April, 2002
Vol. 19, No. 4
U.S.A. $3.50

R/C Radio controlled SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS

R/C Radio controlled SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS

ABOUT *RCSD*

R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc., are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant.

RCSD should not be considered to endorse any advertised products or messages pertaining hereto. An advertising rate card is available for businesses, and clubs.

R/C Soaring Digest
556 Funston Drive
Santa Rosa, CA 95407
phone: (707) 578-7871
e-mail: rcsdigest@aol.com
http://www.b2streamlines.com/RCSD.html

TABLE OF CONTENTS

Don't forget to check out the Midwest Slope Challenge photography, by Dave Garwood & Joe Chovan, on the web site. This month, in addition to the front and back covers, the MWSC article will be available in pdf format in full color!

Advertiser Index

RCSD ON THE WEB
http://www.b2streamlines.com/RCSD.html

The Soaring Site

RES Regulations

We received the following request from Belgium.

"In view of promoting our fine hobby to the less experienced modelers, and keeping costs down at the same time, our club (MACH, from Herentals-Belgium) made a small scale research early this year on the interest for a RES/Open Class. More or less to our surprise, the response was rather enthusiastic, so we went a step further and sent a letter with our intentions to the Belgian clubs - again with a remarkable positive reaction. So, we hope to organize a first contest early next year.

"However, rather than to invent our own rules, we feel that a lot can be learned from experience - and therefore we would be very grateful for a survey of your regulations for this Open/RES Class. Could you, or one of your readers, help us out? Of course, we'll be happy to refund any expenses.

"Many thanks in advance! And if we can be of any assistance from this part of the world, just let us know."

(signed) Roger J. Segers
Hoeksken 25, B-1745 Opwijk, Belgium
rrsegers@worldonline.be

We'll see what we can do, Roger! We'll include your request in the next issue of *RCSD*. However, you might want to check out some of the club pages which can be accessed from our web pages. Some of the clubs hold RES events and may have the information posted to their web sites or you can e-mail the webmaster. Soaring League of North Texas (SLNT) and TULSOAR are two that come immediately to mind. The ESL and LSF may have something posted, as well.

Anyone have suggestions for Roger? His addresses are included above.

Web Page Updates

All of the pdf files and addresses, as well as the club & organization pages have been updated. And, all of the links should be working properly. If any of you have difficulty with any links or files, please let us know!

Happy Flying!
Judy Slates

MIDWEST SLOPE CHALLENGE 2002

Joe Hosey's DAW KA-6E over Wilson Lake. The dam spillway in the background is probably the most recognizable feature of the shoreline and says "Wilson Lake" to all who have seen it.

Photography by
Dave Garwood, New York.

Back Cover
MIDWEST SLOPE CHALLENGE 2002

Joe Hosey's DAW Foam-51 over Wilson Lake during MWSC 2002.

Photography by
Dave Garwood, New York.

Jer's Workbench

Jerry Slates
556 Funston Drive
Santa Rosa, CA 95407
RCSDigest@aol.com

Safety First: Using a Mask

As most of you know, I have been working in and around fiberglass for much of the last 40 years. It was back in 1954, in my senior year of high school, that I discovered fiberglass, a wonderful building material, and I just had to try it out.

My first fiberglass project involved custom work on a 1941 Buick. I molded the rear fenders and trunk lid. While it wasn't much of a custom job, it served to get my feet wet working with fiberglass.

In addition to the Buick, there was also a 1940 Mercury lounging in the back yard, simply begging to become a custom hot rod. This project was a bit more extensive. The molded parts included fenders, hood, and trunk lid. Door handles for electric doors were removed, as well as the running boards. I built new lower body panels to cover the car frame. All this in fiberglass, of course.

From time to time, in addition to the odd jobs here and there involving fiberglass work on other cars, I did fiberglass work on old wooden boats. And, of course, I operated Viking Models, U.S.A. for 25 years.

So what, you say?

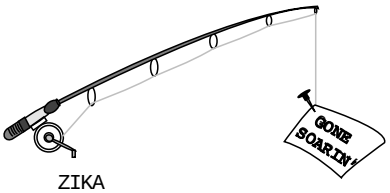
Well, 40 years is a heck of a lot of cutting, grinding, sanding, and painting of fiberglass. It can be detrimental to one's health.

Recently, I had the usual medical check-up by a doctor, including a chest X-ray, and was pleased to get a "clean bill of health." I like to think that the reason is because I try to think safety first. I have always worn a dust mask or respirator of some sort when working with fiberglass. There are numerous ones on the market today, usually available at a home building supply or paint store. Some are inexpensive, costing around $1.50 each, while others are more expensive.

Personally, $1.50 is a heck of a lot less expensive than a doctor's visit that doesn't give one a "clean bill of health."

So, this month, I wanted to remind those of you that work with fiberglass or other types of composite material, to work safely. Even if you are only exposed for brief periods of time, protect yourself. If you don't, after 40 years, it might make an important difference!

■



ZIKA

Custom Building a Workbench

Last month, I shared my plans for building a new workbench and asked for suggestions from anyone that has designed and built a 'perfect' workbench. I have since received input from two modelers who have some very good ideas.

The first is from Mark Nankivil in St. Louis, Missouri.

Mark says, "Got my new *RCSD* yesterday and Jerry, your workbench sounds much like mine. I built a new one over this past winter that is 8 feet long, 30" wide and 42" high. I wanted it that tall for precisely the same reason - hunching over the tables I had was killing my back as I rarely sit down to work on models. It sure is nice to stand there or lean against the barstool and do what I need to do without back pain. The back of the bench is pegboard as is the right side. I hang the soldering irons, covering irons & heat guns, etc., on the right side and there is a power strip along that side too. I also have a second power strip on the back side and use for the chargers that rest on the floor there and when the vacuum pump is needed for bagging wings. I have two shelves under the table top too - sure nice to store full length wing cores and panels without worry of hangar rash. Wings that have been bagged and need to cure/harden further go under there as well. I'll try and take some photos and send them your way soon."

And the next idea was from Bruce Abell in Australia. Bruce called to suggest that a cable be strung across the shop. A light can be hung from the cable, on a swivel, so that it can be moved easily wherever more light is needed!

Thanks, Guys! Your ideas and suggestions are most appreciated!

Rookie Comments on the Majestic

by Paul Cox
Fairdale, Kentucky
LSF1/LASS
SoarCrashnburn@aol.com

Without the help of the following, I'd still be struggling to get this plane in the air. A big thanks (alphabetically) to: Bruce Davidson, Tom Hall, Ellis Howell, Gordy Stahl, and Ed Wilson.

After seeing in person the grace, and ease of ground covering of the LaserArts Majestic, I decided to build one as my next project. It has a 110" wingspan, and it is currently a contest winning model in the R. E. S. class. It is a built-up plane with a V-tail.

Before purchasing my own, I began to question Tom Hall, who had just finished building his own; he then immediately went out and won the "Day after Derby" TD contest in Louisville. (Tom was very helpful, and I wish I had followed all of his instructions on building mine more carefully and with a removable tail.)

To answer further questions in my quest for more knowledge about the plane, I communicated on a weekly basis with Dave of LaserArts. He responded to me quickly, and completely to the point, on all of my e-mail questions.

15 days after sending my check, I received my Majestic. Upon opening the well packed and uncrushed box, I found that most of the individual parts fell out of their sheets. Each piece cut to perfection by a laser rather than a dull-edged punch press. I felt that only a few of the pieces needed any sanding, other than the wooden spurs on the ply-wood parts.

The entire building process was easily followed, and its construction was aided by a well detailed instruction manual. The building process requires the use of aliphatic resin (wood glue), and C/A thin and thick. I added carbon fiber tape and heavy upholstery thread to the main spar. I used HiTec 85's in the spoilers, and HiTec 422's on the ruddervators. I painted the pod and boom, and covered the wings and tail with monokote.

During building I had hoped that I hadn't been using too much glue, or paint and that my plan to build it with a permanent tail would be worthwhile effort; however, after beginning balancing for the starting CG point, I found myself adding a full 9 oz. of weight to the nose. (Sighing deeply...) And CG now correct, I balanced the plane's wings, completed my radio checks and configurations, and looked forward to a fairly calm day.

I have always looked forward to the flying days in Louisville at the L. A. S. S. club. Witty comments, and the occasional sideways pokes at each other are always followed by the extremely knowledgeable help from the very same people. My "first flight day" with the "Majestic" was no different; no less than 4 other members came over to help me out with the final setups.

On the first full launch it climbed very well, straight up with very little adjustment necessary. I flew for approximately 5 minutes, with the new plane jitters running though me. Learning to fly such a large wing was new to me, and I had to be told more than once to make larger turns. Having visually found some thermal bumps on a crosswind tack, I laid the wing into a 40 degree angle and rode the thermal for a bit; it climbed easily and I began to drift downwind and upwards with the thermal. I was reminded that this was a test flight, and to just learn to fly it for now. The Majestic flew back upwind in the 6-8 mph gusts without a whimper. Upon setting up for the upwind landing, I transmitted for full spoilers. The response was quick and the airspeed bled off like I had thrown out an anchor. It laid down nice and easy, without any flaring and was begging to go back up for more.

I highly recommend this plane to everyone looking for their next step, and from the comments of the respected and experienced flyers in my club, I assume they too would agree.

How many hours till the next club flying day?

For more info from the manufacturer:
http://members.aol.com/laserartco/index.html

My previous kit building experiences included a Gentle Lady, and an OLY II for my son.

-in regards to soaring-
"The truth will set you free!
...or get you committed..."

■

on the Wing
B²
P.O. Box 975
Olalla, Washington
98359-0975
bsquared@appleisp.net
http://www.b2streamlines.com

Twist Distributions for Swept Wings, Part 1

Our curiosity got the better of us, and we asked "Why are designers of swept wing tailless models placing proportionally more twist in the outboard portion of the wing?" This series of articles will provide a comprehensive answer to that question.

Our intense interest in tailless aircraft now spans twenty years. Over those two decades, we have built a number of "plank" type 'wings and several swept 'wings. As we explained in a recent column, there are advantages and disadvantages to both of these planforms.

An introduction to twist distributions

The impetus to begin designing our own swept wing tailless aircraft was the presentation given by Dr. Walter Panknin at the MARCS (Madison Area Radio Control Society) Symposium held in 1989. Dr. Panknin provided a relatively simple method for determining the geometric twist required for a stable planform when given the span, the root and tip chord lengths, the root and tip airfoil zero lift angles and pitching moments, the sweep angle of the quarter chord line, the design coefficient of lift, and the static margin.

Dr. Panknin assumed that the wing twist would be imparted across the semi-span. That is, the root would be held at zero degrees and the tip twisted at some angle of washout, with the wing leading and trailing edges forming straight lines. Dr. Panknin's 'wing, the Flying Rainbow, along with Kurt Weller's Elfe II, utilized this type of twist distribution on tapered wings.

In looking at other swept wings of that time period, we were also attracted to Hans-Jürgen Unverferth's CO2. The CO2 was different from the Flying Rainbow and the Elfe II in that the wing was not tapered but rather of constant chord. Additionally, CO2 utilizes a twist distribution in which the inner half of the semi-span has no twist at all. All of the geometric twist is in the outer half of the semi-span. While the actual twist angle is identical to that computed for the Panknin twist distribution, pitch stability is not adversely affected and in fact may be slightly better.

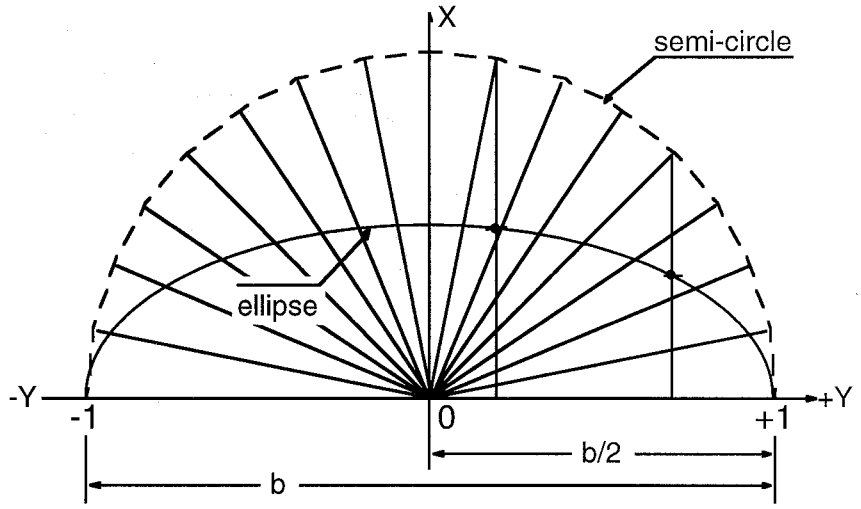


Figure 1. Construction of elliptical lift distribution

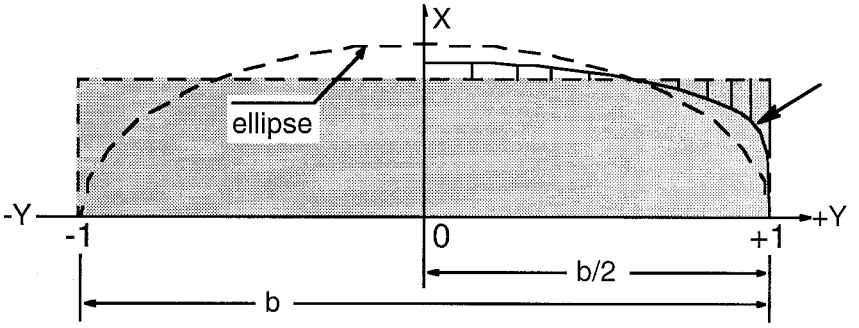


Figure 2. Construction of lift distribution for untwisted rectangular wing.

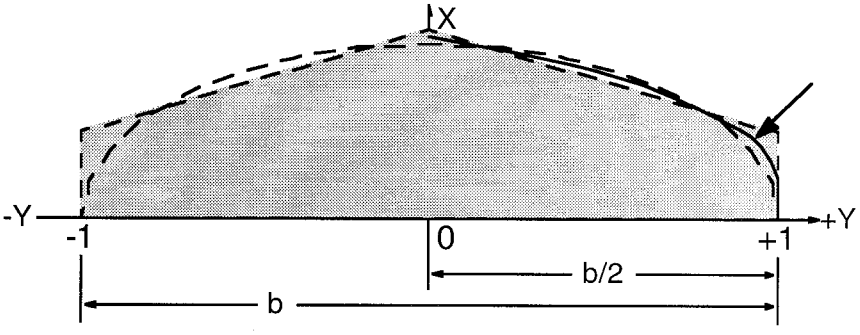


Figure 3. Construction of lift distribution for untwisted wing with taper ratio of 0.45.

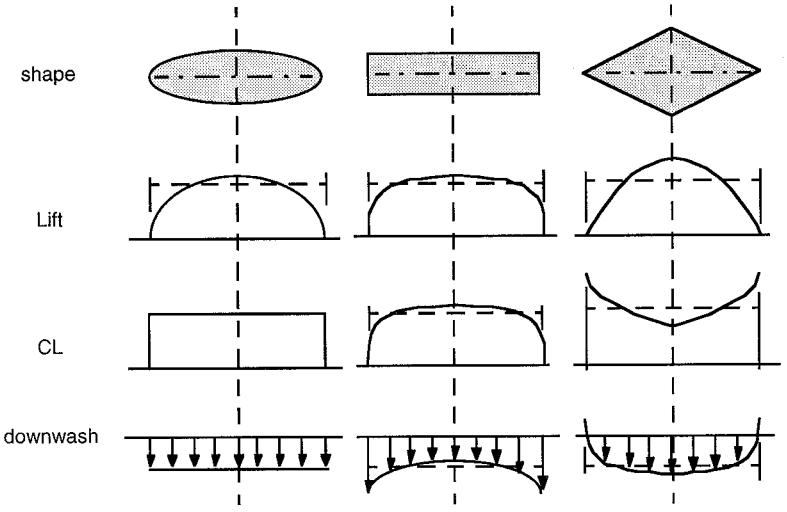


Figure 4. Three wing planforms and their associated lift distributions, coefficient of lift distributions, and downwash distributions.

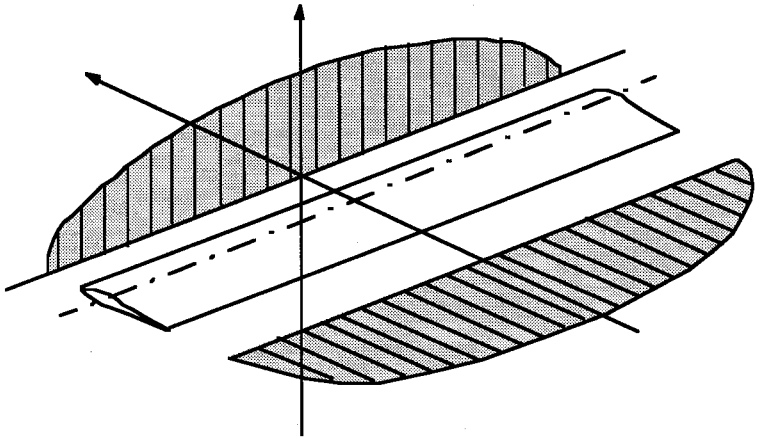


Figure 5a. Lift and drag profiles for untwisted rectangular wing in straight and level flight and no control surface deflection.

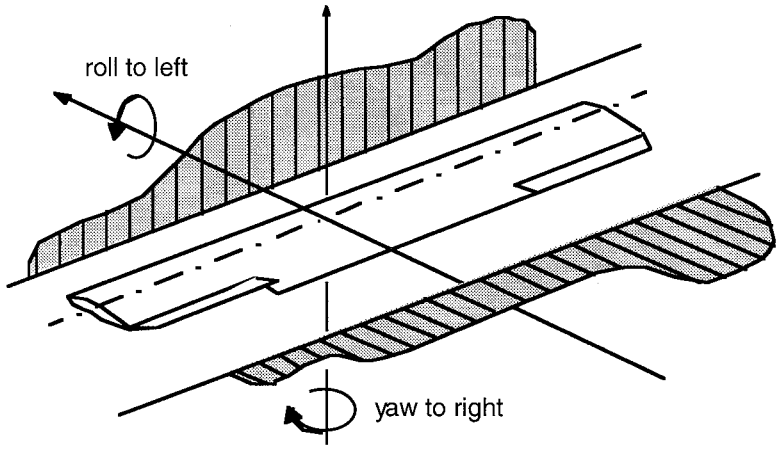


Figure 5b. Lift and drag profiles for untwisted rectangular wing with aileron deflection for left bank, no differential.

More recently, Hans Jürgen and other swept wing designers have taken to imparting wing twist across three segments. From the root to one third of the semi-span there is no twist. About one third of the total twist is then put into the second third of the semi-span, and the remaining two thirds of the total twist is put into the wing between two thirds semi-span and the wing tip.

Our curiosity got the better of us and we asked, "Why are designers of swept wing tailless models placing proportionally more twist in the outboard portion of the wing?" This series of articles will provide a comprehensive answer to that question.

Lift distributions

Nearly all aerodynamics text books devote pages to what is called the "lift distribution." The lift distribution for any straight (quarter chord line at 90 degrees to the centerline) wing can be graphically represented by a curved line superimposed over a standard X-Y coordinate system. The lift distribution curve traces the local circulation — the local coefficient of lift times the local geometric chord.

How is the lift distribution determined? Let's start by taking a look at the construction of the elliptical lift distribution. Assign the aircraft wing tips to the points 1.0 and -1.0 on the Y-axis of the coordinate system. Draw a circular arc above the Y-axis using the aircraft wing tips to define the diameter. A semicircle is formed which has the radius b/2 (the semi-span) and the area $\pi/2(b/2)^2$ which in this specific case is simply $\pi/2 = 1.57$.

Now drop vertical lines from the semicircle circumference to the Y-axis. Mark the mean (halfway) point on each vertical. Connecting these identified points creates an ellipse. (See Figure 1). This elliptical lift distribution is predominantly promoted as being the ideal, as represented in the planform of the British Supermarine Spitfire fighter of the World War II era.

Why would the designer want the lift distribution of his arbitrary wing to closely match that of the elliptical lift distribution? Because with the elliptical lift distribution, a discovery of Ludwig Prandtl in 1908 which he published in 1920, each small area of the wing is carrying an identical load

and so is operating at the same local coefficient of lift, the downwash off the trailing edge of the wing is constant across the span, and the coefficient of induced drag (drag due to lift) is at its minimum point.

To construct the lift distribution for an arbitrary wing without twist or sweep, lay out the wing outline over the elliptical lift distribution with chord lengths proportioned such that the area of the wing is equal to that of the ellipse (one half that of the semicircle, in this case $\pi/4 = 0.785$). Draw a curve along the mean of the ellipse and the wing planform outline. (See Figure 2.)

With some graphical experimentation, we find that the lift distribution for a wing with a taper ratio of 0.45 almost exactly matches that of the elliptical lift distribution described by Prandtl. (See Figure 3.) The tapered planform has at least one advantage over the elliptical planform — it's far easier to build. But the elliptical planform has a stall pattern in which the entire wing is subject to stalling at the same time. At high angles of attack, small gusts can serve to trigger a stall on any portion of the wing span. A tapered wing with a nearly identical lift distribution will tend to behave in the same way.

Lift coefficient distributions

As stated previously, the lift generated by any wing segment is directly proportional to the coefficient of lift and the local geometric chord. This means that there is also a coefficient of lift distribution. For Prandtl's elliptical wing lift distribution, as has been described here, the local coefficient of lift is identical across the span. On the other hand, if the taper ratio is zero (the wing tip comes to a point), the coefficient of lift will be zero only in a truly vertical dive, but otherwise it will be infinite because the wing tip chord is nil. Any time this wing is called upon to produce lift, the wing tip will be stalled. From this extreme example, we realize the tip chord cannot be too small, as it will then be forced to operate at a higher coefficient of lift, leading to a local stalling of the wing. (See Figure 4.)

So called "tip stalling" can be inhibited by one or both of two methods. The first involves increasing the local chord near the wing tip, the second consists of imparting washout.

As we intuitively know, enlarging the wing tip chord reduces the local coefficient of lift. An enlarged wing tip chord is not so efficient as the true elliptical planform, but the penalty for using a perfectly rectangular wing is just 7% and so it may be an acceptable trade-off for a machine designed for sport flying.

Washout, on the other hand, while also reducing the coefficient of lift in the area of the wing tip, is good for only one speed. As the twist angle increases, the deleterious effects become stronger much more quickly as the coefficient of lift for the entire wing, C_L, moves away from the design point. If washout is too great, the wing tips can actually be lifting downward at high speeds. This puts tremendous loads on the wing structure.

Adverse yaw

One other effect of utilizing the elliptical lift distribution comes about as we add control surfaces to the wing. Outboard ailerons, for example, create different coefficients of induced drag depending on whether the surface is moved up or down. The control surface moving downward creates more lift and hence more drag than the surface moving upward. When rolling into a turn, therefore, the aircraft is forced into a yaw away from the direction of the turn. (See Figure 5.)

In conventional aircraft, this tendency can be reduced to some extent by what is called aileron differential. The upgoing control surface travels through a larger arc than the downgoing surface. While this tends to increase the drag on the downgoing wing, reducing adverse yaw to a great extent, many pilots find that some amount of rudder input is necessary to obtain a coordinated turn.

Reduction of rudder input is an important consideration in the quest to reduce overall drag while maneuvering, but the associated induced drag from the fin and rudder, a low aspect ratio flying surface, cannot be entirely avoided. For a swept flying wing without vertical surface, elimination of adverse yaw is obviously imperative, but aileron differential cannot be used in this case because of its effect on pitch trim. Some other means of eliminating adverse yaw must be devised.

Three major problems

And so we are forced to solve three problems when designing a tailless aircraft:

1. Achieve and hopefully surpass the low induced drag as exemplified by the elliptical lift distribution without creating untoward stall characteristics,
2. Reduce the adverse yaw created by aileron deflection without adversely affecting the aircraft in pitch, and
3. Maintain an acceptable weight to strength ratio.

A relevant historical tidbit

The Wright brothers, along with their other accomplishments, were the first aircraft designers to determine that banking was necessary to turn, an idea which no doubt came from their experience with bicycles. While other early aviation pioneers had studied bird flight, the perspective of the Wrights while watching birds was very much different because of their cycling experiences. (Interestingly, their direct competitor, Glenn Curtiss, built and raced motorcycles.)

The Wrights also had the ability to separate the major problem of controlled powered flight into manageable components. Propulsion was separated from the production of lift, and stability was separated from control, for example. In fact, their solution to the problem of flight incorporated only one integrated system, the wing, which provided lateral control, structure, and lift. It was Wilbur's twisting of the inner-tube box, through which the idea of wing warping was derived and the internal bracing of their wing structure was devised, which provided the insight needed to create a controllable flying machine capable of carrying a human pilot/passenger.

But the flying machine they created, while tremendously successful, for all practical purposes ended the use of birds as models for aircraft design. As an indicator of this, the Wrights saw their early successes and records in powered flight quickly surpassed by the inventions of others. Curtiss, for example, solved the problem of banking turns with separate control surfaces rather than wing warping. His aileron system is still in use today.

The Wright's separation of a huge problem into smaller more easily solved problems has continued to be the hallmark of aircraft design for 100 years, and aviation has made nearly unbelievable strides during that century. But there are a growing number of aircraft designers who wish to go back to the bird model. They wish to design an aircraft which is the minimum required for efficient controlled flight by integrating lift, stability and control into a single structural component.

A bird is a biological system which has been very successful for a very long time. To be successful in the competitive environment of nature, a flying bird needs more than just lift, stability, and control. A bird must also be efficient at flying. That is, it must have a very low energy expenditure. Minimum drag while moving through the air is of course of major importance in this regard, as is a very light airframe because extra weight increases the energy drain on the system.

We can see through direct observation that birds have no vertical surfaces, yet birds are able to make beautiful coordinated banked turns without any evidence of adverse yaw. Perhaps birds do not make use of Prandtl's elliptical lift distribution.

What's next?

As a prelude to future installments, let us ask a series of provocative questions:

- What if we found that the elliptical lift distribution does not lead to the minimum induced drag, as has been dogma in most aerodynamics texts since Prandtl introduced the concept in 1920?
- What if we found a way to produce "induced thrust" in addition to, and without increasing, the "induced drag" produced by the creation of lift?
- What if we could increase the wing span and aspect ratio without increasing the required strength of the spar at the wing root?
- What if the answers to all of the above questions are related?

We'll cover all of this and more in future installments!

Ideas for future columns are always welcome. *RCSD* readers can contact us by mail at P.O. Box 975, Olalla WA 98359-0975, or by e-mail at <bsquared@appleisp.net>.

References:

Anderson, John D. Jr. Introduction to flight. McGraw-Hill, New York, 1985.

Anderson, John D. Jr. Fundamentals of aerodynamics. McGraw-Hill, New York, 1984.

Bowers, Al. Correspondence within <www.nurflugel.com> e-mail list.

Hoerner, Dr.-Ing. S.F. and H.V. Borst. Fluid-dynamic lift. Hoerner fluid dynamics, Vancouver WA USA, 1985.

Horten, Dr. Reimar. Lift distribution on flying wing aircraft. *Soaring* June 1981, pp. 40-42.

Hurt, H.H. Jr. Aerodynamics for naval aviators. Published as NAVWEPS 00-80T-80 by the U.S. Navy, 1965.

Kermode, A.C. Mechanics of flight. Pitman, London, 1980.

McCormick, Barnes W. Aerodynamics, aeronautics, and flight mechanics. John Wiley and Sons, New York, 1979.

Raymer, Daniel P. Aircraft design: a conceptual approach. AIAA Education Series, Washington, DC, 1992.

Shevell, Richard S. Fundamentals of Flight. Prentice-Hall, Englewood Cliffs NJ USA, 1983.

Simons, Martin. Model Aircraft Aerodynamics. Argus Books, Hemel Hempstead Great Britain, 1994.

The White Sheet, Spring 1986, No. 36. Sean Walbank editor. White Sheet Radio Flying Club, Dorset/Somerset Great Britain.

■

Midwest Slope Challenge 2002

Moment of Impact: DAW Foam Wulf-190D greets a Composite Specialties Bandit.

By Loren Blinde
Lincoln, Nebraska
LBlinde@alltel.net
www.alltel.net/~mwsc

Photography by David Garwood (except as noted) & Joe Chovan

Kansas slope soaring with a side order of gravy. Take a great site like Wilson Lake, mix in some relaxed country culture and spend three days in May flying with friends from coast to coast. That's the Midwest Slope Challenge. I've been the contest director and concierge for the past 3 years and will try to give you a perspective of what the event is all about.

MWSC isn't really a trophy event or a gathering of the soaring elite; it's more like a family reunion. Aunt Peggy is drinking a bit too much and cousin Bob is doing cannonballs in the pool. You're on a first name basis with the bartender at the local tavern and can almost feel those arteries snapping shut as you order breakfast at the cafe. We've tried to maintain a "something for everyone" (well, maybe except F3F) approach with honest competition for those so inclined and plenty of time for fun flying and socializing.

One of the good people associated with MWSC is Alden Shipp. Alden actually lives in Lucas, our adopted headquarters town, several months of the year. During his stay in Lucas, Alden has done wonders to make the townsfolk slope soaring aware. It's not uncommon for a stranger to stop you on the street and ask how the flying was today. Five minutes later the stranger is a friend telling you about this hill he has in one of his pastures. And one of those pastures came in handy this year...

The Slope Challenge has had the same weather pattern for 3 years straight… It's perfect several days before the event, followed by a north wind day or two (and the big hill faces south), a calm day and somewhere a passable day for racing. Several fliers showed up early in the week and the main hill was bustling by Wednesday, thanks to 25-mph winds right up the pipe.

Thursday, the traditional cold front came through, so it was off to a pasture hill north of Lucas for an afternoon of fun flying. There were cattle in the pasture and an abundance of pie shaped landing targets. Many city folk got their first opportunity to open and close a barbed wire gate. Important farm boy tip for next year: you open the gate, swing the gate out of the way, then drive through - not drive over the gate on the ground.

Friday was combat day and once again the north wind had us at the same pasture. This is a blessing in disguise for Combat. It's a smaller and more accessible hill that makes for closer action and easier retrieval of downed

Foamie Combat. DAW KawaFoamie Ki-61 = Jim Harrigan.

Foamie Combat. DAW Foam-51 = Greg Smith.

Some guys will travel half the world to find a decent slope. New York Slope Dogs: Rich Loud, Joe Chovan, Terry Dwyer, Jim Harrigan, and Wayne Rigby. Not pictured and behind the camera: Dave Garwood.

Does Slope Combat have a future?

As previously reported, the AMA Executive Council considered the following Safety Code proposal from the Safety Committee at their July 15 meeting:

"Any flight activity involving the intentional collision between model aircraft is prohibited."

We have received a temporary reprieve. The EC deferred taking action on the proposal until more information can be gathered.

The feedback and input the EC received from many of you was instrumental in heading off a pre-emptive action that would have put slope combat out of business as an insured activity. We owe a debt of gratitude to the Radio Control Combat Association (RCCA) for their support on the issue. It was the RCCA who brought this to the attention of the soaring community and who spoke on our behalf at the July 15 meeting.

Now before we all relax, remember this is still an open issue and the EC will consider it again, sometime in the near future. We need to monitor the progress of the issue and continue to provide constructive input to our representatives in the AMA.

Loren Blinde

Unlimited race. Hard-working Joe Chovan at the back of the line.

planes. There were 50 pilots entered in this event which says a lot about the drawing power of combat. My guess is that without combat, we would have had maybe 30 people show up.

The combat action was intense and after three qualifying rounds, the top 14 fliers advanced to the final. The final resulted in 5 pilots still tied, so a 5-minute playoff heat was conducted. Since watching 5 planes in combat is about as exciting as watching the cattle graze, we put all 14 finalists on the hill, the goal being to weed out the top 5. If any of the 5 were still flying at the horn, most kills would win. Local Kansas flier Randy Mohr of Great Bend outlasted the 2001 winner Duane Jenkins of Tennessee and took top honors.

A lot of guys build planes just for the Warbird Race. Trouble is, we'd never had one. For some strange reason, the wind didn't die after Combat as planned, so in a panic, the Warbird course was set up. The pylon pole on one end was thirty feet of galvanized steel pipe; the kind used as a top rail on chain link fences. Ironically, the pole material was salvaged from a scrap heap at the local power club clean up day. It survived numerous direct encounters, never wavered and even emitted a derisive "clank" when hit.

The pasture hill was great for combat, but challenging for Warbirds flying horizontally across the face. Four plane heats were flown with additional points for "kills" during the race. Most of the heat winners were more survivors than combatants. But in any case, this event was an absolute crowd pleaser and the mandate was do it again and do it more. In the battle of the final four, Garland Hanson of Arizona was the winner over Joe Chovan from New York and declared the 2002 "Ace of the Base."

Saturday was race day, but there was nothing but a gentle breeze until very late in the day. At noon, we made the call to postpone the races till Sunday and call the day a fun fly. And yeah, it was fun. At least four people told me this was the best day of the entire weekend. One of the nice things about Wilson is there are spacious E-W and N-S oriented areas for fun flying. There was a winch, several bungees, lots of electrics, hand launch and thermal

The Stillman Recovery Net. Pat Mcleave flys, Fred Stillman watches. (Net designed by Fred Stillman and Rick Stillman of Lakeland, Colorado.)

It's the pilot, not the plane! Wayne Henning's Jouster in Unlimited final; nose droops from excess weight.

One-Design isn't what it used to be; Hammerhead, Fun-1, and Cobra make the turn. Hammerhead designer, Denny Maize's backside closest to camera.

planes plus a rocket assisted ME-163. The thermal action was outstanding, just what you look forward to for a slope event.

The Saturday night banquet is the real reason we have the event, flying is just an excuse to be there. With a crowd of 75, this was the largest feast yet. Lucas mayor Dave Urban and his K-18 Cafe crew did a superb job of stuffing the crowd with some of the best prime rib you will ever find. Several legendary appetites in the group were seen waving the white surrender dinner napkin halfway through their third pound of beef.

If you come to MWSC to clean up on competition prizes, you're at the wrong contest; they are all given away by raffle at the banquet. There was fantastic sponsor support this year and at least half the pilots present walked away with a goodie. It should be noted that every maker of a new One-Design racing kit was present and kind enough to donate a kit to the raffle.

Sunday is supposed to be fun flying and go home early day, but this year it was race day. The forecast was promising for the main hill and by 10:30 we had sufficient wind to fly One-Design Racing. One-Design used to be the exclusive domain of the CR Fun-One. This year, the rules were cleaned up a bit and we now have a new flock of competitive kits on the market. All four were represented and performed well. You might as well go ahead and build one because this event is now carved into the proverbial Kansas limestone fence post. After three rounds of heat races, Todd Martin of Topeka, Kansas won the final going away.

It should be noted that the race course

(Above) Bungie Launch! Fred Stillman releases his foam F-86. Mike Bailey on the sticks.

(Right) Those new One-Design kits look better than their makers: Mike Bailey, Foam-One, and Larry Blevins, Cobra.

(Below)
Denny Maize's Hammerhead in far turn; ODR. Photo by Joe Chovan.

ONE-DESIGN KITS

Cobra Racer
Magnum Models
PO Box 47
Lake City, TN 37769
Phone: 865 426-4826
E-Mail: info@magnum-models.com
Website: www.magnum-models.com

Foam-One
Mike s Models
610 West Third St.
Valley Center, KS 67147
Phone: 316 755-0924
E-mail: jbailey19@cox.net
Website: members.cox.net/jbailey19

Hammerhead
Pole Cat Aeroplane Works
797 Polecat Road
Landisburg, PA 17040
Phone: 717 789-0146
E-Mail: denny@polecataero.com
Website: www.polecataero.com

One Fun Design
Soaring Specialties
1403 Lincolnshire Rd
Oklahoma City, OK 73159
Phone: 405 692-1122
E-mail: gavoss@swbell.net
Website: www.soaringspecialties.com

was far more efficient and pilot friendly than past years thanks to the addition of a pylon turn light system and a recorded audio countdown to start the races. Both worked flawlessly and we all owe a big "attaboy" to Lincoln Area Soaring Society member, Tom Wild, for creating them.

Unlimited Racing was planned as a 2-plane, man on man, double elimination tournament. That would have extended the contest till suppertime and we were flat out of prime rib. To give some people a decent chance of actually being at work on Monday, the race was changed to single elimination.

The final came down to Wayne Henning of Bellevue, Nebraska flying his thermal Jouster (granted, with a lead brick inside) and former MWSC CD Paul Wright from England with a Brisk. Don't laugh, Wayne beat skilled pilots with slope specific machines to reach the final; some of the finest flying I've ever seen. In real life, Wayne flies Med-Evac helicopters and does just as well with a machine that doesn't have to beat the air into submission. In the end, new technology prevailed and Paul (who is no slouch himself when it comes to slope racing) was the winner after making up Wayne's big early lead on the 4th lap.

If you'd like to see complete results, more pictures and learn about next year's event, go to www.alltel.net/~mwsc. Be sure to check out the sponsor links and tell them thanks.

Oops, I just said "next year", one of the top-10 things CD's have to be careful about. Okay, let's do it again. 2003 will be the 10th anniversary of the event and it will be special. See you there…

■

GORDY'S TRAVELS

Gordy Stahl
Louisville, Kentucky
GordySoar@aol.com

"Gordy's Sailplane Balancing System"

In my travels I get to meet lots of RC Sailplanes.... And their owners. It amazes me how little we all know about trim and balance.

So often, I see a plane flying that I know is way out of balance. It balloons, lands like a rocketing rock, and falls out of low speed, down wind turns, or just ends up in a tree, somewhere, with its owner saying, "I don't get it! It just wouldn't turn!"

When I ask about how they balanced their sailplanes, they say, "Just where the plan said!"

Aside from the science involved in determining Center of Gravity, Center of Pressure and all those other cool terms, I find that to get a sailplane to fly at its optimum, you have to get the lead out.

After balancing one fella's plane, which moved its 'balance' point back about a full 1 1/2" from what the plan showed, I asked him a simple question....

> "You see that your plane flies the same at virtually any speed, it doesn't porpoise, and it lands super slow. It turns on a dime and shows the smallest thermal... But it's balanced way behind what the plan shows. Are you going to put the lead back in, so it balances where the plan showed, so it flies goofy again?"

He said, "Yes, because the designer must know the right spot to balance it at, since he designed it." So, he put all the lead back in and proceeded to put it in the top of a tree on the subsequent flight. Go figure...

I hear guys say things like, "I like my plane a little nose heavy; it makes it more stable." Or, "If you get the balance point too far back, it gets too twitchy."

The first statement implies that 'more stable' is a good thing, so we should all fly an unbalanced plane. The second statement has a negative connotation, because of the word 'twitchy'.

The 'more stable' statement implies that the guy has through trial and error found the farthest balance point back behind or at the 'neutral' balance point, then added lead to the nose to get it just right. Which he didn't. Guys like this add lead to get the plane to balance slightly ahead of where the plan showed... Really nose heavy. A plane balanced forward of the neutral point, takes more elevator to get the nose to raise, as in when you are low and slow, going down wind. That condition causes you to add more up to get that heavy nose to raise when there is very little air for your elevator to react against... Causing you to pull even more elevator. All that up causes the airflow to stop traveling over the surface, which causes a 'snap roll', what other guys would blame on a "tip stall".

The second statement has a negative connotation because of the word 'twitchy'. How about substituting a different word... And stating that a neutrally balanced sailplane is 'controllable'? Doesn't sound like a bad thing now does it? So if, when the plane is 'balanced', it doesn't need much up elevator to raise the nose, you can reduce the travels or use dual rates to 'calm' the plane down at high speeds.

You've heard of the 'Dive Test'? Probably the dumbest thing anyone ever came up with for checking balance. I hear modelers talk about it saying that when the plane is nose heavy, it will cause the model to pull up quickly and, one that is neutrally balanced or tail heavy, will 'tuck' or increase its dive angle as speed increases.

All probably true but goofy to be talking about in the context of balance. A nose heavy plane has to fly with UP elevator trim, so naturally it will balloon with airspeed. More air passing over the elevator's surface gives it more authority. A tail heavy plane tucks because it has some down elevator — since a tail heavy plane flies a lot better backwards, that's where the weight is!

But lots of things affect what a sailplane does at high speeds. Tail boom flex causes a reaction on the pushrods, changing the position of the rudder. The shape of the stabs can put huge twisting down loads on its tips. Push rod flex can also create things like tuck....But all this is still goofy to be used for determining optimum balance. Since when do we ever achieve and maintain those kinds of speeds when circling in a thermal?

There is never a good reason to have an unbalanced plane. Because the plan shows a CG, that doesn't ever mean it is the optimum balance point for the plane you built. (A lot of what we have done with CG comes from the Free Flight days, where planes were balanced forward so that if they got tipped into a dive they would pull up. We don't fly free flight, we pay big bucks for a transmitter so that WE can decide when or if we want our plane to pull up.)

Here is a simple way to get your plane almost perfectly balanced before launching. *(Keep in mind that this system is easiest to use with a sailplane equipped with a full flying stabilizer, as fixed stabs bring decalage, or the alignment (usually mis-alignment) of the horizontal stabilizer to the wing, leaving the elevator to attempt to compensate for the two surfaces fighting each other.*)

It's called "Gordy's Sailplane Balancing System", named after a brilliant, intuitive RC soaring legend.

On the bench, balance the plane on a couple of pencils, or your finger tips, at about 40% of the root chord, from the leading edge of the wing. (Root chord is the width of the wing panel at the center of the wing).

(No I don't care what the plan says;

unless it says 50%, then go ahead.)

Go do a few hand tosses to get the plane trim, so that hands off, it flies flat and level, not diving nor ballooning… Just a long flat glide. If your glide is heading downward, it's not trimmed for a long flat glide!

Now, once trimmed as stated, give it a good toss, get it flying straight and keep your hands off of the elevator stick! The only important part of this system is the last 10' of its glide, so watch what the nose does very carefully. If at the end when the sailplane slows, the nose suddenly drops to the ground, GET THE LEAD OUT.

The nose dropped because the elevator ran out of power (air moving over it) to hold all that lead in the nose up. So start pulling lead. (Note! With each chunk of lead you pull out, you will need to take some up trim out, as the elevator is having to do less work.)

When finally your plane flies flat off the toss, and at the very end, the tow hook touches first, YOU ARE BALANCED, or at least as close as you can tell this close to the ground.
step, launch the plane and get it trimmed in the air for flat and level flight. Then flip it over inverted. Your goal is to pull lead until almost no (thats like almost NONE) down elevator is required to hold the plane inverted in level fight.

Now when your plane enters lift it will pop its tail up like a dog in heat, as it is not being forced downward with compensating up elevator, trying to hold a lead laden nose from diving down. It will land like a feather, because it can be slowed to incredibly low flying speeds without the nose dropping like a descending rock.

The bottom line is that it doesn't matter where the balance point of your sailplane measures. What matters is that your sailplane is optimized to be as 'clean' in the air as possible, and that it reacts when told, always maintaining its attitude, regardless of air speed.

So get rid of that plan and get that plane balanced! Once balanced, you can reduce surface movement travel, use your dual rates or expo, and get that plane tuned up for attempts at the winner's circle!

Next trip is a flight! An electric flight at that. I'll be reviewing Hitec's new Sky Scooter Pro Version 2. An EPP speed 400 electric that has me grinning lately.

As always, you can reach me for questions at <GordySoar@aol.com>.

■

MWSC 2002

RCSD writer Greg Smith's DAW Foam-51. Mike Bailey launches. Photography by Dave Garwood.

By Tom H. Nagel
904 Neil Ave.
Columbus, OH 43215
tomnagel@iwaynet.net

Flying at the Lakeside Mayfly Festival - July 2002

The stories I send to RCSDigest are usually about a vacation to some place that is great to go for flying. Sometimes I don't get to fly much, but that's my family for you. The sites are usually well worth a visit for the flying alone. This story is different. This is about finding a way to fly a little at a place that is worth visiting for a vacation, even if the flying is not so great. The story starts over a hundred years ago.

My wife's Great Aunt Lucretia was a Methodist church lady living in Chillicothe, Ohio, and she liked to hang out with her church buddies and go to retreats and Chautauqua and stuff like that. (Chautauqua is an Iroquois word that translates roughly as "concentration camp for Protestants.") Lucretia's husband was a funeral director in Chillicothe who liked to drink beer, smoke cigars and play cards with his buddies. So, Lucretia's husband built her a cottage in Ottawa County, Ohio on the Marblehead Peninsula, in the little Methodist retreat center now known as Lakeside. Lucretia would take the train to Lake Erie and spend her summers at the Lake with her church buddies and her husband stayed home, played poker, drank beer and smoked cigars. It worked out so well that Lucretia's cottage is still in my wife's family over a hundred years later.

Now days, even Methodist church ladies play cards, drink beer and smoke cigars. So the whole family goes to Lakeside. Now days, we drive up in a Ford towing a sailboat and three kayaks, with two dogs in the crew. (Yes, we take the dogs, too. They get rinsed off in the lake at least twice a trip and smell a whole lot better on the way home.)

The Heath-Nagels are now in charge of opening and closing the cottage each year, and we spend a couple of weeks up there every summer. Church stuff isn't mandatory anymore, and the Methodists leave you alone if you keep the beer on the porch, and are otherwise and in all respects just the kind of people you'd want owning the lakefront cottage next door to you. The Victorian architecture is fun, the heavily wooded grounds are cool and pleasant, and the fishing off the 100 yard long concrete pier is astounding. You can catch one of everything if you stand there long enough. Right now the smallmouth bass are abundant, since their favorite food is Lake Erie's latest European invader, the round Gobi.

Tiger Moth, flown by Tom and Rew.

The HEATHCLIFFE sign is displayed on the front of the family cottage. Tom's wife's last name is Heath.

When you buy a pass into Lakeside, it is like buying a ticket into another century, one where homes were small, nobody drove cars, and everybody left their doors unlocked. Everyone travels by bicycle. You can let the kids roam free without concern. You can play as much free shuffleboard as you want, but just make sure you don't get snookered by an elderly Wesleyan shuffleboard shark. When ESPN2 covers the Intergalactic Shuffleboard Finals, the venue is Lakeside, Ohio.

There is a sailing club where you can rent a slot for your Sunfish or Laser, or take sailing lessons and get free rentals for the week. There are free tennis courts. There are free swimming lessons for the kids. And every June there are hordes of free mayflys. More on that later.

Every night there is free entertainment in a massive auditorium. Some of it is pretty good stuff —the Preservation Hall Jazz Band, Celtic Storm, Karla Bonhoff, and the Flying Karamozov Brothers, for example. The Karamozov Brothers were as close as I ever got to flying at Lakeside, though. This year, I decided to change that.

The problem with flying at Lakeside is all those 200 year old oaks and walnuts and ash. The whole place is heavily wooded. The Fox squirrels almost outnumber the church ladies. The only open space at all is the old "parade grounds" up the hill by the clay court tennis club. The parade grounds are laid out as a football field, but benefit the schools that run their summer band camps at Lakeside. Nobody ever plays football there. I considered it as a place to try a handlaunch glider. Let me describe the parade grounds:

Bushes and trees crowd the south sidelines, never more than ten feet from the sidelines. There are no end zones –- just 100 yards of chalk lines. The tennis club's chain link fence crowds the east end. Tall power lines run across the west goal line. And the woods sort of sneak out onto the field from the south sideline. Trees overhang the south sideline at the east 20 yard line. By the 40 yard line, whole tree trunks are out in the field, and by the time you march to the west goal line, the entire marching band is in the shade. The timber on the parade grounds doesn't seem to faze the marching bands much, but the flag twirlers have to watch out for overhanging branches. At best there was 2/

The Spirit of St. Louis Park Flyer from the Toledo Show, one example of light electrics that would work well on vacations.

Scratch built PT-19 from the after-Toledo-Show indoor electric fly at Bowling Green State University, another example of light electrics that would work well on vacations.

3rds of a football field in which to fly. No way was I going to get a HLG to work in there, even with my wimpy javelin launches.

So I decided to do what any self respecting lawyer would do. I decided to cheat. This year I hauled along my son's park flyer, a little GWS Tiger Moth. The TM rode safely all the way to the lake, perched up on top of the luggage in the van and survived the risks of shifting loads and nosy family dogs.

Rew and I got started flying electrics with an indoor electric group put together by Terry Nitsch this last winter. It was the first interest Rew had ever shown in actually flying a model airplane. (As opposed to hanging out with the old guys at the field and driving golf carts at the NATS.) He thought the Pico Stick was way too ugly for a cool kid like him to fly, but suggested maybe the Tiger Moth would be OK. Good choice. The TM not only flies better than the Pico Stick, but it has a smaller wingspan and travels better, too. And as it turns out, the indoor flying was great practice for flying out of Lakeside's so-called parade grounds. With a little concentration, I was able to take off and land in the tiny clearing, while amazing the Methodists with my flying skill.

I also amazed one of the local frisbee dogs, who thought the TM was fair game. Unlike a frisbee, the TM managed to climb and swerve until the dog owner got a leash on the critter.

So, what has this got to do with RC Soaring?

Well, first off, if you are having sailplane withdrawal symptoms, flying a park flyer is better than not flying at all.

Secondly, it turns out that the TM is a great little thermal hunter. You can use the TM to practice your low level thermal locating instincts. You just cruise around in a lazy circle, and the TM signals lift by going up, Up, UP! Then I got to practice my spin, to get back into the tiny field.

Thirdly, the TM is great for helping you locate other RC sailplane enthusiasts. I found out that our elderly Lakeside neighbor, Amos, is a long time RC flyer with a Gentle Lady and some sort of flying wing in his past. Several vacationers, including lots of kids, stopped to watch the middle aged dude and his son flying a biplane. We told all of them about light electrics and sailplanes. Nobody who stopped had any problems with the tiny electric RC biplane. We might have made some converts.

And fourthly, even if you don't get to fly RC you can still feel good in comparison to the Lake Erie Mayfly (genus Hexagenia megabunchabugga). Mayflies spend one to two years burrowing in lake bottom mud, then emerge briefly at the end of June (hence the name Mayfly), mate, clog gutters and die. Not being able to eat, they don't even get lunch.

This year we were at Lakeside in time for the Mayfly Festival, which started Thursday night right after the Celtic Storm concert. An hour and a half later, Coast Guard radar was picking up swarms of Mayflies emerging from the lake bottoms and the swarms were everywhere. Mayflies carpeted the roadways under the street lights, and cars were sliding through intersections on layers of slick bug bodies, like Gordy through the landing zone. It was heart warming to see two gazillion critters each of whom fly worse than I do.

In closing, if you are looking for a great place to fly in the Midwest, try Muncie. If you want to hang out with the family in a quiet lake shore Victorian village with free shows, tennis and shuffleboard, and great fishing and sailing, call the folks at Lakeside to make reservations.

Bring your park flyer, and don't worry about the Mayflies. They don't bite.

Check at it out at:
www.lakesideohio.com

The Lakeside Association
236 Walnut Avenue
Lakeside, OH 43440
Phone: 419.798.4461
Fax: 419.798.5033
Toll Free: 1-866-9 LAKESIDE

Accommodations:
accommodations@lakesideohio.com
Extension 234

REQUEST A COPY OF THE 2002 CALENDAR!
Schedule@lakesideohio.com
Extension 0

Smith's Realty
213 W. Third Street
Lakeside, OH 43440
For reservations: (419)798-4415

Lakeside NorthCoast Realty
317 Maple Avenue
Lakeside, OH 43440
Info.: (800)494-5400 or (419)798-5400

Bolte Real Estate, Inc.
209 West Second Street
Lakeside, OH 43440
Info.: (419)798-4779 or (800)464-5247

Fine dining:
The Crow's Nest (on Catawba Island)
Jimmy's Gotcha (with food much better than Jimmy's naming skills)
Marina Del Isle
Bomba's Fish Cleaning and Donuts, a local legend

And of course:
The Almost Official Mayfly Website
www.cros.net/jlucas/june.html
Bugmeister John Lucas, Port Clinton, OH

■

TULSOAR

TULSA RC SOARING CLUB

AMA CLASS A SANCTION APPLIED

21st ANNUAL LAST FLING OF SUMMER

BLUE SPRINGS SOD FARM, Broken Arrow, Oklahoma
September 13, 14 and 15, 2002

Friday, Sept 13th, 2PM:	Class A: Handlaunch	6 Rounds
Saturday, Sept 14th, 9AM:	Class D: Unlimited	6 Rounds
Sunday, Sept 15th, 9AM:	Class B: 2 Meter	4 Rounds

(Expert and Sportsman Class for each Event)

Awards:

1st Place Overall	Trophy For Combined 2m and Unl scores (Flyoff in case of tie)
Handlaunch	1st thru 3rd, 1st place for Sportsman (Certificates and cash awards)
2m and Unlimited	1st thru 5th. 1st place for Sportsman (Certificates and cash awards)

Event	Entry Fees	
Friday Handlaunch	$10.00	Attached
Saturday Unlimited	$20.00	T1(modified) / L6
Sunday 2 Meter	$20.00	T1(modified) / L6
Event Discount	-$5.00 (More than 1 event)	
PreRegistration Discount	-$5.00 (By 9/06/01)	
Total:	$_____	

CD:
Dave Register
737 Brookhollow Lane
Bartlesville, OK 74006
(918)-335-2918
e-mail: regdave@aol.com

ASSISTANT CD:
Dave Miller
3909 N. Battle Creek Dr..
Broken Arrow, OK 74012
(918)-355-3909
e-mail: dmiller@sitemaster.com

ENTRY FORM
Name:_____
Street:_____
AMA:_____
Frequency (1st/2nd) HL:_____/_____
Amount Enclosed:_____

Date:_____
Phone:_____
City_____
Open/Sport:_____
2M: _____/_____
(To: Tulsa RC Soaring Club)

e-mail (optional):
_____
St/Zip:_____
Unlimited: _____/_____
(Return Entry to CD)

Cancellation prior to September 9th will receive a full refund. Mail or e-mail to Dave Register

Classified Advertising Policy

Classified ads are free of charge to subscribers provided the ad is personal in nature and does not refer to a business enterprise. Classified ads that refer to a business enterprise are charged $5.00/ month and are limited to a maximum of 40 words. *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs. Personal ads are run for one month and are then deleted automatically. If you have items that might be hard to sell, you may run the ad for 2-3 months.

For Sale - Business

PARACHUTES: $12.50 (includes S&H U.S.A.) Send check or money order to Dale King, 1111 Highridge Drive, Wylie, TX 75098; (972) 475-8093.

Reference Material

Summary of Low-Speed Airfoil Data - Volume 3 is really two volumes in one book. Michael Selig and his students couldn't complete the book on series 3 before series 4 was well along, so decided to combine the two series in a single volume of 444 pages. This issue contains much that is new and interesting. The wind tunnel has been improved significantly and pitching moment measurement was added to its capability. 37 airfoils were tested. Many had multiple tests with flaps or turbulation of various configurations. All now have the tested pitching moment data included. Vol 3 is available for $35. Shipping in the USA add $6 for the postage and packaging costs. The international postal surcharge is $8 for surface mail to anywhere, air mail to Europe $20, Asia/Africa $25, and the Pacific Rim $27. Volumes 1 (1995) and 2 (1996) are also available, as are computer disks containing the tabulated data from each test series. For more information contact: SoarTech, Herk Stokely, 1504 N. Horseshoe Circle, Virginia Beach, VA 23451 U.S.A., phone (757) 428-8064, e-mail <herkstok@aol.com>.

BBS/Internet

Internet soaring mailing listserve linking hundreds of soaring pilots worldwide. Send msg. containing the word "subscribe" to soaring-request@airage.com. The "digestified" version that combines all msgs. each day into one msg. is recommended for dial-up users on the Internet, AOL, CIS, etc. Subscribe using soaring-digest-request@airage.com. Post msgs. to soaring@airage.com. For more info., contact Michael Lachowski at mikel@airage.com.

International Scale Soaring Association

There is a growing interest in scale soaring in the U.S. We are dedicated to all aspects of scale soaring. Scale soaring festivals and competitions all year. Source for information on plans, kits, accessories and other people interested in scale. For more information:

web site: www.soaringissa.org

Books by Martin Simons: "World's Vintage Sailplanes, 1908-45", "Slingsby Sailplanes", "German Air Attaché", "Sailplanes by Schweizer". Send inquiries to: Raul Blacksten, P.O. Box 307, Maywood, CA 90270, <raulb@earthlink.net>. To view summary of book info.: http://home.earthlink.net/~raulb

T.W.I.T.T.

(The Wing Is The Thing)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines. Full information package including one back issue of newsletter is $2.50 US ($3.00 foreign). Subscription rates are $20.00 (US) or $30.00 (Foreign) per year for 12 issues.

T.W.I.T.T., P.O. Box 20430
El Cajon, CA 92021

Sailplane Homebuilders Association (SHA)

A Division of the Soaring Society of America

The purpose of the Sailplane Homebuilders Association is to stimulate interest in full-size sailplane design and construction by homebuilders. To establish classes, standards, categories, where applicable. To desiminate information relating to construction techniques, materials, theory and related topics. To give recognition for noteworthy designs and accomplishments.

SHA publishes the bi-monthly Sailplane Builder newsletter. Membership cost: $15 U.S. Student (3rd Class Mail), $21 U.S. Regular Membership (3rd Class Mail), $30 U.S. Regular Membership (1st Class Mail), $29 for All Other Countries (Surface Mail).

Sailplane Homebuilders Association
Dan Armstrong, Sec./Treas.
21100 Angel Street
Tehachapi, CA 93561 U.S.A.

The League of Silent Flight (LSF) is an international fraternity of RC Soaring pilots who have earned the right to become members by achieving specific goals in soaring flight. There are no dues. Once you qualify for membership you are in for life.

The LSF program consists of five "Achievement Levels". These levels contain specific soaring tasks to be completed prior to advancement to the next level.

Send for your aspirant form, today:

League of Silent Flight
c/o AMA
P.O. Box 3028
Muncie, IN 47302-1028 U.S.A.

http://www.silentflight.org

The Vintage Sailplane Association

Soaring from the past into the future! The VSA is dedicated to the preservation and flying of vintage and classic sailplanes. Members include modelers, historians, collectors, soaring veterans, and enthusiasts from around the world. Vintage sailplane meets are held each year. The VSA publishes the quarterly BUNGEE CORD newsletter. Sample issues are $2.00. Membership is $15 per year. For more information, write to the:

Vintage Sailplane Association
1709 Baron Court
Daytona, FL 32124 USA

ESL

The Eastern Soaring League (ESL) is a confederation of Soaring Clubs, spread across the Mid-Atlantic and New England areas, committed to high-quality R/C Soaring competition.

AMA Sanctioned soaring competitions provide the basis for ESL contests. Further guidelines are continuously developed and applied in a drive to achieve the highest quality competitions possible.

Typical ESL competition weekends feature 7, or more, rounds per day with separate contests on Saturday and Sunday. Year-end champions are crowned in a two-class pilot skill structure providing competition opportunities for a large spectrum of pilots. Additionally, the ESL offers a Rookie Of The Year program for introduction of new flyers to the joys of R/C Soaring competition.

Continuing with the 20+ year tradition of extremely enjoyable flying, the 1999 season will include 14 weekend competitions in HLG, 2-M, F3J, F3B, and Unlimited soaring events. Come on out and try the ESL, make some new friends and enjoy camaraderie that can only be found amongst R/C Soaring enthusiasts!

ESL Web Site: http://www.e-s-l.org

ESL President (99-00): Tom Kiesling (814) 255-7418 or kiesling@ctc.com