R/C Radio controlled SOARING DIGEST
THE JOURNAL FOR R/C SOARING ENTHUSIASTS
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TABLE OF CONTENTS

The Soaring Site

RCSD Index

The *RCSD* index has been updated to include 2003, and is now available from our main web page. Thanks to Lee Murray for all the hard work!

RES & Nostalgia Rules

We received a couple of questions regarding RES and Nostalgia Rules. We double checked the LSF web site and find the rules are posted. The LSF web site is:

<http://www.silentflight.org>

Santa Clarita Soaring Association

A new club link for the Santa Clarita Soaring Association has been added to our list of clubs and organizations off the main *RCSD* web page:

http://home.earthlink.net/~djndan/index.htm

The Santa Clarita Soaring Association is located in the Santa Clarita Valley, California. They promote remote controlled soaring and electric powered airplanes of all types.

Austin Silent Flyers

Another new club link has been added to the club listings page for the Austin Silent Flyers:

http://www.austinsilentflyers.org

They are a growing club in the Austin, Texas Metroplex area. Their focus areas include electric and non-powered flight.

Special Thanks

OOps! I missed a special thanks to Bill Kuhl. Both he *and* Bill Kuhlman provided the technical expertise needed to ensure that I didn't mess up the series of articles recently provided by Mark Drela. Sorry, Bill!

Mess up? Oh, yes, and to give you an example, computer translations don't always work as I would expect, or like. Because of this, the Christmas article in the December issue was cut short. The tail end of the article included a chart on "Data for Foam Boards" by Dave Beck and Lee Murray. The chart didn't look much like a chart when I was through with it! Thanks to Dave Register, who has taken back control of his computer and escaped from the clutches of the hospital staff (not Adele's, of course), that article is included in this issue.

FAI 'Aeromodelling Information'

The following message is from the FAI 'Aeromodelling Information' mailing list, forwarded to us by B2. (CIAM Home Page: http://www.fai.org/aeromodelling/)

"FAI has ratified the following Class F (Model Aircraft) record:
==========
Claim number : 7851
Sub-class F3B (Glider)
F3: Radio controlled flight Category
Type of record : N°157: Gain in altitude
Course/location : St Vincent les Forts (France)
Performance : 2 068 m
Aeromodeller : Frédéric JACQUES (Monaco)
Crew : Thierry REGIS
Date : 19.07.2003
Previous record : 1950 m (11.06.1982 - Jack R. HINER, USA)
==========
"FAI congratulates the aeromodellers on their splendid achievement."

Please send in your scheduled 2004 events as they become available!

COLD WEATHER SLOPE SOARING

Terry Dwyer, New York Slope Dog from Syracuse NY, with CSD Slope Scale Northrop F-20 Tigershark on a chilly but mega-wind flying day at Lake Ontario in November, 2003.

Photography by Dave Garwood, New York.

BACK COVER

"C'mon, Dad! Hook me onto the Tug!"

Peter Abell's 10 week old daughter in the cockpit of Bill Bland's 1/3rd scale Fox at an aerotow day at Madden's Plains south of Sydney (Australia).

Photography courtesy of Bruce Abell, Australia.

Building a Solar Plane

We received an e-mail request for information on building a solar plane, recently.

"I am a student at the U of MN, and am working with some other classmates to design a solar powered plane, and I was hoping that you could help me! I would appreciate some advice on what kind of skin/wing covering material to use. I need the lightest strongest material available. I was thinking some kind of mylar film would be good, but don't know which would be best. Also, how far apart could I space the ribs for a given covering material thickness? How much will the skin material deform for a given rib spacing distance, and is there an easy way (or hard way) to estimate the amount of skin deformation when flying? I need to place the ribs as far apart as possible to save on weight. Also, is there a good way to estimate the forces that will be acting on the ribs? How far apart do you think the ribs should be spaced?

"I would really appreciate your help with this!"

Thanks, (signed Matt)

So I sent his message to the experts on this subject, saying, "Matt, I am forwarding this message to Lee Murray for his assistance in response, as he was involved with Dave Beck when Dave set a record on solar flight in R/C.

Lee's response back follows:

"Matt, Dave and I would be happy to share our thoughts on models and wing construction. Dave has tried a few things and found out some things that don't work.

Regarding Covering:

"At one time he was using 3M window insulation film. I suspect that was a polyethylene. I got Dave some optical grade Mylar from a Dupont contact. That may have been the best covering although you have to add the adhesive to the structure to use it.

Regarding Rib Spacing:

"Dave used the width of the solar cells for rib spacing. The spar was a carbon fiber tube. The original model was a kit from Germany. Dave stretched the wingspan and increased the tail surfaces to compensate using PC-Soar, my program.

"Dave did some testing of his on matching props, motors, gearboxes and solar plane cell output. Presently he is using a hand wound "Out-Runner" motor. He has some magic in mind for reconfiguring the solar cells automatically to get the most out of the motor.

"My link to his web page doesn't work any more. Dave - Where is your page now?"

(signed) Lee Murray

Yup, Lee sent a message on to Dave Beck. Dave's response follows:

"Hi All. I'm still in the solar powered model airplane game. My web site was moved - the current address is:

personalpages.tds.net/~dbeck

"Lee is right on what he says. To add a little detail to this, the covering that is clearest is the inside version of 3m window covering. However, this is not very stong - it shrinks great and is easy to cover with.

"The clear optical grade mylar that Lee got for me is also very clear and is very strong so it acts like a structural element. However, it is not easy to shrink and I usually get wrinkles in it, no matter how careful I am.

"The solution I've settled on is to make a wing with flat facets that is structurally strong. On top of this I add small strips of balsa that frame out airfoil shape. I then place the cells between the small rib-lets, and cover with the 3m window covering.

"There are lots of things that I can tell you about building these types of planes, but it probably would be best if you looked over the web site and then asked questions.

"By the way, you are the third guy in the last week that has asked for details on building solar planes. Maybe you all could join in on such a project.

"Let me know if you have any questions."

Regards, (signed) Dave Beck

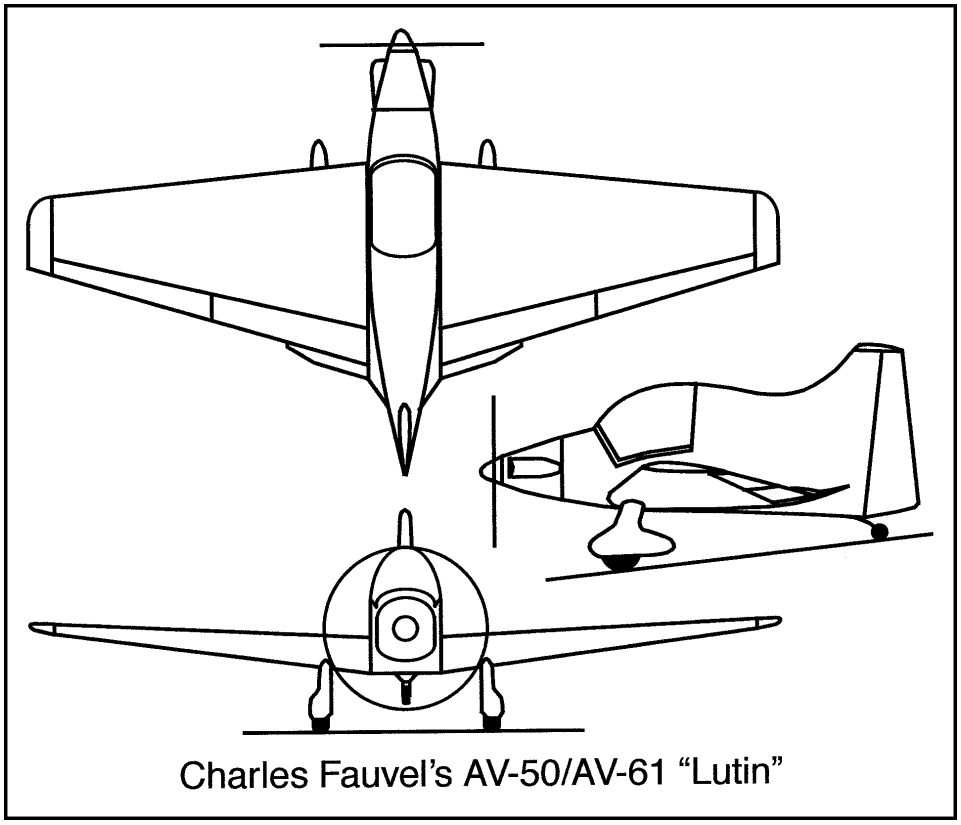
My thanks to both Lee and Dave for taking the time to share their expertise on the subject of building a solar plane. If any of you need help in this area please let them know!

We do get requests on various subjects every month and, as you readers can see, we try to respond to all questions, one e-mail at a time!

Happy Flying!
Judy Slates

on the Wing B²

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



Charles Fauvel's AV-50/AV-61 "Lutin"

Fauvel's AV-50/AV-61 "Lutin"

The Fauvel AV-50 "Lutin" (Imp), also known as the AV-61, was a single-seater all-wood light aircraft of tailless configuration, designed by Georges Jacquemin, a Canadian engineer. One of the last of the Fauvel aircraft, the AV-50/AV-61 looks like it would make a good flying electric. If built light, it may have more than a little thermal soaring potential.

The nomenclature of the "Lutin" has a rather interesting history. The AV-61 designation was given because of its chronological position in the Fauvel line. Its predecessor was the AV-60 "Leprechaun," built and flown in the USA. The AV-61 was a simplified version of the AV-60 and the construction principles were the same with the exception of a few details (some control components were identical to those of the AV-45 motorglider, for example). The nomenclature was changed to AV-50 to more accurately reflect its design and construction heritage.

Suitable power plants included modified Volkswagen engines, developing 40 to 67 hp, and the 40 hp Rotax or Hirth two-stroke engines. The nose length can be modified to accommodate various engine dimensions. A tandem wheel, tailwheel or tricycle landing gear could be fitted. The tailwheel version is depicted in the included 3-view which is derived from a small Janes' illustration and reproduced "shop" drawings.

The AV-50 wing section could be either the original Fauvel 14% or a Wortmann FX 66-H-159 laminar airfoil. Neither of these sections are appropriate for model use. The Fauvel is too thick, particularly at the leading edge, and the Wortmann profile has an upper surface high point which is probably too far back even with turbulation. Better choices for a model are the Eppler 228 (C_m = 0.0143) and the Eppler 230 (C_m = 0.0250).

Characteristics and performance of the AV-50/AV-61

Wing span	7.50 m, 24.61 ft.
Length (with VW engine)	4.10 m, 13.45 ft.
Wing area	10.60 m^2, 114.1 $ft.^2$
Airfoil	Fauvel 14% or Wortmann FX 66-H-159
Aspect ratio	5.2
Empty weight	190 kg, 419 lbs.
Gross weight	329 kg, 725 lbs.
Max. speed (tailwheel version)	205 km/h, 127 m.p.h.

One prototype was under construction in Australia; its wing section, originally intended to be thinner, retained the thickness of the Fauvel section. It is unknown as to whether this aircraft ever took flight. No other AV-50 are known to be under construction.

The AV-50 plans show a very cute little aircraft that would perform well given the proper airfoil whether built as a model or as a full size aircraft. The big question is why this aircraft hasn't been more successful. One contributor is, of course, Charles Fauvel's death, but a more major factor may be simple lack of advertising.

It is very difficult to obtain information about this aircraft, and we wish to sincerely thank Christophe Bordeaux of France for forwarding to us electronic copies of all of the relevant information in his archives.

References:

Bordeaux, Christophe. <http://www.nurflugel.com/Nurflugel/Fauvel/>

__. Personal e-mail correspondence, November and December 2003.

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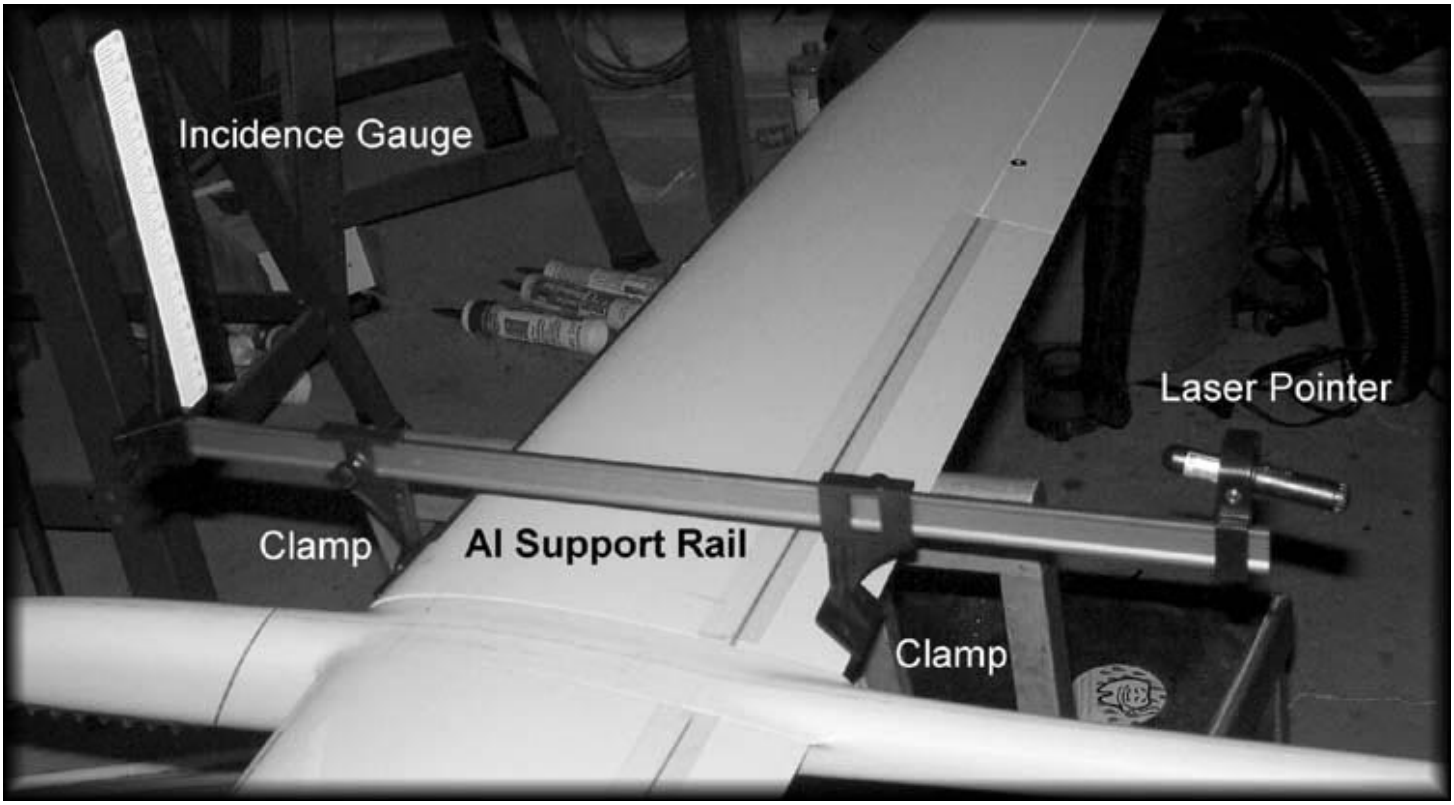
TECH TOPICS

Dave Register
Bartlesville, Oklahoma
regdave@aol.com



This month we'll cover two items (in lieu of the 2 meter design work which has been somewhat delayed):

Phil Barnes' tutorial on bagging wings
&
Great Planes' Laser Incidence Meter

"VACUUM BAGGING MADE EASY - THE PRODUCTION METHODS OF PHIL BARNES", by Phil Barnes and Bill Haymaker

Anyone who has purchased any of several high performance sailplanes manufactured in the US is flying on wings and stabs made by Phil Barnes. The Victory, Edge and XP3 are a few of the planes that benefit from his craftsmanship.

In this 2 DVD set, Phil shares his techniques for vacuum bagging and general composite wing construction. Mike Garton first noted this tutorial in his *Model Aviation* column. Based on Mike's comments I ordered the DVD-R format.

The DVDs arrived on a Saturday full of 'honey-dos' so I didn't notice it until about 11PM that evening. I tossed one in my DVD player just to be sure it played. About 5AM in the morning I finally dragged myself away from the TV. Yes, it was that good!

Needless to say, Fr. Steve's sermon didn't have much impact that morning. Adele's elbows did - every time she jabbed me in the ribs to wake me up. A small price to pay for the knowledge gained in that first viewing.

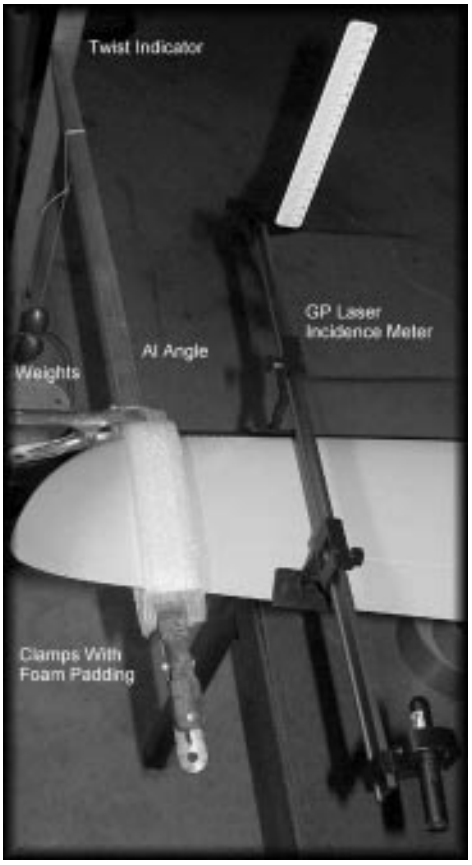
The DVD format lends itself well for this type of tutorial. Bill Haymaker has edited the DVD into segments which can be separately viewed and re-viewed almost instantaneously. If you didn't quite get all the details of the leading edge prep, just click over to that segment and play it again. Missed the part about setting the proper bias cuts for the skins? Ditto.

Anyone who has bagged a wing understands the basic principles. Phil adds to this some of the many little 'tricks' he's learned over the years that make the difference in quality and durability. The style is casual with Phil just working in his shop while he talks through what he's doing and why.

The real gems come along when he stops for a moment and makes an off hand comment – "Well, normally you'd do this lay-up this way but it works better if you put it down like this and then add a little resin like this and then roll it out with this little tool I found at Home Depot and then…..".

For anyone that vacuum bags, or thinks that someday they want to vacuum bag, this is a 'must-have' DVD set. Add it to your Dave Thornburg and Paul Naton videos and you're covered from building to flying and everything in between.

Ordering Information:
http://www.paonline.com/hayman/video.htm



George Voss' on-line review can be read at:

http://www.liftzone.com/

Click on Reviews to find this and other great articles.

GREAT PLANES LASER INCIDENCE METER

Great Planes has provided several incidence meters over the years that use various mechanical gauges to do the job. In this latest version, the mechanical gauge has been replaced with a small, low wattage solid-state laser mounted on a gimbal to provide a sharp dot of light on the incidence angle scale.

For those who haven't used an incidence meter, its primary function is to determine the DIFFERENCE in angles among various airframe components. For instance – washout is a condition where the wing tip is flying at a lower angle of attack than the wing root. This is used to minimize the potential for a tip stall. An incidence meter can determine the amount of twist in the wing and whether it's the same for both wings.

Decalage is another example. This is the difference in angle of attack between the wing and the horizontal stabilizer. Normally the stab should be at 1 or 2 degrees negative with respect to the wing (lower angle of attack for the stab than the wing).

The Great Planes meter is set up with an aluminum rail with sliding and rotating grips below the rail to properly center the device on the leading and trailing edges of the surface to be measured. The laser (a low power presentation pointer – very clever!) is mounted on a gimbal on one end of the rail. An indicator plate is mounted on the other end with marks at 0.25 degree increments.

The laser gimbal has an offset dial weight that can be used to conveniently zero the scale indication. You then move the indicator assembly to another location on the airframe, snug up the sliding mounts and read the new angle. The difference in angle between the two locations gives you valuable information for setting up your airframe.

Let's use two examples to show how this can be used. On my Whisper 2M, I continue to have problems with a left wing tip stall. Setting the CG and trim is also tricky. Let's see what our incidence meter tells us.

In the first picture, we've assembled the plane and secured it on some mounts. The incidence gauge is set on the right wing root. After zeroing the indicator, we now move it to the right stabilizer and find that the decalage is – 1 degree. Exactly where I hoped it would be.

Repeating the process on the left wing gives the same results so I now know three things:

1) The left and right wing are at the same angle of attack at the root (Aw),
2) The left and right stabs are at the same angle of attack (As),
3) The decalage (As-Aw) is about -1 degree which is typically where I want it, and
4) The pitch sensitivity is most likely related to dead band in the flat plate style V-stabilizers and the low static margin of this design.

Moving on to washout, we again note the angle indicated by mounting the meter at the wing root. Now we move the gauge to the right wing tip. The same angle is indicated. So far so good – the problem is not in the right wing.

Repeating the process on the left wing indicates about 0.75 degree wash-in. That is, the wing tip is flying at a higher angle of attack than the root. Since the plane has a tendency to roll to the right and tip stall to the left, this is consistent with what I thought was going on. But now I've got some hard numbers to work with.

To correct the problem, Jim Frickey and Jeff Naber suggested twisting and heating the wing. What eventually worked out was a homemade jig to twist the wing while heating it. This jig held the wing in the twisted position until fully cooled so it could hold the 'set'. Hollow molded structures are a bit tougher to fix than the old open bay, Monokote covered wings!

The accompanying picture shows the clamps, weights and indicator used for this crude (but effective) operation. The dimensions of the indicator suggested 0.5 inch deflection was needed. 1.0 inch was actually used to allow for some creep back once the weights were removed.

With a little trial and error, the incidence gauge indicates the wash-in twist is gone. Both tips now measure the same angle of attack, which is the same for both roots. And, voila, the left tip stall is now gone!

Other uses for an incidence gauge could be to check the deflection of your control surfaces. Make sure left and right ailerons have the same throw and differential. Same thing goes for V-stabs, flaps, etc.

However you use it, an incidence meter is a valuable tool for setting up and maintaining any airframe. At about $20, the Great Planes Laser Incidence Meter is a terrific value and exceptionally accurate and easy to use.

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Gift Giving Ideas

from Lee Murray & Dave Beck

(With data on polystyrene foam products)

For the technical types, such as myself and my friend, Dave Beck, who collaborated on these recommendations. How about starting with an idea and ending up with a foam wing for that next great model. We start out with Profili 2 software that will help in the following areas:

Searching the right airfoil for your application
Creating new airfoils
Analyzing the airfoil aerodynamic (even if the airfoil comes from your custom shape)
Drawing, plotting or printing all the ribs for a trapezoidal or elliptical wing or the foam cutting templates http://www.profili2.com/eng/default.htm)

Those wanting to build a simple foam cutter can see the gravity based cutter at:

http://www.sea-gull.demon.co.uk/aero.htm

For laser cut templates, a resource is laser arts:

http://members.aol.com/laserartco/index.html

I also found a really great list of links for all aspects of model flight:

Http://www.westwindsrc.com/Links/index_html

It's amazing what's listed there.

For the flier that has everything, perhaps a CNC Hobbies foam cutter would be good for Christmas:

http://www.members.cox.net/ap1fuels/

This is an amazing cutter that would allow you to make your cuts with amazing reproducibly and without templates. Adjusting the cutting speed so the wire doesn't really touch the unmelted foam eliminates the cutting wire bowing back in the center. The melt back adjustment to your airfoil coordinates would need to be increased to get an accurate airfoil in that case. The hard to get parts and controllers are provided. The only down-side is that the stepper motors they have to sell require more power than the controller they sell. However stepper motors from printers and plotters can be used. You will need to assemble X - Y translation hardware that fits your needs. An example of a cutter made from CNC Hobbies parts and Home Depot hardware is shown on a web page:

http://www.8linx.com/cnc/cnc.htm

Regarding the process of foam selection, there are two general types of polystyrene foam: Expanded Polystyrene (EPS) and Extruded Polystyrene (XPS). A number of people manufacturer EPS, a.k.a. Bead Board, that is made of polystyrene pellets with a dissolved gas (Pentane) inside it. When the beads get heated above a certain temperature (the glass to rubber transition temperature) about 102°C for polystyrene, the beads expand and fill a chamber. Sometimes the chamber has square sides and the product is slabbed off to make sheets. There is some minor porosity to the EPS sheet. Sometimes the chamber into which the beads are put is a mold for a particular article such as a cooler or a model airplane. The beads expand to the mold and make a smooth surface against the mold.

The XPS is a continuous process in which the sides are smooth and the foam cells are closed. Dow Chemical makes Styrofoam(R), which is Gray or Blue (mostly blue) while Owens-Corning makes pink foam. There are multiple grades of foam made by each company for different purposes. Would you believe not even one product, to my knowledge, is designed for foam core model glider wings. Here are some physical properties you will find interesting. We really can't compare the compressive strength between Owens and Dow because

Data For Foam Boards

	Density, lb/ft^3	Compression Strength at 10% deflection, psi	Compression Modulus at 10% deflection, psi	Tensile Strength, psi	Sheer Modulus, psi
Dow Styrofoam Grade		Minimum	Minimum		
Grayboard	1.3				
Deckmate CM	1.6	30			
Floormate 200	1.6	30			
LT	1.7	37	1,774	67	1,182
IB	1.7	37			
Highload 40	1.8	40			
LB	1.9	44	1,774	74	1,182
Roofmate SL	2.0	44			
Perimate DI	2.0	44			
SP	2.1	52	1,478		
Floormate 300	2.1	52			
RTM	2.5	59	2,365	103	1,478
Floormate 500	2.4	74			
HD300	2.8	103	3,695	148	2,069
Floormate 700	2.8	103			
	Density, lb/ft^3	Compression Strength at yield or 5% deflection, psi	Compression Modulus at 5%, psi		
Owens Corning Grade		Minimum	Minimum		
Formular 150	1.4	15			
Insulpink	1.6	NA	NA		
Formular 250	1.8	25			
Formular 400	2.0	40	1,400		
Formular 600	2.4	60	2,200		
Formular 1000	3.6	100	3,700		
Spider Foam	Density	Minimum, psi			
(CST Data)	2.3	60			
White EPS **Bead Board**	1.3	~10			

Owens measures at the yield point (where your wings will dent) or at 5% deflection, while Dow reports a value at 10% deflection. The Dow numbers are expected to be higher.

The Owens data came from:

http://members.webpathway.com/patrulla@webpathway.com/Pink%20foam%20properties.txt

The Dow foam data came from several sources I found by searching for Dow polystyrene foam engineering data. The Owens data was in metric units, so I made unit conversions using factors or combinations of factors on the MIT web page:

http://www-mtl.mit.edu/~lincc/constants.html

Such a comparison should have some standards for comparison. I have included some limited data on Spider Foam that I obtained from the Composites Store, Inc. (a.k.a. CST):

https://www.cstsales.com/hot_wire/hot_wire_foams.htm

I also am providing the computed density of an Owens home insulation product Insulpink(R) board. The Owens web site did not provide the physical properties for Insulpink (R) probably because this application doesn't require strength considerations.

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Stressed-Skin Sizing over Servo Bays

Mark Drela 28 Apr 03

A servo bay cut into the bottom surface of a stressed-skin removes much of the buckling support for the upper surface skin directly above the bay. This loss of support severely reduces the stress which the upper surface skin can withstand without local buckling failure.

This analysis determines the increased local upper surface skin thickness which is required to compensate for the weakening of the servo bay. The alternative method of using short CF rods to stiffen the skin is also considered.

This calculation procedure requires using mostly the same relations as the skin sizing calculations, applied at the servo bay location.

Three-meter glider example...

E = 20 Msi, uni CF skin modulus

wing span : b = 130 in
wing load : F = 150 lb (winch line force)

unsupported spanwise length of skin:
case 1: L = 0.5 in (only over servo arm area)
case 2: L = 1.5 in (over whole servo bay)

At servo bay location (span fraction τ=0.2), MH32 (T/c=0.0866) ...

moment factor: a = 0.6 (from appendix table in file skin_sizing.txt)
stress factor: f = 0.0449 ("Ixx/t(Y-Yc)" from Xfoil, approx. 0.5*T/c)
chord : c = 9.7 in
bending moment : M = a b F/8 = 1460 lb-in
skin load : P = M/(f c^2) = 345 lb/in

minimum thickness of unsupported skin: $t_{bay} = 1.2 \, (P \, L^2 / E)^{0.3333}$

case 1: t_{bay} = 0.0195 in (4+ layers)
case 2: t_{bay} = 0.0290 in (6+ layers)

The increased local skin thickness may be impractical to implement. An alternative is to use CF rods buried just under the unmodified skin. Each rod should be perhaps 1.0-1.5" longer than the servo bay. The chordwise spacing of the rods must be set so that the resulting unsupported structure has a buckling load comparable to the surrounding supported skin.

chosen rod diameter : d = 0.060 in

existing skin thick.: t = 0.009 in

Rod spacings to match the required skin thicknesses from above...

For case 1...
required thick.: tr = 0.0195 in
rod spacing : $s = 0.6 \, d^4 / (tr^3 - t^3)$ = 1.16 in

For case 2...
required thick.: tr = 0.0290 in
rod spacing : $s = 0.6 \, d^4 / (tr^3 - t^3)$ = 0.33 in

These spacing estimates assume that the rods and the existing skin are not bonded together, and contribute to the stiffness independently. In reality, the fully-bonded structure will be stiffer than the sum of the parts. The non-bonded assumption simply produces a smaller and hence more conservative spacing.

Cold Weather Slope Soaring

Terry Dwyer's CSD Slope Scale Northrop F-20 Tigershark over Lake Ontario near Syracuse NY.

Writer Dave Garwood with CSD Slope Scale Aircobra, dressed in snowboarding jacket and snow pants. Photo by Terry Dwyer.

by Dave Garwood
Scotia, New York

DISCLAIMER: *This article is not for Californians or Hawaiians. You guys just turn to the next article. It is for those of us in the other 48 states.*

The National Weather Service forecast on Wednesday and Thursday indi cated highly favorable slope flying wind conditions setting up at Lake Ontario. It also indicated cool temperatures and some snow. No matter. New York Slope Dogs know how to dress for cold and windy conditions and we went out to fly anyway.

On Friday, mega-outdoorsman Terry Dwyer and I went to Lake Ontario to fly near Syracuse NY. Lucky for us the snow flurries stopped shortly after we got there, the sky clearing for three good hours of rock and roll flying. More luck: the hail didn't start until after we started driving home. Snow plow trucks were at work on the NYS Thruway, removing "lake effect" snow, but we had a great day of flying.

Terry's CSD Slope Scale Tigershark was positively *hauling*, and that plane looks great in the air. Terry also launched for the maiden flight on his Magnum Models Cobra Racer. I flew a new Windrider Aviation Bat, and my trusty old "Pinball" Aircobra. With all-basswood tail parts, it's my heaviest Slope Scale, recently epoxyed back together after landing out of sight and smacking into a limestone fence post at Wilson Lake in Kansas in May. Like the legendary Phoenix, it emerged from major repairs and flew "just like the very first time." Gotta love those Slope Scale Iron Horses.

All this big fun in 35 degree air temperature, 35 MPH wind, mostly cloudy conditions. How do we do it? By dressing for the conditions. OFB Steve Savoie used to say, "There's no such thing as cold weather. There's only under-dressed sailors." We can handle cold weather flying with preparation and attitude.

Terry Dwyer turns and burns his CSD Slope Scale Northrop F-20 Tigershark over Lake Ontario near Syracuse NY.

PREPARATION

Remember that with the wind chill factor, it's cold at the slope in winter. The solution is to dress for cold weather comfort.

Dress in layers. This strategy works because fundamentally it's the trapped air that keeps us warm, not the cloth, leather, fibers or feathers in the garment's construction. Air's relative resistance to transmitting heat is the reason goose down parkas work and pink fiberglass insulation in houses work as well as they do.

Trapped air holds in body heat. The air between layers of clothing adds to their insulating value so layers of clothing are warmer than an equivalent thickness of a single garment. Further, dressing in layers allows you to adjust your personal body temperature by adding or removing layers to suit conditions. Consider these specific items of clothing for cold weather exposure.

• **Head covering** is important, as physiologists estimate that as much as half the heat lost from the body is radiated from the head. A knit watch cap works well because it covers the head and ears. A knit ski mask covers the face as well but may reduce your visibility. My favorite is the balaclava, a knit cap that pulls down to cover the chin and neck, has an opening for the eyes and nose. Mine has a short brim.

• **Eye protection** in windy weather is important to preserve good vision because the cold increases tears. Wear regular prescription glasses, sun glasses, safety glasses, or ski goggles to protect the eyes. Ski goggles are a good choice, with their wrap-around lenses and ventilation mechanism to reduce fogging. I have a pair designed to fit over prescription glasses. The ski goggle lenses can be soft and easily abraded, but replacement lenses for many brands are available from 1-800-PRO-LENS.

• **Upper garments** are nothing special, but remember the layers. Cover your upper body with your favorite combination of long underwear, sweat shirts, sweaters, or flannel shirts topped off with a windproof jacket.

Terry's got that motorcyclist's bugs-on-the-teeth smile as he looks out over the Lake at the whitecaps and the snow squalls going *around* us.

Terry is dressed for cool and windy conditions with three layers of pants, sweater and parka, hear covering and eye protection. Terry has learned to fly with fairly thick gloves.

This last is the most important, I think, and my favorite outer upper garment is a hooded shell known as a "mountain parka" or "60/40 jacket" because it's commonly made of a combination of 60% nylon, 40% cotton. It's tough, windproof and slightly water resistant. Interestingly, it provides almost no warmth on its own, but serves to keep the other layers working by shedding the wind. Typically, they have several pockets, which come in handy.

• **Lower garments.** Do your legs get cold? Mine used to, before I got Goretex™ snow pants from a ski shop. Goretex™ is wind and water resistant. Alternatives are Carhartt™ insulated overalls, or a snowmobile suit. For less severe conditions I like cotton sweat pants coupled with nylon wind pants.

• **Gloves** are important to staying out in the wind for extended periods. We have a large variety of glove types available from sporting goods, ski shops and Army/Navy stores. Some cover the palm and wrist and leave the fingers uncovered, some have flaps so you can extend or retract fingers. My current favorites are thin leather surplus military flying gloves, and I've seen excellent thin rubber gloves with cloth liners available from SCUBA suppliers. Consider also transmitter mitts designed especially for R/C flying. Gloves can make the difference between flying and having to put your hands in your pockets.

THE FORECAST

NEARSHORE MARINE FORECASTS NATIONAL WEATHER SERVICE BUFFALO NY 312 PM EST THU NOV 13 2003

FOR WATERS WITHIN FIVE NAUTICAL MILES OF SHORE

LOZ044-045-140312-
SODUS BAY TO THE ST LAWRENCE RIVER ALONG LAKE ONTARIO
312 PM EST THU NOV 13 2003

STORM WARNING IN EFFECT

FRIDAY
NORTHWEST GALES TO 40 KNOTS DIMINISHING TO 30 KNOTS. MOSTLY CLOUDY. SNOW SHOWERS LIKELY. WAVES 8 TO 12 FEET SUBSIDING TO 4 TO 7 FEET.

ZONE FORECASTS FOR WESTERN NEW YORK
NATIONAL **WEATHER SERVICE BUFFALO NY 359 PM EST THU NOV 13 2003**

NYZ005-006-140959-
NORTHERN CAYUGA-OSWEGO-
INCLUDING THE CITIES OF...FAIR HAVEN...OSWEGO
359 PM EST THU NOV 13 2003

WIND ADVISORY IN EFFECT TONIGHT

WINTER WEATHER ADVISORY IN EFFECT TONIGHT

FRIDAY
MOSTLY CLOUDY WITH SCATTERED SNOW OR RAIN SHOWERS.
AN INCH OR LESS OF SNOW ACCUMULATION WITH TOTAL SNOW ACCUMULATION OF 4 TO 6 INCHES. COLD AND WINDY. HIGHS IN
THE MID 30S. WEST WINDS 20 TO 30 MPH. CHANCE OF PRECIPITATION.

On this trip Terry introduced me to chemical hand warmers, and they work great. You can put them inside gloves or boots, or keep one in your pocket to warm hands that have been exposed to the wind and the cold. Look for them at sporting goods stores.

• **Footwear** is critical. You won't last long if your feet get cold. My preference is leather boots with two layers of socks: inside cotton, outside wool. Like gloves, many types of warm footwear are available. If you're susceptible to cold toes, look at electric socks, Thinsulate™ insulated boots, and thick Arctic mukluks or snow mobiling boots. For wet conditions, bring spare socks. Dry feet are happy feet.

With the right clothing, you can withstand cold and wind and keep flying, especially if you have the right attitude.

ATTITUDE

A construction worker flying buddy said of being outdoors in cold weather, "Hey, I work out in it. We ought to be able to fly in it." and loaned me a pair of Carhartt™ insulated overalls he wore on the job. Reflecting on his attitude, I started to feel like a wimp for *not* flying in the cold.

Sure, it's easy to conclude it's too cold to fly, that cold weather is "building weather" but you can build at night. Get out while the sun shines and fly. You might be surprised at how good the flying is, and you'll certainly be impressed with your own toughness and stamina.

CONCLUSION

Winter slope soaring in winter can be as rewarding as during any other season, and sometimes better. To handle the severe conditions, be prepared in the clothing department, and think tough. Beat the cold! Bundle up and fly.

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HAVE SAILPLANE, WILL TRAVEL!

By Tom H. Nagel
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THE LESSONS OF THE LAVA LAMP

This installment of HSWT is a re-working of three short articles that I wrote a couple of years ago for the *RC Soaring Exchange*. I have had a continuing interest in simulation of thermal activity, including computer simulations based on cellular automata — things like John Compton's game of Life. In the spring of 1999 when my wife asked what I wanted for my birthday, I said: "Get me a lava lamp!" And this series of articles was born.

For those of you who have been living in a cave since 1950, a lava lamp is a cylindrical or conical table lamp, filled with a clear petroleum based liquid, inhabited by a blob of brightly colored wax, and lit from the bottom by a low wattage bulb. The heat from the bulb melts the wax, and convection forces in the oil and the liquid wax cause blobs of wax to surge up and down like lava.

Or like a thermal, I thought.

Yes, readers, I had indeed conned my wife into buying me a table top thermal imaging simulator. She thought I just had tacky taste. Well, that too. But mostly, I wanted to see what I could learn from the thermal simulation provided by the lava lamp.

First, a little history:

The Lava Lamp was invented by Englishman Craven Walker after WWII.

In 1965 two men from Chicago, Adolph Wertheimer and Hy Spector, saw Craven's lamp at a German MF trade show and bought the American rights. Lava Manufacturing Corporation was the company which they created upon return from Europe. Lava Manufacturing Corporation produced the *Consort*, the *Continental* and the gold/white "squiggle" painted *Aristocrat*. For unknown reasons, Lava Mfg. Corp. became Lava-Simplex, Inc. During the Great Lava Lamp depression of the early 1980s, Haggerty Enterprises cleverly purchased the operation. In the mid-90s Haggerty created the division Lava World International, the company we know and love today. Many thanks to the creators of the OozingGoo.com web site for this information.

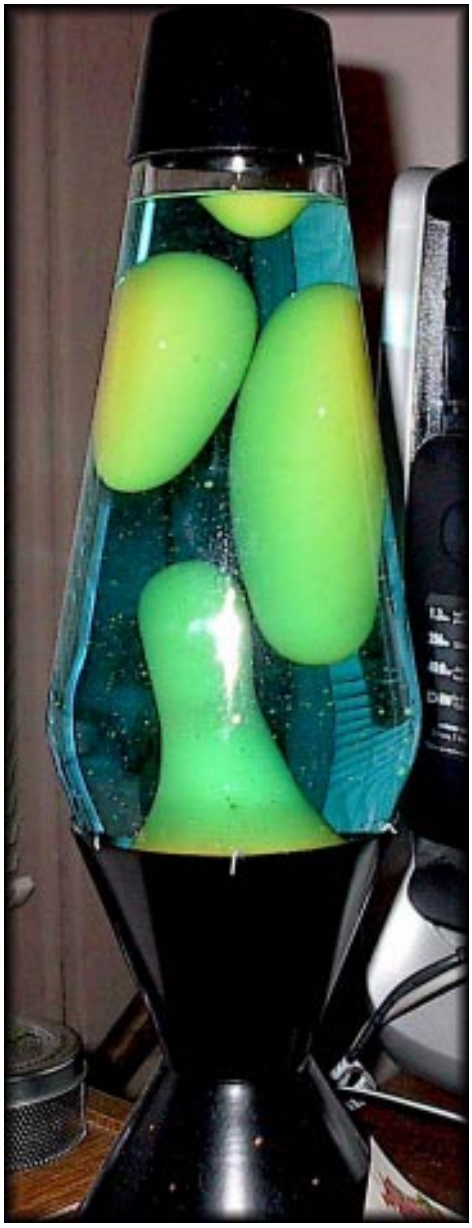
The first time I turned on my lava lamp, I watched what happened as it warmed up. The colored wax, the goo, was all solidified at the bottom of the lamp. After several minutes, little hot wax geysers began erupting from the wax, sending squiggly solidifying wax worms up through the lamp. All kinds of strange shapes emerged and solidified until the lamp heated up sufficiently to keep the wax liquid. These strange shapes have absolutely bupkis to do with thermals or soaring, except to the extent they resemble airplane parts left over after some of my less successful landings.

I knew going in that the lava lamp was suspect as a thermal simulator. Lava lamps contain liquids, and liquids are generally non-compressible. Atmospheric thermals are gaseous, and gases can expand and contract with pressure changes. The lava in the lamps exhibits obvious effects of surface tension. Blobs quickly assume spheroid shapes under the influence of surface tension. Masses of gas are not influenced by surface tension. And, of course, there is no wind in a lava lamp. Nevertheless, I thought there might be things to learn.

Lesson One: the lava lamp goes through a series of phase changes as it warms up.

1. You start with solid wax.

2. Then get weird wormy stalactites.



The "blob juggling phase."

3. Next, you get liquid goo. And at first that liquid goo tends to move around in smaller than usual blobs, and they rise and fall quickly. Does that mean that thermals formed early in the day tend to be small and fast moving?

4. Next, the goo tends to settle down into one solid column, from the base up to the surface of the liquid, or else a phallic column that stands there like a mixture of Flubber and Viagra. This stable phase lasts a significant amount of time, while the lamp reaches its full temperature. Does this mean that the best, most stable thermals are found shortly after thermal activity kicks in?

5. And when the lamp is mostly heated up, or fully heated up, you get

the typical rising and falling blobs of goo. The full height column gets unstable. It writhes and twists, and dances like Denny Maize doing the hula. And then it breaks into separate rising and falling blobs. This must be what thermals look like, I thought. And this must also be why Denny Maize doesn't dance the hula.

If the lava lamp is indeed simulating thermals in the atmosphere, then they look different than I had expected. Are we flying in discontinuous blobs of air that cycle up and down? If we fall out of a thermal, could that be because we have fallen out of the bottom of it, not because we have drifted off to one side?

Lesson Two: cyclic behavior of the lava lamp.

After the lava lamp had been on for several days, I noticed an unexpected phenomenon. The lamp was cycling back and forth between two states. It would spend several minutes tossing blobs up and down, and then it would switch over several minutes during which all of the wax was contained in one column, the Flubber meets Viagra shape. Then it would start imitating Denny Maize doing the hula, and soon be back in the blob tossing phase.

All of the more experienced flyers talked about thermals cycling on and off. Maybe this is how it would look, if one could see thermals.

Lesson Three: thermals within thermals.

I began to take special note of the Flubber meets Viagra phase of things. Odd stuff was going on within that columnar pile of wax. As I watched, I could see the sides of the column do imitations of lava lamp peristalsis. At times it looked like a python swallowing an egg. Blobs of hot wax were flowing both up and down, not as separate free-floating blobs, but contained within the waxy column itself.

No one had ever suggested to me that thermals have flows and counterflows within themselves. Do atmospheric thermals have internal upflows and downflows? Do they have wiggles and blobs? Do they do the Denny Maize hula?

Lesson Four: the effects of head flow.

My lava lamp came with a plastic top, about the size of an espresso cup. The plastic top covers the bottle cap that stoppers the lava lamp liquids. It seemed to me that removing the plastic cap made the lava behave a little differently, but I wasn't sure. As an experiment, I took the plastic cap off, got a sheet of aluminum foil, and added a set of bunny ears to the lamp. The bunny ears were sort of scrunched on over the bottle cap. I had added a radiator to the top of the lava lamp.

The lava lamp immediately changed behavior. I am not going to try to describe the new pattern – this is something you can experiment with on your own. However, the message was clear: heat flow out of the top of a thermal system is just as important as heat flow into the bottom.

We have all seen days where it looks like thermals should exist, but our planes seem to hit a glass ceiling. The thermals are not going up past this relatively low, invisible ceiling. I have heard this blamed on temperature inversions. Radiators at the top of the lava lamp cause thermal convection to pick up; insulation at the top of a lava lamp causes convection to slow down.

Lesson Five: getting agitated.

Eventually, I began to be bothered by one of the odd little behaviors of the lava lamp. It developed a dingleberry, a small blob or plate of lava wax that spread out on the surface of the liquid, and persisted there hour after hour, day after day in a manner that was just like nothing a real thermal ever does. I wanted to get rid of that dingleberry. I gave the lava lamp a little shake. The dingleberry mocked me, and stubbornly refused to sink. I gave it another little shake and managed to create a flock of micro-blobs, but the dingleberry continued to hang onto the surface of the liquid.

I was getting tired of being mocked by the dingleberry. I lifted the lava lamp off its base, picked it up and gave it a half dozen really hard shakes, really agitating the contents. My expectation was that the wax would soon settle out, consolidate itself, and resume doing its lava lamp thing.

This column is dedicated to soaring vacations. If you have a favorite sailplane saga, consider writing it down for *RCSD*. If you are planning a vacation that includes your plane and transmitter, consider making notes as you go, and working up an article later. Take photos. Collect maps. And send your story to Tom Nagel at tomnagel@iwaynet.net for gentle editing and suggestions.

Tom

I put the lava lamp back on the base and let it sit. The contents were not just agitated, but they were emulsified, separated into billions and billions of tiny microscopic microblobs. The liquid was milky. I figure it would clear up in an hour or so.

A few days later, the lava lamp was still completely clouded, and no large blobs could be seen at all. If any had re-formed, they were invisible inside the milky contents. Ultimately, I had to turn off the lava lamp for a day to let the wax cool and settle out. When I turned the lamp back on everything was fine, and it went through its usual start-up phases, including the creation of a new dingleberry.

The lesson from this experiment had little to do with thermals, but a lot to do with the *Radio Control Soaring Exchange*, *RCSE*, the internet discussion group sponsored by Airage.com. I posted my results there shortly after my agitation experiment. The soaring exchange is a complex self organized dissipative system, following the laws of chaos, and its behavior varies according to the input supplied by the two or three thousand worldwide readers. Every once in a while some Dilbert will start a thread about downwind turns, Dynaflight Skeeters, AMA insurance or the over-emphasis on landing points in sailplane contests. On such occasions, the *RCSE* discussion goes nuts. Useful conversation ends, wild statements flourish and vituperation erupts spontaneously.

The message is a good life lesson: when you are dealing with a chaotic system, don't shake the lava lamp.

In closing, as the holidays approach, my best wishes to all of you for peace, truth, pulchritude, many thermals, a little chaos and a few good beers. Not necessarily in that order.

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GORDY'S TRAVELS

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What Gordy's Travels Have Really Been About? RC Sailplane Zen!

If you have been following my column, you notice that I seldom (maybe never) did a travelogue type of article. Not, "Hey it's great flying in Utah, or Kentucky or, well, anywhere else." Rather, my column exposes and discusses new products, plane equipment. They include discussions centered around philosophies on building, setting up, trimming, balancing, launching, flying and landing RC Thermal Duration Contest sailplanes.

Oh sure, I travel with my sailplanes more than anyone else on Earth, fly 'em more, and fly more different kinds of sailplanes with more great, smart RC sailplaners than anyone else on Earth, unless there's someone that I haven't met. Someone that does as much flying and traveling that I do. I suppose even I didn't realize where the title of my column was going to take me when I stumbled into it. I figured it was just a logical title since I 'travel' a lot.

Although my RC sailplane travels were originally going to be about location, rather they become a chronicle of my journey of understanding of the hobby. Sort of the *Zen* of RC Thermal Duration Contest Soaring and Sailplanes, if you will.

As most of you may have noticed, I am NOT a science guy. Me and equations just don't get along. For me to 'measure' or calculate a 'CG' is a totally alien concept. The idea of having any flying model 'teeter' on some pegs, at some measured point, just drives me nuts.

Over the years, having flown with hundreds of RC Sailplaners of varying experience, skill and savvy, I've noticed lots of things that most would never consider. For instance, skegs and dork landings make perfect sense for thermal duration contests, but not for 'soaring'. Having weird, comical or trick landing targets are fun and exciting for TD Contest pilots, but for soaring guys they are an insult.

TD Contest fliers have been referred to as "Elitists" by some. We fly super expensive sailplanes, with the most featured filled radios, and pay ridiculous prices for servos. We balance our planes so that they are virtually uncontrollable (according to 'soaring' enthusiasts) yet have the most control over every aspect of their flights and landings. We get up at ridiculous morning hours to travel hundreds of miles in the rain, with confidence that once the pilots meeting is over, the sun will shine and the lift will be great. We pay ridiculous amounts of money for our sailplanes, then do everything we can to abuse and damage them. And can't wait for the new one to become available.

But what TD Contest pilots really are is 'Measured'. We don't go out on a Sunday to simply float around. We never just land the sailplane somewhere. Every flight is measured precisely, with a clock and a ruler. The goal? To walk onto a contest field, receive and accept the tasks assigned by the director, and to head up to the winch with confidence that we have done the things necessary to prepare ourselves for this moment. Then, proceed to see if, in the end, we did enough preparation.

TD Comp sailplanes aren't about soaring, they are simply tools for the tasks assigned when we show up at a contest. There is nothing more fun than putting in a day of just soaring, *once you have TD precision sailplane control and skills.*

IF mathematically figuring the aerodynamic CG is important, RC soaring pilots and TD guys would bother, but

Photo taken at the Cincinnatti Great Pumpkin Fly October 2003. Gordy Stahl, Saturday Champion Unlimited, flying a Pike Superior.

they don't; it's probably safe to say that you never have and neither has anyone else, that actually flies TD. IF you were to set up a plane with that spot, the wing would lift to its optimum, but the sailplane would fly terrible. You'd see the point soooo many guys that get in the hobby miss: our planes have to be an *optimized compromise* of all the factors that make up a RC sailplane. This only applies to RC Thermal Duration Contest Sailplanes. Why? Because it is the only place where it all matters, and the only situation where it will be tested, measured and graded.

I recently participated in a ten minute fly off challenge against two pretty darn good 'soaring' guys. The goal was a precision 10 minutes, no landing points but the plane had to be in a 20' landing 'zone' in order for the flight time to count. These guys were on their home turf and had great TD ships, which were pretty much the same as mine. The first guy went up and didn't find great air, coming in about 20 seconds short, but making the landing zone. We all launched within a minute or so of each other so we were in similar air. The next pilot didn't find great air but was doing okay. I launched and went to boomer air that I recognized from my 'experience' and it was clear 10 minutes wasn't going to be a problem. The second pilot came over to join me. His time was about 15

seconds off of 10 minutes but his landing was about 3' short. That left everyone to watch my landing. My timer was instructed to give me every 5 seconds when I had one minute left on the clock, then at 30 seconds, every second. I told him that I would have my plane crossing my right shoulder at that 30 second mark and then at 20 would make my final turn to line up with the tape, just as I had practiced a hundred or more times. I wasn't nervous because I was prepared. My sailplane's nose touched down right at 10.00 minutes, with the fuse laying in-line and right on the tape.

Why? For two reasons. I had my sailplane set up for TD contest work and two years of never flying without a countdown watch going, a landing procedure and a target to put the nose on. After your 'tool' is tuned up, then it's all you. It's not airfoil, construction, wing span, or tail configuration. Only with disciplined practice can you ever take advantage of those things.

What follows is a story that might explain why it's important for newbies to get involved with the League of Silent Flight achievement program and how it can make our 'sport' grow. For all the effort, time and money, TD must be the MOST fun of all the rest of RC soaring or so many guys wouldn't be having so much fun at it! Don't get me wrong, not everyone should be 'pushed' into TD Competitions! But they should be moved along in ways that advance their confidence, control and understanding, or they won't stay involved. LSF slowly allows them to work, practice and learn, all the great fun things that embody Thermal Duration Contest Soaring.

Read on, laugh and learn!

Interrogation of a Sport Soarer

(An imaginary story from the daydreams of a soaring enthusiast!)

I flew a contest in St. Louis and got into a discussion with the club president about why lots of guys show up if they call a 'fun soar' day, but not many show up for contests.

I knew why, but heck it's just my opinion, so I asked him who would be a representative 'sport soarer' in the club. He told me and I got the guy's address. I proceeded to head over to the guy's house only to find him cutting the grass. I snuck up and bopped him with my Super Stand pole, then stuffed him in my truck. I got to the motel, I tied him to a chair with wing tape, then took off his shirt and applied the new really aggressive hinge tape, that I got from Don Richmond at Visalia, all over his hairy chest and back.

I brought him back to reality by spritzing some CA Kicker under his nose and began my interrogation (for an *RCSD* article of course), asking the same question over and over adn over, again...

WHY DON'T YOU FLY YOUR CLUB CONTESTS!

And, I wasn't too pleased wih his response.

"I'm not interested in competitions..."

Yep, I could see it was going to be a long night before I'd make it thru the usual canned 'reasons'.

RIPPPP! I pulled off a piece of tape.

"YEOW!!!!" He exclaimed.

"It's too much stress!" *RIPPPP!*

"No full size plane sticks its nose in the ground for a landing." *RIPPPP!*

"I don't need to prove anything." *RIPPPP!*

"It's not 'fun'!" *RIPPPP!*

"Cuz I don't own a stop watch!!!!" *RIPPPP!*

I finally ran out of hinge tape, and I considered clipping pieces of carbon pushrod to use under his finger nails. I was close to him finally fessing up with the truth... It was getting late and I had an 8:30 pilots meeting the next day so it was time to get serious, and pull out all the stops. Yep, the one thing that will break any sailplaner...

I reached for his wallet...

"Okay, Okay!!!! I'll tell you why us sport soarers don't come to contests. It's because we aren't PREPARED! We never practice. Heck, we aren't sure how to practice! When we come to the field, we don't have a talking timer to count down specific amount of minutes of flight time, and we never have a target to land at. SO, when contest day comes up we aren't comfortable suddenly being expected to control the sailplane on purpose! We just aren't prepared and that makes us feel like we aren't welcome. We love to fly and want to fly every opportunity. We want to join in the fun those contest guys seem to have! We just haven't practiced and don't have the confidence to feel we belong."

Now that I had him talking, I couldn't get him to shut up...

"When I turned 16 there were 8 of us in our town who went down to get our drivers licenses. When we got there, there was some government guys there who separated us into two groups. I was in the 'Sport Drivers' group of four, the other group was called the 'Elitists'."

"Those poor Elitists really got screwed! Us Sport Drivers were taken to a 100 acre driving area that had no obstructions and was surrounded by thick soft rubber bumpers. The instructor assigned us each a car, showed us how to start it and make it go, but that was it. He may have mentioned something about a 'brake', but there really was no need. Mostly all we had to do was to stay away from each other. IT was a ball, we could drive anywhere, any way, fast or slow. On weekends we'd go out and drive around for hours on end; we'd do circles and figure 8's, and pretty much just drive around. It was great, and we did it for about 2 years. Near the end it got kind of boring."

"The Elitists had it really bad. They had to go to classes, and were forced to place their hands on certain spots on the steering wheel. Even had to shift their hands in a certain way when turning. They had to drive in skinny lanes, and could only drive one direction in certain lanes, too. And were restricted to specific speeds, as well. Uck! Seemed like a lot of work for nothing."

"The instructors would make them do really hard boring stuff over and over and over. Things called U-turns, Y-turns, parallel parking. Then even made them back up with trailers hooked to their cars. As the 2 years went on, the Elitist group was made to

do more and more boring and scary stuff like driving in rush hour traffic with lots of other cars packed in really close, and driving really fast on freeways. Or drive downtown and park in really tight spots. (We couldn't figure out why they would bother with stuff like that, since mostly all we did to stop was just let the car coast till it stopped somewhere on the driving area. Sure, it was a hassle cuz it could be a long walk back to the entrance, but it sure was a lot easier than what those poor Elitists had to put up with. Imagine this! Their driving area had lots of weird obstacles called stop signs and stop lights, and their instructors would make them practice making their cars stop with its front wheels on a thick white line, EVERY TIME. And if they missed it they would get penalty cards called 'tickets', which they had to pay fines for!"

"While we got bored with driving near the end of that 2 years, the Elitists were soooo brainwashed by the government men, that they couldn't wait for the next driving class. They'd actually run to get there!"

"The abuse to the Elitist group didn't stop there. Their instructors even had them doing math. They'd have to figure out how long it would take to get from one place to another, traveling at specific set speeds which only varied pending on signs posted along the way."

"Anyway, near the end of those two years, us Sport Drivers pretty much hardly ever went to the driving area. Sure we had fun driving around with no rules, no requirements, and no need to fine tune our control, at least for a while."

"Little did we realize the atrocity of the diabolical evil of this government experiment. But that wasn't to be revealed till just before Senior Prom..."

"This gorgeous girl who I had been in love with since grad school came up to me and asked me if I would take her to the prom. She said she planned on having all the fun that was the stuff of dreams! However, she'd only go with me IF I agreed to drive her."

"How could I? I mean, I had never had to keep my car in a lane, or at a specific speed, and what would happen if I had to do one of those parallel park things and ended up smashing into something? I couldn't bear the pressure and possible embarrassment. I just wasn't prepared!"

"I told her, thanks for offering, but I was only a 'sport driver – *I just do it for 'fun'*. I couldn't admit that I wasn't prepared..."

"She ended up marrying one of the Elitest Drivers."

I Woke Up!

It was at this point that I woke up! Such a sad story! But it gave me a few ideas that I wanted to share with you.

Club Leaders, here's one secret to increasing club participation. Start holding club 'clinics'. One night offer landing classes. You know, the 30 second pass over your shoulder, 20 second turn on approach, then work the 'throttle' to a spot. Make it fun, offer rewards for best averaged score for the month of clinics! Vary the shape of the landing zones. Heck, assign each participant the duty of coming up with a different zone for each clinic.

Set a night of time flights, where each participant alternates as a timer and a pilot. Same sort of reward thing for best average precision time for the month of clinics. Take some of the club money and get some cheap stop watches for the clinics. Issue each participant monthly clinic score cards. an example. You always fly with a clock, and always toss a hat or put down a tape.

Help your members learn to control their sailplanes, and maybe they'll be part of those *elitists*, the guys who have so much fun in the hobby that they get up at 5 am to drive hundreds of miles in the rain to make a 9 o'clock pilots meeting to find out that the landing is a crazy shaped spot and the time tasks are all minutes plus seconds, in a weird add 'em up of a limited number of flights. Who have so much fun that even after losing a $1,000 plus plane, are on the phone that Monday ordering another. And a week later back on the phone threatening the supplier that if the plane doesn't show, he's going to expose his lousy service on the *RCSE*, shaking in the throws of TD withdrawal symptoms.

Build your club by helping sport flyers learn where to *place their hands on the steering wheel*, and how to launch with their left hand, while keeping their right thumbs on the control stick. Teach them launch techniques, and coach them in the logic of 'there is never a good reason to have a downward component of a thermal turn! They're supposed to be falling UPWARDS.

A great way to build up club contest participation would be to call a Tom Hoopes Pro/Am Contest. Assign an experienced contest pilot to a less experienced one, a month early. That way they can fly together and the more experienced pilot will be able to mentor the other. They will build team spirit and learn to time for each other. Or, create other fun ideas that will promote 'on purpose' control and activities.

After all, you don't want the girl to run off with someone else! Do you?

Hope you had as great a 2003 as I did! I have a feeling my travels through RC soaring are just getting started!

...Damn, I forgot to untie that guy when I checked out... Oops! Maybe I'll untie him in my next dream?

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DUO