

# Newsletter

**November 2006 Edition**

**Next Meeting**  
**Monday 20/11/2006**  
**AT THE CLUBHOUSE,**  
**8:00pm SHARP**



## Next Club Meeting

**8:00pm Monday the 20th of November at the clubhouse**

On the agenda:-

- Show and Tell, bring your model along.
- Pizzas, soft drink, tea & coffee provided.
- Discuss Christmas Function
- Discuss electric Fun Day

**Electric Fun Day for Club members  
Saturday 2nd of December 2pm-5pm**

Weather permitting or else 9th or 16th of December

For more details check DAC web page [www.dac.org.au](http://www.dac.org.au) or Club notice board

**Planned Events:-**

- Precision Touch & Goes (plane with under carriage)
- Limbo (robust plane, eg ME163)
- Pylons course (any plane)
- Cut the ribbon (robust plane, eg ME163)
- Two minute flights (any plane)
- Balloon popping (robust plane, eg ME163)
- Slowest flight (any plane requires release hock)
- Precision Bomb drop using Vortex Nerf ball (plane requires a release hock)
- and more...

All club members welcome. Electric planes only.

Safety - Think it, Talk it, Fly it. (Also must have fun.....)

## O S Engines 70<sup>th</sup> Anniversary Fly-In

### Artical by Knobby Clarke

On Sunday 29<sup>th</sup> October 2006, P&DARCS hosted a Fly-In to mark the 70<sup>th</sup> Anniversary of the founding of O S Engines. I got to their airfield near Cardinia at about 9:15am to discover that registration was already well underway. P&DARCS kept a tight control over parking which was to everyone's advantage. You dropped off your model close to the pits and then took your car away to the parking area where marshals directed you to park in orderly and well-spaced lines. Our President, Cliff McIver, was already registered and David Law arrived shortly after I did. Cliff had brought a couple of aerobatic models, David had his Ultimate Biplane and, of course, I had my battered old Sky Raider Mach 1 trainer. We were part of about a hundred registered pilots and most people seemed to have brought at least one model so the pits were very crowded. I'd like to say that the organisation of the transmitter pound was excellent because the two P&DARCS members who manned it all day worked hard and cheerfully in the face of a huge demand. Every pilot was provided with a numbered tabard and the same number was used to find your transmitter in the pound. You only got to touch a transmitter once your key was safely in the slot on the frequency board. If you wanted a frequency that was occupied, you asked for your key to be hung on the waiting list for that frequency. Regrettably, I did observe one occasion where someone had his key hung on the waiting list for the wrong frequency. I took Cliff's advice and politely but firmly insisted on getting personal visual confirmation that my key was always in the right place.

I think every sort of model that might conceivably use an OS Engine was represented. There were scale models from every era, a few pattern and fun-fly models, pylon racers, ducted fans and some magnificent multi-engined projects. The flight line was organised by a marshal who told you when you could take-off and made certain that the whole flight-line knew when a landing was being attempted. This worked very well and avoided crisis situations even though there were six aircraft on the circuit throughout the bulk of the day. There was no formal competition and little evidence of rivalry. It was simply a matter that everyone flew the manoeuvres of which they were capable. This meant that Cliff did knife-edge take-offs, David did great chunks out of the pattern schedule and I try to fly tidy rectangular circuits enlivened by the occasional loop. I found doing circuits with a mixed bag of models that might include a ducted fan Sabre doing high-speed passes, a fun-fly doing aerobatics and a Puss Moth doing vry slow circuits an interesting challenge.

Natural selection seemed to weed out those "whose faith was greater than their ability" so that the seemingly inevitable crashes were all over early on. I am delighted to be able to say that those from Doncaster were not among them (though Cliff tried hard with a "dead stick" at the end of his first flight. What's that again about never using more than half the tank?).

No one else seemed to want to use Cliff's frequency so by lunchtime he pronounced himself "flown out". By contrast there was always a queue of four keys waiting for 36.430 which is the channel David and I share. I took David's advice and placed myself back on the waiting queue as soon as I landed. The situation was not improved when the team from Keilor set up to fly their scale Tupolev TB3 "aircraft carrier". This model was described in RCMN magazine issue 73 so I won't go into the detail here. Suffice it to say that it takes a long time to get its four main engines started and all the while the team is blocking a channel for the carrier aircraft and two more channels for

the little fighters. Nevertheless, they persevered, took off, launched the fighters, amused the appreciative crowd and took out the prize for best pilot / aircraft. There was a similar pause in general flying while the Liberator bomber took to the sky, though as the aircraft climbed out one wag was heard comment “All right so far, I want to see him land it without wiping off the undercart”. Probably because the gear was never retracted, the Liberator was guided through a series of low passes and then landed without incident.

After lunch, Ron Snell turned up with his Fairchild PT 24 which was duly put through its paces and Cliff seemed unable to resist the temptation for “just one more flight”. The main prize, a five-cylinder OS Sirius radial engine, was drawn at about 3:30pm. The fact that all the prizes were won by members of the team from Keilor sparked a number of conspiracy theories but it seemed that they were just numerous and lucky. In any case, no one seemed to care very much. We had all spent a wonderful day being part of the amazingly rich diversity of the hobby we call aeromodelling. Personally, I was very satisfied to be part of the demonstration that the Doncaster Club embraces not only some of the hobby’s finest exponents, but also those with less ability who just want to participate in safety.

As I drove away a little before 4:00pm our “flown out” President was having “just one more flight”.



# Aerodynamics of Delta Wings

## Artical by Knobby Clarke

Sixty years ago the advantages of the delta wing form for transonic and supersonic flight were relatively well understood. However, little was known about the low-speed handling characteristics of delta wings designed for use at high speed. Avro's design for what was to become the Avro Vulcan bomber used a delta wing and there was concern that it might be difficult to land. To investigate the low-speed characteristics of the delta wing, Avro built the type 707, a single-engined, single-seater scale model of the Vulcan. You can see one of the few examples of this aircraft in the RAAF Museum at Point Cook. As it transpired, the Vulcan had famously excellent handling characteristics. I can personally recall seeing the Vulcan rolled and looped at the Farnborough Airshow in the mid-1950s. It was said that the correct procedure for landing was to slow down, place the aircraft over the runway threshold at 50 feet, close the throttle and take hands and feet off the controls. The Vulcan would assume an increasing angle of attack and settle quietly on to the runway.

Why is this so? What is special about delta wings that makes them essentially stall-proof?

We are all familiar with the stalling characteristics of aerofoils. As the angle of attack is increased the lift increases until finally the flow on the upper surface of the wing breaks down. This is the stall point.

This analysis, which was the basis for all the NACA testing of aerofoil sections done in the 1930s, is two-dimensional. It assumes that the wing extends infinitely along its span. Of course, real wings do not have an infinite span, but for medium to high aspect ratios ignoring the tip effects does not cause significant errors. We all know from practical experience that real model wings do behave pretty much as the two-dimensional theory predicts. The induced drag is close to that predicted by considering the change in momentum of the air flow as it passes over the aerofoil section.

However, there is another component of the induced drag. The air on the underside of the wing surface is at a higher pressure than the air on the topside. At the wing tip, this potential energy gets dissipated in a vortex. You can often see this effect on full-sized aircraft in conditions of high humidity when the vortex is visible as a cloud trail extending back from the wing tip. Designers of conventional wings try to minimise this vortex and so reduce the induced drag. Clearly a high-aspect ratio wing has less of its span subject to tip effects and so has less induced drag. This is why high-aspect ratios are popular on gliders. It was also known by the 1930s that an elliptical planform gives the theoretical minimum induced drag, which is why Roy Mitchell used it for the Supermarine Spitfire.

In the delta planform, the wing has a very low aspect ratio. It is really one big wingtip. How does this behave as the speed slows and the angle of attack is increased? Initially, the

conventional two-dimensional analysis holds good and the lift increases with the angle of attack. Then comes the serendipity. When the airflow begins to separate, the tip effect forms it into a stable vortex over the top surface of the wing. Because of the circulation in the vortex, the air pressure in it is lower than it would otherwise be. This gives lower pressure over the top surface of the wing, which gives lift. The result of this phenomenon is that the delta wing continues to give large lift values at high angles of attack.

The First Law of Thermodynamics tells us that you only get what you pay for. The work required to sustain the vortex must be supplied by the force that drags the wing through the air. Phrased another way, the presence of the vortex causes increased induced drag. This means that as the angle of attack of a delta wing is increased the lift increases, but so does the drag. On balance, this is a good thing for landings and serves to explain the agreeably docile landing characteristics of the Avro Vulcan. The disadvantage appears in tight turns. The high-lift characteristics make it possible to turn the aircraft tightly, which is excellent as a combat manoeuvre. However, the disadvantage is the increased drag which tends to bleed off the speed. Most fighter pilots regard speed as a valued commodity which they are loath to lose. This may explain the tendency away from pure delta planforms in modern fighter aircraft design. In models, this effect is responsible for the known tendency of delta wings to spiral dive when placed in very tight turns.

In model sizes, what is the balance of advantages and disadvantages? The planform gives a high wing area for a given span. For example, a 48 in span delta with clipped wing tips can easily have a wing area of 5 sq ft, whereas a rectangular planform of the same span and an aspect ratio of six would have a wing area of less than 3 sq ft. For the same weight of model, this gives a greatly reduced wing loading with a corresponding reduction in stalling speed. Then we add the delta vortex effect. The result is an aircraft that can be safely flown very slowly and which will have the most benign stalling characteristics. The disadvantages are the previously mentioned tendency to lose speed in turns and, for aerobatics, the fact that deltas will not spin properly; the best that can be achieved is a tight flat spiral.

Perhaps the greatest advantage is that the model looks different.

All of the above is theoretical and based on reading articles, textbooks, technical papers, etc. I am looking forward to seeing how it works out in practice.

Anyway..... 'ere 'tis.



## The 2006/7 DAC Committee

Name	Position	Contact
Cliff McIver	President	03 9850 4478
Denis Travassaros	Vice President	03 9712 0229
Colin Kahn	Secretary	0412 566 610
Graham Kay	Treasurer	03 9842 8777
Ian Slack	Registrar	03 9489 3001
Anthony Peate	News Letter Editor	03 9877 8225
Fernando Monge	Committee Member - IC Group Training coordinator	03 9722 2908
Ian Pullar	Committee Member - Electric Training coordinator	03 9428 4365
David Gibbs	Committee Member - IC Group	03 9889 4939
David Law	Committee Member - IC Group	
Grant Collins	Committee Member - Electric Group	0418 872 218
Michael Best	Committee Member - Electric Group - Web Page Editor	

## Note from the Editor

The newsletter relies on articles from club members and any member can submit one. Just make sure they are emailed to me at **Anthony.Peate@telstra.com** in one of the formats listed below. If you want to include pictures, try to limit you articles to 2MBytes in size. I will also accept articles attached to Emails that are compressed using PKZIP.

**Please also include Author's name at start or end of article text.**

- Plan text
- Word document
- Excel Spread Sheet

Keep flying,  
Anthony Peate.

## Doncaster Aeromodellers' Club Mowing Roster

Name	Home	Work/Mobile	W/E Sat	W/E Sat	W/E Sat	W/E Sat	W/E Sat
<b>Dennis Travassaros</b>	9712-0229	0432 889 883	2-Sep-06	4-Nov-06	6-Jan-07	10-Mar-07	12-May-07
<b>Cliff McIver</b>	9850-4478	03 9882 7521	9-Sep-06	11-Nov-06	13-Jan-07	17-Mar-07	19-May-07
<b>Nik Daud</b>	9852-3236	0412-263-883	16-Sep-06	18-Nov-06	20-Jan-07	24-Mar-07	26-May-07
<b>Greg Sleeth</b>	9848-6809	03 9634 4658	23-Sep-06	25-Nov-06	27-Jan-07	31-Mar-07	2-Jun-07
<b>Anthony Peate</b>	9877-8225	0419 332 644	30-Sep-06	2-Dec-06	3-Feb-07	7-Apr-07	9-Jun-07
<b>Theo Kyriopoulos</b>	9370-9424	0419 358 659	7-Oct-06	9-Dec-06	10-Feb-07	14-Apr-07	16-Jun-07
<b>Bill Osborne</b>	9846-6373	03 9408 6042	14-Oct-06	16-Dec-06	17-Feb-07	21-Apr-07	23-Jun-07
<b>Grant Collins</b>	9849-1790	0418-872-218	21-Oct-06	23-Dec-06	24-Feb-07	28-Apr-07	30-Jun-07
<b>Mathew Marino</b>	9462-1051	0403 159 470	28-Oct-06	30-Dec-06	3-Mar-07	5-May-07	7-Jul-07

If for any reason you need to change a rostered date, organise a swap if possible, or contact Cliff on 9882-7521