of my direct drive models which sounds like a glow model when flown with an unbalanced prop, becomes inaudible at 200 feet when flown with a well balanced prop of the same brand.

Making It Turn

A propeller with no source of power is useless, so next month we'll look at how an electric motor interacts with the propeller to convert electric power to the form that we need it for flight, namely thrust and airspeed.

Thanks to Eric for supplying this write up.

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Special Event Dates to remember for the next 2 months ……
With the better weather come more events !

Check out the VMAA & MAAA websites for more info on other club events.

Australia Day and Floatplane Day at Lake Narracan Sunday 26th January

Many Thanks to those who have contributed to the newsletter with articles, Pictures and information. Ash, Graeme and Chris in particular for their monthly contributions.

HAPPY NEW YEAR

TO ALL FROM THE

LATROBE VALLEY MODEL AERO

CLUB COMMITTEE.

LETS HOPE 2020

IS A GOOD YEAR FOR US ALL.