The Flypaper

OCTOBER 2004

NEWSLETTER OF THE RADIO CONTROL FLYING CLUB OF TORONTO

SPECIAL POINTS OF INTEREST:

- Meetings are held in the Cafetorium of the Alexander Mackenzie Senior Public School, 33 Heather Road, Agincourt, *usually* on the first Friday of each month, Oct to May (subject to change – check the Flypaper) Meetings start at 8:00 PM

For the latest club news, photos and other points of interest please check out our web site at: www.rcfctoronto.ca

INSIDE THIS ISSUE:

Summer Fun Fly:

The August 28 Fun Fly featured precision flying demonstrations, tasty food, great prizes, and decent weather

President's Message - Richard Staron

What a summer eh? Looks like the fall has taken over for the summer and maybe we will have nice long autumn and even a warmer winter with no snow and tons of flying….OK so I'm dreaming….

We have had quite a few other clubs coming to our field to fly as guests this season whether it be during Fun Fly's, Sunday afternoons or even a couple of bouts of good old fashion combat. Members of the Humber Valley, Richmond Hill, Seaton Valley, Ajax and Whitby clubs, to name a few, have come to our field to fly and all have mentioned that we have the best field so far. We even had a chance to be on the Surreal Gourmet on the Food Channel…..but you will have to come to the Oct meeting to find out what happened there. RCFCT was involved….sorta!!!….hee hee!!!

We have had a great infusion of new members this year bringing in many new ideas, concepts and a passion for this hobby that is very refreshing and I hope that we as a club can nurture that spirit and let it grow. Some ideas maybe turn out to be fantastic and others may flop, but if you don't try you will never know.

Next month, will be the annual club elections, where you, the club members select and vote upon the new executive that will run the club for the next year. There may or may not be much to do….its depends upon the new exec and how they want to steer the club.

RADIO CONTROL FLYING CLUB OF TORONTO

2003 - 2004 EXECUTIVE POSITIONS

President	Richard Staron	416-288-0569	*rstaron@eol.ca*
Secretary	Arthur Krikorian		*arthur@tangestudios.com*
Treasurer	Guy O'Reilly	416-443-1299	*joulavert1@aol.com*
Field Officer	Bob Miller	905-839-7868	*robert.miller2@rogers.com*
Membership Officer	Paul Battenberg	416-694-4414	*paulbat@sympatico.ca*
Wings Officer	Scott Baily		*sbaily195@hotmail.com*

Non-Executive elected positions

Editor/Publisher	John Riley	416-469-3990	*jcmriley@sympatico.ca*
Fun Fly Director	Hans Paule	905-837-2664	*hpaule@rogers.com*
Refreshments	Steve Horwat	416-439-7084	
Program Director	*Vacant*		

If you can, get involved in some way whether it be as an exec, non exec or just anything will always help.

Upcoming Club meetings:

- **Friday Oct. 8**
- **Friday Nov. 5** ***(Elections)***
- **Friday Dec.10**
- **Friday Jan. 7**
- **Friday Feb. 4**
- **Friday Mar. 4**
- **Friday Apr. 8**
- **Friday May 6** ***(Beauty Show)***

As we enter the fall and into the winter months, the Friday night club meetings will be become the norm for something to do, have a cup of coffee and stuff our faces with those delicious donuts while discussing the latest topics and eyeballing the latest creations of our members. If any of you members have any ideas for topics or know of anyone that would like to present at our club meetings please contact the exec and let them know. Remember that it doesn't always have to do exactly with RC stuff but something that would be of interest to the members.

Well enough of my rambling and time to get back to doing a bit of building.

From the Membership Officer - Paul Battenberg

It's been a quiet month for me as Membership Officer. We cut off membership for new members without wings, only taking anyone who can already fly. So far to date there have not been any additional members. Last month we took in six new members to raise our total to 165 for the year. Maybe we should be looking at capping our membership at a certain number next year. Any thoughts? I hear it gets pretty busy on the weekends. Gee, it's really nice to be retired !

Attention: NEW MEMBERS There are still quite a number of name tags in the cupboard that have not been claimed yet. Please check the cupboard and take yours - better still take it and even wear it, at least for a little while anyway. I go to a lot of trouble to order one for everyone, so please, please, pick yours up.

From the Wings Officer - Scott Baily

Hi All,

I hope everyone has enjoyed their summer of flying! It hasn't been the best for weather but our training days have been virtually untouched by poor weather conditions. It has been a pleasure assisting the new folks get through the wings program and we have quite a few new pilots this year - so watch out! I would like to take this opportunity to congratulate all the new pilots (in no particular order):

Nestor Santos	*John Kusturin*	*Rod Snyder*	*Steve Hensman*
Brad Sandbrook	*Leslie Mitchell*	*Bryan Gorham*	*Gary Coniam*
John Safrance	*Peter Englesakos*	*Amin Alamsjah*	*Justin Bowditch*
Eddy Chan	*Kumar Rajanayagam*		

I would also like to take this opportunity to thank all the instructors for their time and patience. In particular, I would like to acknowledge Curt who, as usual, was extremely dedicated to making it out nearly every training session. And one of our new instructors, Ty, who I'm sure you all know by now. Ty was an instructing machine and dedicated himself to being available at all times for student training.

Personally, I made it to the training sessions as much as I could. With a new baby and a busy work schedule, it wasn't easy but I think we had a good season of flight training. The instructors received a lot of positive feedback from the new students and we were often rewarded with a round of coffees. Thanks to you all!

Fly safe!

Editor's Note - John Riley

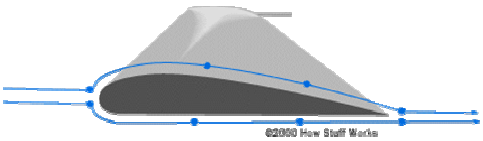
This is the second last issue of *The Flypaper* with myself as Editor, with my replacement to be chosen at the November club meeting election. Think you might like to give it a try? Don't hesitate to get in touch with me if there are any questions about what's involved. Being editor is easier than some might think and it's a lot of fun. The editor is given pretty much complete creative control over the design and content of the newsletter (although I'm sure the executive would get on my case if things got too out of line or just downright strange….). Newer software, the web as an information source, and advances in digital photography are all quite helpful, and anyone with a bit of imagination, a computer, and a modest amount of time can do it. There are no out of pocket costs, since the Club looks after the cost of materials, postage, etc.

Left:: recently I was on a business trip to a famous European city. This photo is a clue as to which one…..In a classic must have seemed like a good idea at the time move, someone once flew a light airplane under the Eiffel tower. You can check out the story and photos at the web site: http://www.airspacemag.com/asm/web/site/QT/eiffel.html

Just Winging It….. *by John Riley*

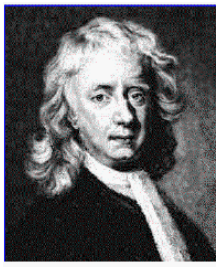
Sources: www.howstuffworks.com, (a website about, well, how stuff works), and Andy Lennon's excellent if rather dense *Basics of RC Model Aircraft Design*, 1996 Air Age Inc.

The importance of good wing design for decent aircraft flight is self-evident, although 3-D RC aircraft, with their high thrust/weight ratios, sometimes fly on mostly engine thrust. Whether for models or full scale planes, wing designs vary substantially depending on the application. Chief characteristics include airfoil selection (e.g. flat bottomed or symmetrical), aspect ratio (long and skinny vs. short and fat), and planform (e.g. straight, tapered, swept). Since detailed explanations of aerodynamics usually delve into the field of fluid mechanics (a twisted branch of physics that utilizes disturbingly complex mathematics), much of the early work on wing performance done by good old experimental trial and error. Interestingly, debates still rage today on the fundamental question, how does a wing provide lift?

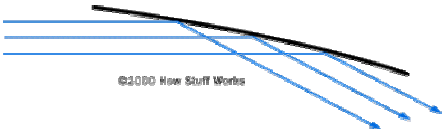


Daniel Bernoulli

Many have heard of the Bernoulli theory of lift—the notion is that with a wing where the top surface is more curved, the air has further to travel than air flowing along the bottom surface. Thus, for a stream of air split at the leading edge and that rejoins at the trailing edge, air traveling over the top must go further in a given period of time (faster velocity) The Bernoulli principal states that fluid pressure is reduced when velocity increases, therefore the pressure on the top of the wing is less than the bottom, causing a net push from the bottom, resulting in lift. What doesn't quite jive in this picture is the fact that as RC modelers know, symmetrical airfoil wings—where the top and bottom curvature is the same, fly perfectly well, as does the airplane, whether upright or inverted. Also, the air flowing over the top doesn't "know" that it's supposed to arrive at the trailing edge at the same time as air on the bottom (and in fact, doesn't). On the other hand, measurements show that there *is* a pressure difference between the top and bottom of a lifting wing that *is* responsible for lift….

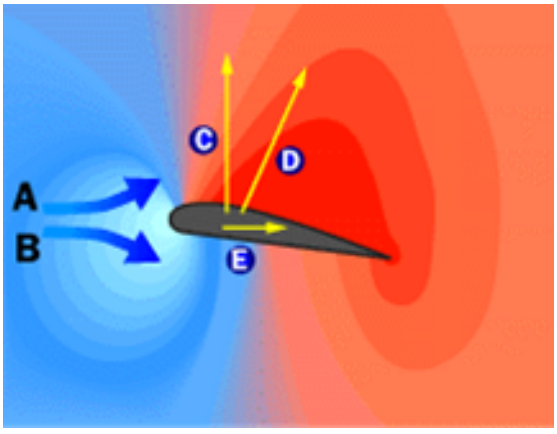


Sir Isaac Newton



I heard once that the Newtonian explanation of lift is apparently favoured by Air Force types. The idea relates to Newton's 3rd law of motion: every action causes an equal and opposite reaction. The lifting wing maintains an upward angle of attack, so air molecules at the underside bounce off, like shotgun pellets hitting a plate, and push upwards on the wing, generating lift. The problem here is that the shape of the top of the wing would have no effect on lift, which in fact is wrong. Also, it's been found that fluids bend around objects that they flow past, without touching them. So the situation is more complicated than the shotgun pellet analogy, and experiments show that the Newtonian theory of lift does not provide accurate estimates for lift (except in very thin air at hypersonic speeds, such as a re-entering spacecraft).

So what gives, something produces lift! Turns out the situation is complicated, and while both the above explanations have valid aspects, neither provides the complete answer. Lift is a force on a wing that acts perpendicular to the flow of air, and is the result of pressure differences caused by changes in the velocity of the air at all points around the wing (thus involving both the top and bottom surface). The disruption and turning of the air flowing around the wing is responsible for the changes in the velocity. The diagram below left shows a representation of the pressure profile around a wing.



Left: areas of higher pressure are shown in blue, and reduced pressure is shown in red. The net force produced by these pressure distributions is shown by arrow D. Arrow C is the lift component, and arrow E is the induced drag component

Calculating lift : The shape of an airfoil (there is data available for hundreds of different ones) and its angle of attack (the angle at which the wing meets the oncoming airflow) provide the coefficient of lift (C_L), traditionally determined by wind tunnel experimentation, and now provided by computer simulation. The lift (L), can be calculated once the C_L, the airspeed (V), air density (d), and wing area (A) are known, using the equation:

$$L = \frac{C_L \times d \times V^2 \times A}{3519}$$

Wing Planforms :

Elliptical: Famously used on the Supermarine Spitfire, elliptical wings are said to be ideal, as they are the most efficient wing planform, with the lowest induced drag, requiring the smallest angle of attack for a given amount of lift, and with even stalling characteristics across the span. Unfortunately, constructing them is a royal pain….

Tapered wing: Approximates the elliptical wing when the tip chord is 40% of the root chord, and is therefore more efficient than a rectangular wing. Tip stalls can occur with overly narrow tip chords because they experience an unfavourable "scale effect" (Reynolds number) at low speeds. Structurally, a tapered wing can be lighter yet stronger than a rectangular wing of the same area, because the greatest strength is at the root where it's needed.

Sweptback wings: Can be prone to tip stalls (sometimes desirable for wing stalling maneuvers such as snap rolls and spins). Sweptback wings promote directional stability, since in a yawed situation, the advancing wing experiences more drag and is thus pushed back. There is also a dihedral effect.

Swept-forward wings: These stall at the root first, and there is good aileron control at high angles of attack. They promote instability around the yaw axis (and could be seen as being more responsive). The wingtips are prone to flutter, so the wing must be torsionally stiff.

Delta wings: The triangular shape of a delta wing gives it a very low aspect ratio (discussed below), and consequently it stalls at a high angle of attack, and with high induced drag. As a result, there is less need for flaps on delta wings. For the same reason as sweptback wings, they are directionally stable. Structurally, they are very strong.

Aspect Ratio : This the ratio of wingspan to mean chord, and can be calculated by dividing the square of the wingspan by the wing area. Aspect ratio is an important feature of wing design, and has a major effect on induced drag, which is the drag produced as a necessary by-product of lift. Unlike lift and parasitic drag, induced drag is greatest at slow speeds. Reduction of induced drag is the reason why gliders have such long, high aspect ratio wings, since their glide ratio will be directly reduced by induced drag. By the same token, low aspect ratio delta wings tend to have power off gliding characteristics described as "brick-like". On the negative side, high aspect wings are difficult to design with the required structural rigidity for higher speed aircraft without introducing a weight penalty. With larger rolling moments, airplanes with high aspect ratio wings are less maneuverable than stubbier aircraft.