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Soaring Digest

April 2008

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Back cover: "Up, Up and Away" — Philip Brister (Patagonia, Arizona) launches his Art Hobby "High Aspect" fuselage with a home-built "Bubble Dancer" wing from a Laser Arts rib set and carbon laminate from CST. Photo by Virginia Turner.

Canon Powershot G6, 1/1250 sec., f4.5

R/C Soaring Digest

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In the Air

Directly after the March issue was put on-line, we received this note from Hutton Oddy:

It is with some misgivings that I write to inform you that there is an error in the report of the Armidale Expo (March 2008 RCSD).

It says that I “beat out” Joe Wurts in HLG.

If only that were true. Unfortunately, and not unpredictably, Joe beat me...

Could you please correct the error in your own good time (so that I can bask in false glory for just a little while).

Thanks and Regards,
Hutton Oddy

We also received a note from Brian Ford, who covered the event for *RCSD*, apologizing for the error.

RCSD also offers apologies... not only for publishing incorrect information, but also for having to terminate Hutton's basking.

Lots of articles this issue! Exceptional photography, event coverage, a potential FAI rule change, sailplane design and sailplane design considerations, and some construction tips as well. As last month, there are several contributors, both writers and photographers, new to the pages of *RCSD*. If you find something of value in this issue, we encourage you to drop a note to the person(s) responsible and give them some positive reinforcement.

Time to build another sailplane!

Central Arizona Soaring League

South West Classic

Photo coverage by Skip Richards



2008



Scenes from SWC '08...

Photos by Skip Richards

Co-CD Chico Romero - Chico was the man behind the event.
He did EVERYTHING - a totally dedicated hard worker.

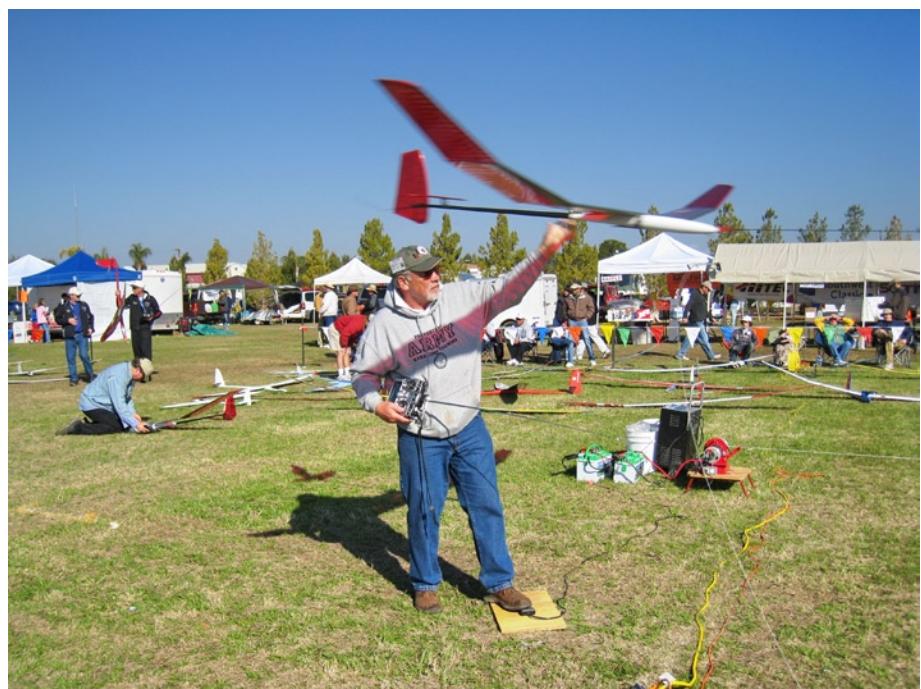
▼ Co-CD Darwin Barrie - you'll see him in several pictures.
Darwin authors the soaring column for Model Aviation.



George Joy (Peak Electronics) and his wife/spotter/timer/partner-in-everything, Jo Joy. Jo managed to successfully steer George around the mud puddles. ►



▲ The SWC '08 impound tent and some of the personnel who made it run smoothly.



Clockwise from left:

- A Perfect Gordy Launch - Gordy in action at the winch. Too bad I didn't get him launching his Marauder!
- Gordy's Timer blowing smoke in his face while he's watching for thermals! No one gives him a break!
- THE GordySoar - this is the quintessential Gordy shot!



▲ 3-Man Team - Pilot Darwin, Timer Jerry Robertson, and Launcher Rick Bothell in action.

◀ My obligatory Daryl Perkins shot.
He's hard to miss... all class!



Clockwise from left:

- Me spotting/timing for nervous pilot Mark Russell. He took my advice and easily made his time!
- Teamwork - Andreas' servo wire got hung up in his center panel and a whole team of competitors came to his aid!
- Darwin and Jerry coming back from a good landing. They're all smiles!

Mike Lee, launching for Manny. Mike spends lots of time helping younger flyers get competitive. ►





▲ The Colorado Boys - A group shot of the Rocky Mountain Soaring Association pilots who attended SWC this year.



Who's a doctor? The infamous Dr. Dan Williams, clowning around at the winch. ►



▲ An anonymous pilot showing a great launch form, with retriever string trailing...
Cool motion in this shot.

Total Concentration - A good example of total concentration during launch. ►





▲ Another Mike Lee launch assist.



▲ Lex Mierop shows nice launch form.

THE HISTORY OF THE SOUTH WEST CLASSIC SOARING COMPETITION

By Rev. Iian Glitherow, Senior CASL Member

The history of CASL would not be complete without a history of the SWC

In 1988 CASL was approached by the organizers of the "Southwestern Regionals Model Aircraft Championships" SWRMAC ("The Regionals"), held at Eloy in February every year, with the idea of re-starting the sailplane event.

The sailplane event had been dropped for lack of an organizer in 1981, although an Old Timer Sailplane event was still being run.

CASL agreed to try it out and 12 flyers registered for the event.

The SWRMAC provided publicity, trophies, medallions, and a flying site in Eloy. CASL provided equipment, manpower and know-how. The SWRMAC is primarily a free flight event, with some SAM events on certain days.

The soaring event was a two day event, but the second day of the first year (1989), was so windy, and there was so much blowing dust, the event was called for visibility. The following year was more successful with the weather. The third year the event was moved to the Casa Grande airport, which almost

cost the event when the owners revoked permission to use the field two days before the event. After much pleading, the event was allowed to continue. About 40 flyers registered and the event was a great success.

At this time there were several CASL pilots traveling to the CVRC event in Visalia California, and to the Pasadena event also in California. Consequently, several California flyers reciprocated, and came to the event in 1991.

The 1991 soaring part of the SWRMAC was so successful that CASL members decided the from that the event would be able to fund itself in the future, so a break was made with the other organization and in February 1992 the first CASL South West Winter Soaring Contest was born.

Even the birth of the SWWSC was fraught with problems. Officials at the Community College site had agreed to allow the use of their facilities for a two-day event once per year, but when they were approached in the fall of 1991 to confirm authorization for the upcoming event, management had changed and with it, permission for use of the site.

Our minds were made up, so a location at Rodeo Park in Gilbert was arranged. The event was still very much a "Do it yourself" event, with wives doing the catering and everyone pitching in to make it work.

The contest continued to grow in participation into one of the major USA soaring competitions, and as it seems is always the case, the area around Rodeo Park began to be developed. Prudence and space requirements conspired to force a move to Schnepf Farms by 1998. This move gave a very nice landing area, a large flying site and even indoor plumbing! The cost of the use of the facility for three days was, and is, extremely high, but the continued success of the event has allowed the contest to make a small profit, which allows for continuation of the event.

Now known as the CASL South West Classic, the event has a loyal following from all over the USA, with World and National class, even some European soaring pilots attending. ■

Iian has been a member of CASL since its beginning and is still an active volunteer at the Southwest Classic.





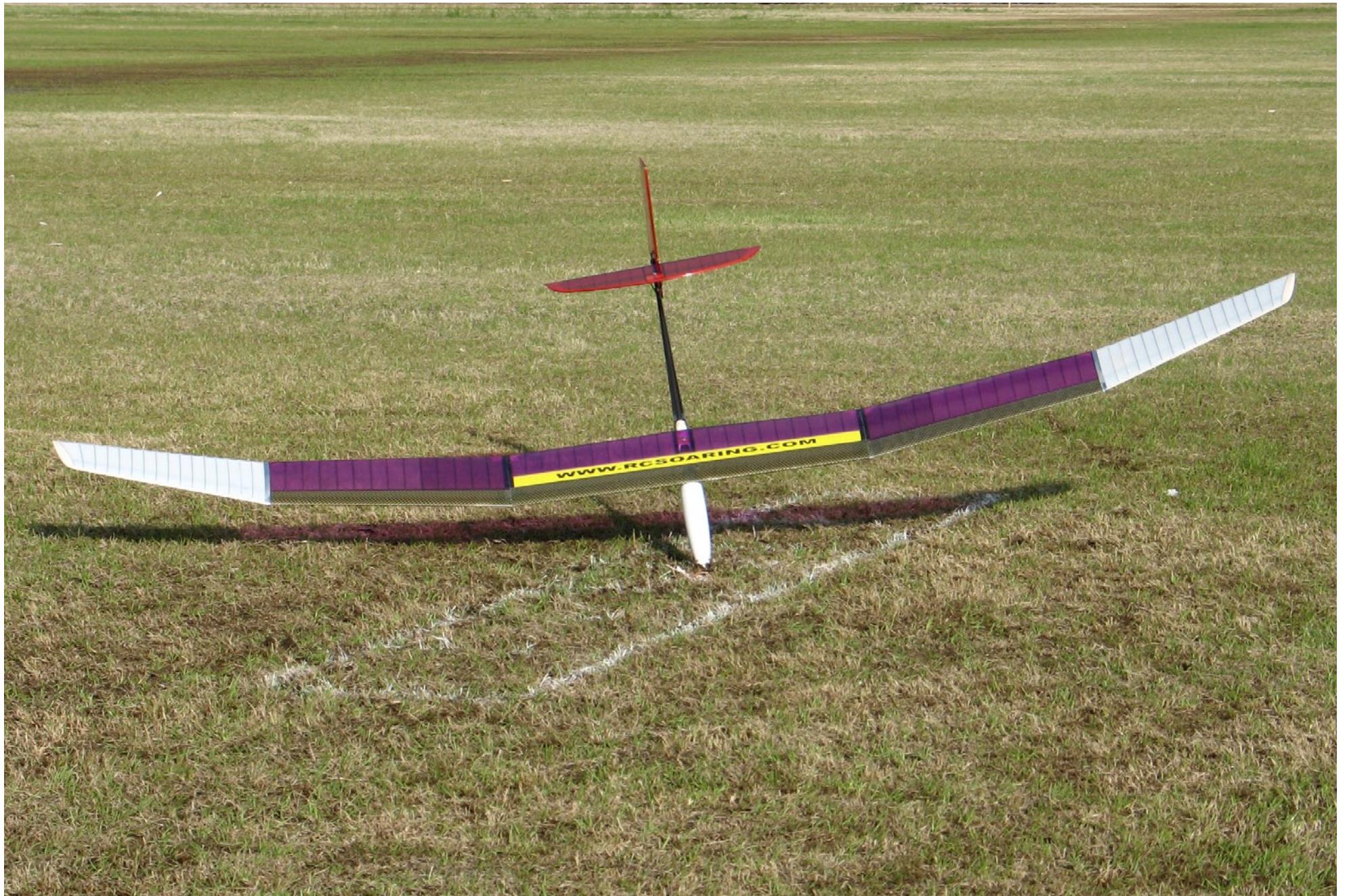
Skip Miller lands his Pike Perfect at SWC '08

This photo sequence was shot at the South West Classic on Saturday.

This was an easy sequence to shoot once I lined up the first shot. I see Skip land a lot at the RMSA field and he never seems to get out of shape during the approach. He was spot-on the time and he managed the energy on the approach for a pretty undramatic landing.

The best pilots seem to take the drama out of this difficult approach. I prefer excitement... sideways, too fast, too high, dump it in. Gets the adrenaline going!

— Philip Jones



"Oh so close." Joe Nave, Honolulu, Hawaii, guided his <www.rcsoaring.com> AVA into the landing zone at the 2008 SWC, but missed the 35 point maximum landing (orange dot) by 1/2". Photo by Virginia Turner. Canon PowerShot G6, 1/500 sec., f5.6

Uncle Sydney Previews **CIAM** in Lausanne

Sydney Lenssen, sydney.lenssen@ntlworld.com

Do you want to launch with 100 metre lines?

This month's biggest F3J question is when and if we are going to get our launch lines shortened to 100 metres. That's the explosive issue that 2008 CIAM plenary meeting will decide on 29 March in Lausanne.

Another decision due that day is whether the first two metres of the landing tape will be divided into 20 cm lengths so that the landing score can be anything from 100, 99,98 etc. down to 91 before the old tape scores of 5 points lost for every metre resumes. That proposal is not likely to be controversial, and the first metre of it has been used in Holland and Germany for a couple of years under local rules. The object of the changes is that FAI wants to see are bigger differences between top scores, particularly in the flyoffs.

The Belgians - and others - also want to see penalties for spear landings, and their way is to give zero landing points if the tail of the model is not touching the ground. While sympathetic to the aim, I don't see this solution getting a positive vote, simply because pilots could lose their score even if they land gently and hit an odd lump of mud or tuft of grass.

What lies behind shorter line thinking?

F3J models and pilots have become too good in recent years. Top pilots reckon to score 9 minutes 54 seconds plus and hit the 100 spot in all but horrible weather. Quite a number rarely fail to achieve 14 minutes 54 seconds plus in the flyoffs, although doing it four times running in calm or tricky air is not so easy.

So the F3-RC soaring subcommittee has proposed an amendment to Rule 5.6.8.7 Towlines, where b) is set to read "The

length of the towline shall not exceed 100 metres when tested under a tension of 20N."

Chaired by Tomas Bartovsky, the committee reckons that flight times will be become shorter and fewer pilots will fly out the working time. That in turn will put greater emphasis on the skill of pilots finding thermal lift. Instead of the all-too-common "launch and landing" competition, the event will turn into more of a thermal hunting - or "aerodynamic quality" - competition.

The likely result of shortening towlines for F3J is more complex than that!

The committee also notes that shorter lines would allow a smaller field to be used, and that cannot be disputed. But I am not sure that F3J competitions are seriously restricted because the



organisers cannot find a big enough field to cope with 150 metre lines.

There is a problem. At the start of every FAI world or european championship, the early discussion among pilots is how close the scores will be. Top pilots do spend plenty of effort into deciding whether to make a two or three second launch to gain an extra point or two. It is not unusual for all the flyoff places to be within 20 points of the maximum possible after ten rounds - allowing for one dropped round. But in all fairness, that is the very nature of F3J.

F3J as a class started as the simplest way to run a thermal soaring event. In F3B, still the most difficult and demanding contest for RC sailplanes of this model size, more and more pilots became fed up with the increasing physical and mental effort - and money - to compete at top level. F3B still thrives in many countries, it remains the pinnacle of our sport in my view, but the numbers of pilots enjoying the class are diminishing even amongst the leading nations.

The answer was F3J, a derivative of the British Association of Radio Control

Soarers Open thermal contests, and official FAI championships started in 1997. Keep it simple, try to fly out your slots and land reasonably accurately to gain maximum points, flying "man-on-man" to reduce the advantages gained between slots when thermal conditions changed. Pilots often delayed their launches, waiting for someone else to find a thermal. When does that happen today? In fact by the first world championships at Upton in 1998, everyone launched on the buzzer, or even before!

Inevitably when rivalry is involved, the sport moved on quickly. Pilots wanted to launch quickly and as high as possible. Tow using two men, speed up the line and zoom to gain extra height, new aerofoils to allow pilots to cross the skies at speed with minimum height loss, greater manoeuvrability for precision landings, more reliable towlines and pulleys. Many of today's pilots have seen the whole period of development for it is less than 20 years in total.

Development still continues, albeit at a slower pace. Even five years ago when the Sharon and Pike Plus and a few others reigned supreme, few pilots

Tomas Bartovsky, chair of CIAM's RC Soaring Committee, at Martin's WC's.

guessed that another generation of aerofoils and better use of high tech materials would be significantly better and more likely to win.

What will shorter lines lead to?

First I heard of shortening competition lines was in 2002, the world championships in Lappeenranta, Finland. The problem of tight scoring was already apparent, but also a few pilots saw shorter lines as a way to launch more quickly. Jo Grini was the pioneer promoter, and used 75 metre lines in one or more rounds. He persuaded CIAM to agree to examine the merits of shorter lines, but they slept on it and nothing happened at Red Deer in Canada, nor at Martin in 2006 except that the matter was briefly talked over at the managers' meeting.

Then out of the blue in June last year, CIAM's F3-RC Soaring committee was circulated on the line change now up for decision. Nobody I know is sure whether the committee really wants to see the change or whether they are offering the proposal to get Jojo off their backs.

If they pass the proposal next month, will the shorter lines be used in Turkey this coming July? Unlikely according to Tomas; if the proposal passes, then normally it would be published in the Sporting Code next January and then apply. Since it is not an urgent change, likely start is 2009. But there's nothing to prevent the jury and the Turkish organisers choosing the shorter line as a local rule earlier.

UK's tentative reaction is not to support the change at this stage. They would like to see "extensive trials," they warn of dangerously increased pre-launch line tensions and greater chances of models veering off course on launch. They note that some UK flyers would support the move but a majority would not, and suggest a more modest reduction to say 135 metre lines.



Jo Grini with his short span chuckie "Nimo" at Costa del Sol, Spain.

There have been trials.

In Norway they have flown several F3J cup events last year with 100 metres to the stake, and according to Jo Grini 19 of the 20 pilots loved it. Those flying F3B models managed to launch slightly higher than the F3J models, but the differences between launch heights were smaller overall, which might be seen as fairer for all.

One serious snag with lower launch heights, and this was also noted in the Martin discussion, is that a long safety corridor with 15 or more pilots can put some pilots at a disadvantage when the air is kinder on one side of the field, and that happens more often than not.

The Dutch have gained valuable experience with shorter lines, and I respect the lessons they drew as one of Europe's leading F3J countries. In 2006 they held a contest with 75 metre lines, not so much as a trial of possible CIAM changes, but the club organising it was having its 75th birthday!

There was a mix of models, and some of the pilots felt they could not apply

slightly higher launch heights. That trial is irrelevant I think to the current proposal.

(The Brits have allowed winch launching for three years now, and I suspect that many if not most countries apart from Germany and Czechia do the same for national events. In varied conditions, UK experience found little difference in height between winch and towmen, but after one season everyone was winch

Peter Zweers and Cor de Jong for their memories!)

Could be that many other teams have tried shorter lines. We all use short bungies for trimming out new models, and there's nothing more satisfying than catching a low level thermal from a hand or short bungee launch.

If you have views or experience of

If the proposal passes, then normally it would be published in the Sporting Code next January and then apply. But there's nothing to prevent the Turkish organisers choosing the shorter line as a local rule earlier.

full tension without risking the model breaking. Because it was a fun event, many were using old lines and suffered line breaks. Line breaks happened with new lines too. The starts were explosive in all senses, the zoom after launch was very high, a feature which might have been exaggerated with the model much closer to the pilot. Pilots typically reckoned that launches were 40-50 metres lower than normal, and the apt description was "catapult start."

In 2007, the Dutch had a contest using F3B winches with the return pulley set at 150 metres. The day happened to be pretty calm and most pilots gained

launching because at the end of the day, we were less knackered! It also showed that some winches were much better than others.)

Back to Holland: in 2004 several F3J enthusiasts tried putting the turnaround stake 50 metres from the launch corridor, still using the 150 metre line. So the towmen start running 100 metres from the corridor. The shorter towline was balanced against very high speeds on the line and the elasticity of the full 150 metre line. Launch height was judged to be almost the same as usual, perhaps 10 metres lower. Launch times were at least one second faster. (Grateful thanks to Rob Sanders, Frank van Melick,

100 metre lines or shorter, then send your information and opinion to Tomas Bartovsky (tomas.bartovsky@vscht.cz), your national committee, or FAI (ciam-rcsoaring@fai.org). I'd like a copy, too.

My reservation about shorter lines? They will encourage further sophistication in model design and materials, they will not hinder many pilots for long in flying out the working time, and they will discourage newcomers to the sport from even trying to fly with the experts.

KISS - Keep It Simple S-----!

Uncle Sydney

Gordy's Travels

Marauder

Wins SWC Woody Class!

Gordy Stahl, GordySoar@aol.com, with photos by Philip L. Lutz

During my RC adventure, I've owned and wrecked a lot of very nice wooden sailplanes. I was a power flier because I was a power plane guy. I was drawn to soaring right from my first day in RC, which started with a gorgeous swap-meet-purchased Gentle Lady. Like most power fliers, I went out to the field, hooked it to a high start, stretched it way back, let it go and... like just about every power guy, watched it swing over sideways, heading toward the ground fast, and like most power fliers... pulled UP! Which of course is the exact opposite thing to do and produced the usual result — the model smashed into the ground and was drug toward the high start stake... shredded into bits of balsa and Monocote.

Along the way I trashed some seriously beautiful models (also purchased at swap meets) which pretty much ended with similar sad endings.

Years later, when I moved to Louisville from Milwaukee and met up with the Louisville Area Soaring Society, I jumped into soaring with both feet, but also directly into a full-house ship. As a result, I really never got too involved with wooden planes.

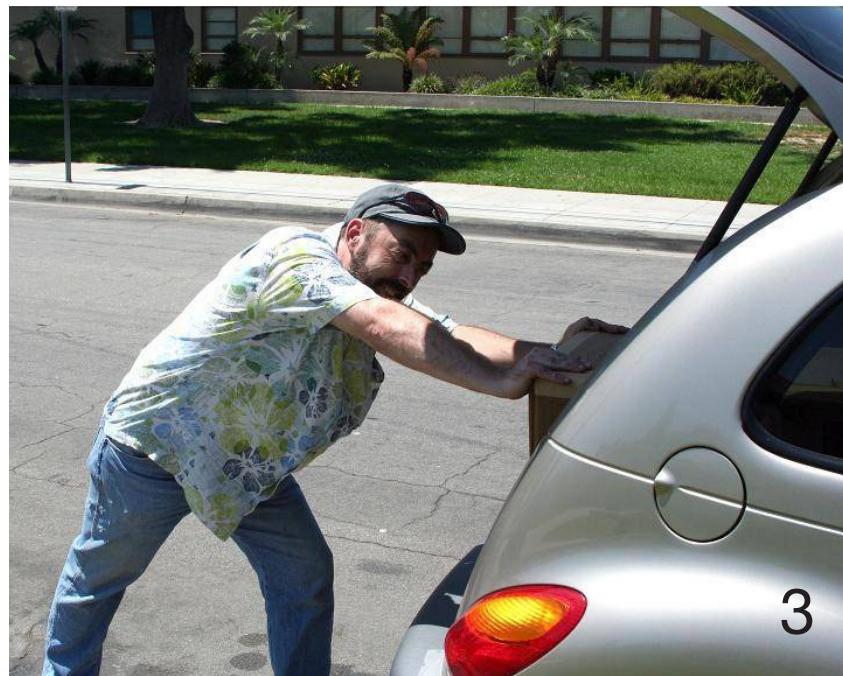




1



2



3

1. Merrill checks out the Marauder box. 2. Enough peanuts to supply the local shipping store for two months. 3. It just won't fit!

Last year at the Arizona Southwest Classic competition, Merrill Brady and pal Phil urged me to fly one of their Marauders. I knew of the plane's contest success (including when it flew against full-house molded ships!) but didn't realize just how nimble it was and how well it could cover ground to look for air. Totally impressed and hopped up on too many cups of coffee, I agreed to buy one (built by the experts themselves) since there were Woody class competitions being held each year in Muncie.

A few months before this season's SWC, my new Marauder showed up in a huge

box... a HUGE box. In fact, it was big enough that Merrill could sit in the box with his legs straight! It had enough foam peanuts to supply the local shipping store for about two months!

I had asked that they make the tail sections removable so that I could carry it with me on my travels in a Sportube. And it was done in colors to match all of my sailplanes: Volz blue fuse, red, white and blue American flag colors. The only thing it needed was for me to install the new XtremePowerSystems 2.4 receiver <<http://www.xtremepowersystems.net/>> and a battery.

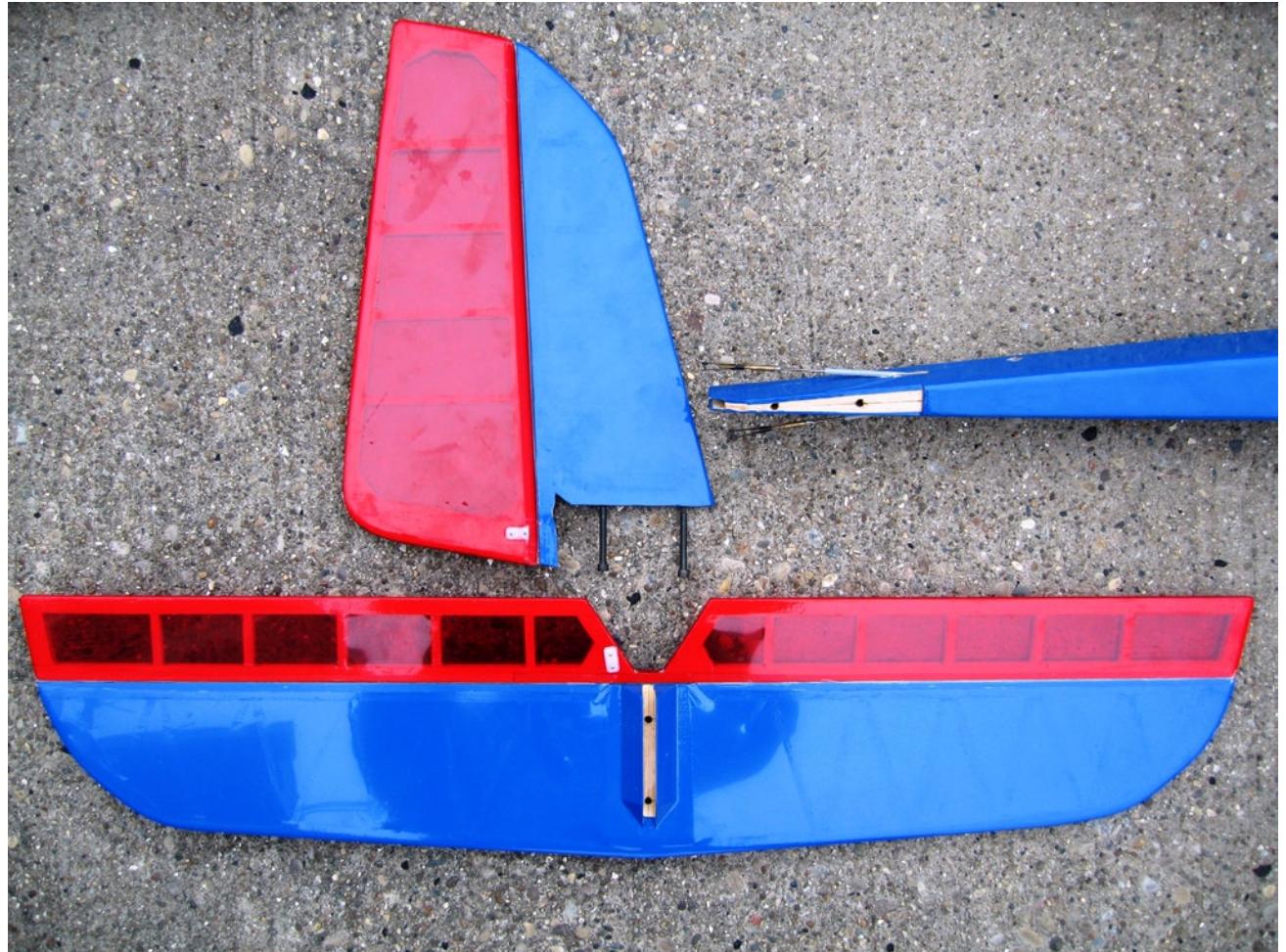
I flew it a few times and then decided to use it for my first LSF5 8 hour attempt. It flew every bit as well as I remembered, but my 8 hour slope flight turned into a 5 hour slermal flight, as the wind never came up long enough to get more than about 20 minutes at a time. So I spent most of that time wayyy back behind the slope, working the thermals that rolled into the hill that day. Didn't get the task, but did have a really fun day of hard work flying with friends.

The next stop was the South West Classic. I had entered Open, RES and Woody, but it was Woody class that I



The JR 9303 with XtremePowerSystems module.

had my sights on. Kind of silly when you consider my lack of experience with wood and the model, but what the heck! All went well and I did pretty good in both RES (5th) and Open about 16th (74 points off the win). But as I flew the Marauder, I became very focused on doing well in



The bolt-on tail group.

that class. All went well except for the landings. The rubber multi-tooth skeg kept loading with mud on the first touch and then would just slide straight through the landing boxes. It hurt, but I felt that if I could stay steady on time and hit a few landing points I should be able to at least

place. At the end of the first day I was in first place by about 40 points, a good spot to be starting out Sunday's final three rounds.

Sunday was sunny and calm, so barring some mechanical disaster or dumb decision about air, I felt pretty confident



that the others would have to hit big landings to catch me for the win. George Joy was closest, and a tough competitor, so I couldn't take anything for granted. The first two rounds were pretty easy with lots of planes for me to read prior to launching, and I hit a landing. However, walking up to the final flight it was me, all alone, launching first. The air had cooled quite a bit, and there was very little in the way of a breeze to indicate an initial direction. I felt a small pull off to the right, so that was going to be my

heading. This was it. It seemed like mine to lose. I hooked up to a winch that had been working perfectly all day, launched and found that the battery sagged! The dead air launch was about half the height of others' prior! I headed off to the right, just inside the field tree line. Altitude was about 300' (not good for traveling) and my pretty Marauder was getting farther away... beyond some power lines, beyond a tree line, and, well, almost beyond my ability to read it even if it did hit some air!

My trademark "Dang! I'm in a tight spot!" was heard more than once, and finally I decided that I had to turn back or lose the model. It just seemed impossible that I had been wrong about the read, so against my usual rule, I turned downwind from where the model was... dangerous for sure!

It turned out to be a good decision. It was indeed up-wind of the core! The Marauder is really speedy for having such a thick section, and she ran really quick downwind without too much loss of altitude. I saw the tail pop up and felt the controls get lively, so I banged and cranked hard, and sure enough, she zoomed up into the turn... always a good sign.

Nine minutes later she slid into the box for some landing points and a bunch of high fives! It turns out I wasn't the only one who new it was a "hero or zero" decision to turn downwind that far away from the field!

The rest is history. My Marauder's first contest turned out to be a major and a first place trophy! I have all my LSF 5 wins and a few extra, one in RES with the Supra, but this one, even though there weren't enough pilots to qualify it as a LSF5 win, is one of the most fun wins of my hobby experience!

It was a blast! ■

MM Glidertech Marauder

<http://www.mmglidertech.com/marauder.html>

Span: 115 in. Area: 1090 sq. in.

Airfoil: Eppler 195 Mod.

Flying Weight: 60 - 70 oz.

Construction: Built-up fuselage, 3-piece wing



Making a V-tail

Bill Williams, billandtash@waa.co.za

I have recently finished building a Banshee, a 60 inch slope speed foamie from Tuffplanes. I bought it because I liked its no-nonsense look as opposed to the many semi-scale planes they had on offer. (Tuffplanes seem now to have closed, as the entire website is out of stock). The plane is now finished and flies very well. It needed masses of lead in the nose to get the C of G right due to both a short nose and a fibreglass strengthened tail, so she is not made for light winds. However, when the wind is strong, as it was on Sunday at Switchblade, she goes zipping around the sky, and I look forward to entering her in a speed comp.

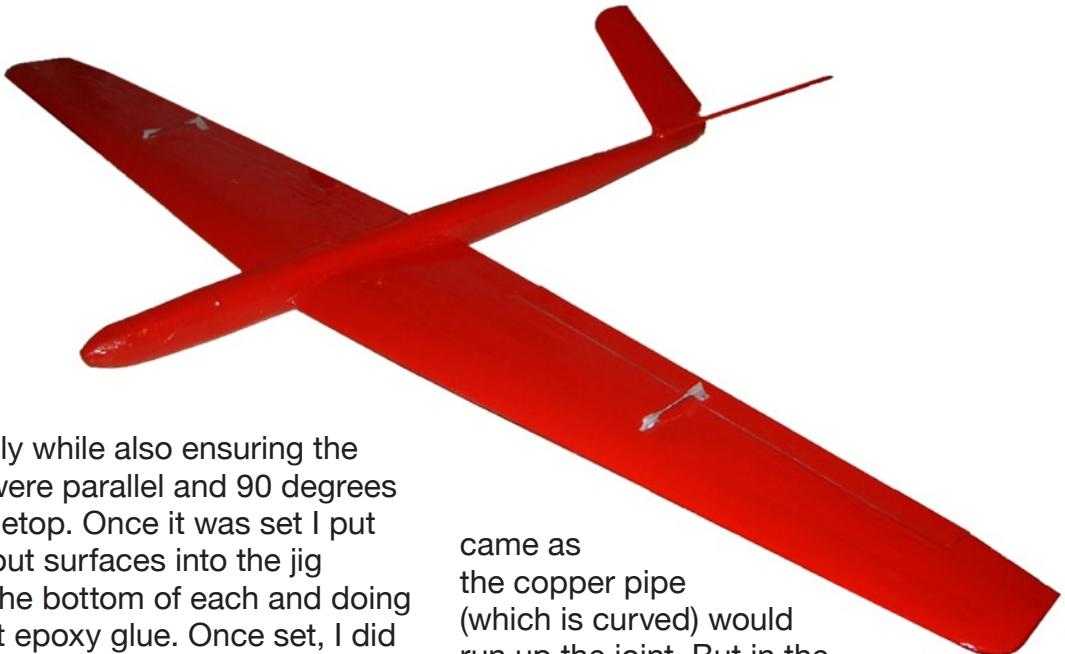
My biggest challenge, however, was the V-tail. I was surprised when the kit arrived and all I got was a balsa plank and rough sketch showing me how to assemble the tail. I was very worried I'd mess it up and decided to make a jig.

First I did a computer printout of the 110 degrees I needed, then cut out two identical cardboard frames that I had to

line up exactly while also ensuring the two sheets were parallel and 90 degrees from the tabletop. Once it was set I put the two cut out surfaces into the jig chamfering the bottom of each and doing an initial light epoxy glue. Once set, I did a second epoxy, then put three layers of fibreglass (in diminishing lengths) on both sides.

The next big challenge was gluing it to the fuselage. I got the fuselage perfectly level, then cut the jig in two and put the halves either side of the tail as a former before epoxying the tail on. Again finishing the tail/fuselage joint with three layers of glass.

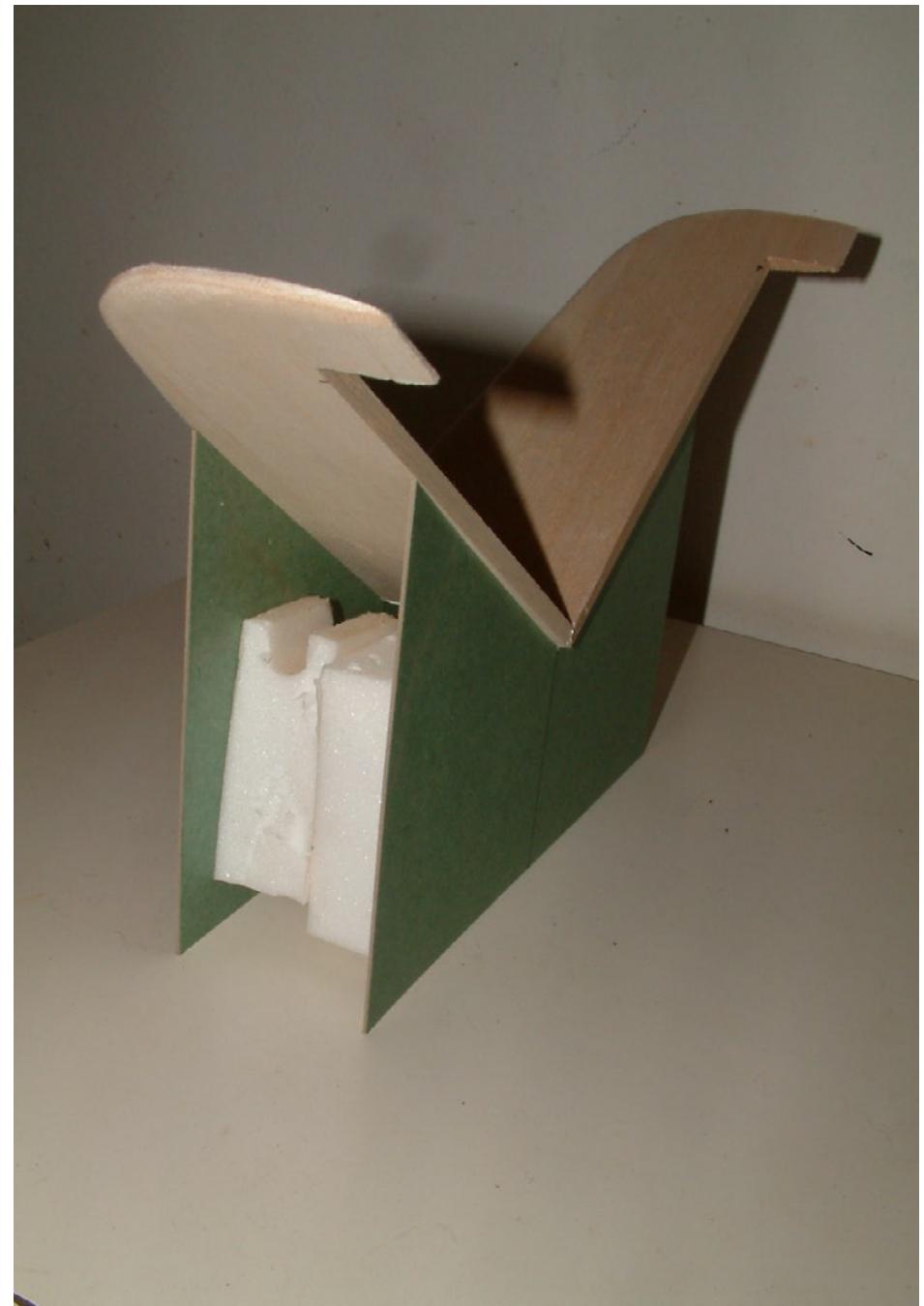
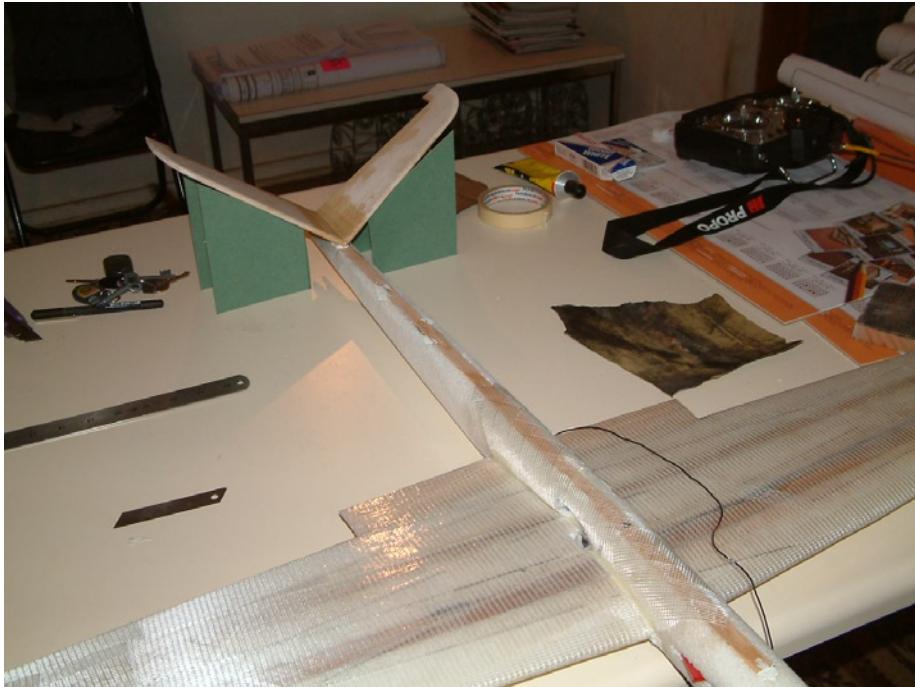
The final challenge was the control surface connections. Again, all I got was a brass pipe and a sketch... My only concern was that I wanted top hinged elevators (the kit suggested there was no need for rudder input or "ruddervators") using book binding tape and not the central hinge on a curved elevator end they were suggesting. The problem



came as the copper pipe (which is curved) would run up the joint. But in the end it worked out. Getting the brass bent at the right angle was quite a mission, though. I also had to make my own "Y" pushrod for the elevator control horns, which I made with two threaded bars onto one with epoxy and wrapped in thin metal wire.

There was not a whole lot of room to play with and I used brass connectors, not the normal plastic ones. I also struggled to get decent play on the elevators, but due to the long tail the small play is fine as it turned out.

This plane is also a great dynamic soarer, and here is a link to a video of it screaming around! <http://www.tuffplanes.com/Banshee_60/Banshee_60_EV1.wmv> ■



the BW 050209 airfoil and a plank for the slope

Dickon Harding, hardingclan@bigpond.com



Having got back into the gliding scene and discovering EPP, I did the old internet search and found a vast array of types ranging from V-tails to delta wings to planks. Refining my search, I found two groups producing EPP gliders.

1) Dezzanet produces the Redback <<http://www.windfeelhobbies.com/viewPlane.php?productId=30>> and <<http://www.californiasailplanes.com/planes/epp/Redback.htm>>, my first choice because it looked like a plane and was pleasing to the eye. (But I was yet to discover planks.)

2) Steve Drake <<http://www.stevedrake.com/>> was my second discovery. Wow! I loved the shapes and colours and bought a Gulp straight off.

As I pondered EPP forms, most seemed to have wings as one piece attached to the fuse makes transport in a regular car quite hard if you got more than one as my son and I do. (Steve now has multiple versions of Gulps with detachable wings.)

So the old mind ticked into gear and I was challenged by the new foam techniques and skills.

So, figuring I could build my own with a detachable wing, I used the Redback bolt-on wing process and built a prototype one-piece plank based on the Gulp and a JW I had seen at my local slope.

Having discovered that too much wind, if that is possible, and too much lead definitely consume sky at a vast rate of knots (pun intended), my prototype ended up at the top of a 60-70 ft tree. Why? Well, I was using the tree as a turning point as it was on the ridge line,



Initial CG location at 2.75" proved to be too far forward, requiring excess down elevator for inverted flight.



but just misjudged... somewhat. There it stayed 'til it fell out and got run over at some point in the night storm. So radio gear, etc., were all ruined.

At least I had a vague idea of what I was doing, so the following took place...

1) Refine prototype design and plan

I had to decide on some materials, such as spars, fin, and radio gear. The radio gear wasn't too much of a problem as I had a Futaba 6 EX PCM, although I never had the PCM switched on.

The standard servos that came with the set were way too wide and not really that torquey (is that a word?). I was going to use the HS125, but too many people suggested otherwise, even shops selling them. In the end I got a couple of HS225s for one plane and some GWS 2BBMG micro servos with same torque but mildly slower.

The GWS servos required plug adjustment and soldering to match the Futaba receiver, an R136F that came with the set.

As the nose section is 50mm (5cm or 2"), the receiver fit in nicely, so I simply Dremeled out a slot for it and fitted it with a taped-on lid.

Due to the size of the fuse, the use of a 4-cell square battery pack was out of the question, so a flat four was used. This meant more Dremeling, hacking, plus another tape-on lid.

Ballast went in front of the battery, again simply grooving out a hole and putting it in.

Next is No.2...

2) Design wings and find aerofoil to use

Here I did some investigation and ended up at the Martin Hepperle web site. Good info, but I didn't want to use the same

aerofoils everyone else might be using. I looked further and came up with the BW020509 I found at Bill and Bunny Kuhlman's b2streamlines.com web site.

So step three...

3) Cut out wings and build

As for the BW020509 aerofoil, I uploaded the coordinates into my Profili 2, drew it out on the computer, and sanded some 3mm ply to act as a blank to cut the foam.

So on with the build...

Next, I needed some form of wing brace.

My son had a Zagi-type 'wing that used wooden spars, as did the Redback. I opted for upper and lower 5.5mm carbon tubes. Just to see how the techniques worked, the top side tube was Gooped in, the bottom used polyurethane glue.



Put all the pieces together and *voila*, a plank.

But will it fly?

The polyurethane was a bit messy and required more work to clean up, but I think it's better overall. Just my personal opinion of course.

I joined the upper and lower rods in the middle after Dremeling out grooves for them. Instead of wrapping the joint of the left and right rods in glass or carbon cloth, I simply made a notch in the foam on both sides of the joint, top and bottom, and filled with fibreglass resin. I figured the weight gain would be minimal.

4) Cut out the fuselage and wing shape in the fuselage. (Gee, sanding EPP is tough.)

Here I stiffened the fuselage with a couple of carbon rods, 4mm, one either side. I routed out a groove for them to fit in a straight line from nose to tail, so the cut under the wing was about $\frac{3}{4}$ ". These were glued in using polyurethane glue to foam up and fill the gap,. The rest I just filled with spackle and taped over the top.

I cut a 3mm groove under the rods once the glue had set, and put in a 3mm piece of marine ply. This was then glued in with polyurethane as well. A couple of bolts go through the wing into self gripping nuts on the underside of the plywood.

I needed a fin of some description. Foam would be light, but I'm not equipped to make foam tails, and I wanted the curve all the way up. I looked at corraflute (for

about one second) and decided balsa was the way to go at this time. I used 1/8" sheet and sanded the T.E to paper thin, rounded off the L.E and *presto*, a fin.

I used my Christmas gift Dremel tool to cut a slot out for the fin. This turned out to be a bit wider than the sanded down wood. I filled it with glue to make a nice tight slot, although this did add weight in the tail. I just used some made-up pegs and, once taped in place, you wouldn't know the difference.

5) Sand, shape, and cover fuselage and any remaining bits and pieces.

Put all the pieces together and *voila*, a plank.

But would it fly?

Well, off to the park to find out.

A couple of minor adjustments, wait for a gust and chuck. "Yeehaa!" About 60-70 yards off a hand throw, although I suspect the small slope helped. Again, a couple of chucks to trim and get ready for the mountain flight.

On the mountain, it flew fine, but I started off with CG at 2.75" aft of leading edge. As we speak I'm moving it back somewhat as it is too far forward. Otherwise the flight went well. Due to incorrect CG, inverted flight required most of the available forward stick, which was a shame. Hopefully all will be good after retrimming and adjusting.

The BW 050209 turned out to be a nice and steady section with no unexpected wing drops or stalls, good in tight knife-edge turns as well as carvey turns. Tight rolls and 4-pointers all worked well, but I had to be quick with the 4-pointer.

We did try a stall, and minimal wing drop occurred.

For my first plank it worked out well.

We did fairly thwang the plane around the sky and it was reasonably quick

Still not quite sure how, but my son cartwheeled it while airborne, and recovery was all good once the nose was down.

I only had my Gulp to compare, which I think was faster, but if you want to be more aggressive than I am, my suggestion would be to get a thinner section that is more aggressive.

The BW020509 provided good steady lift in very blustery wind and looks like it will work well in less lift than I have so far tried.

Would I use the BW 050209 again? Yup, for sure.

And that's about it for your run-of-the-mill home-made plank.

For a 3.7MB video of the BW 050209 equipped plank being flown by my son, Andrew, see <http://www.rcsoaringdigest.com/Andrew_flying.wmv>. ■



Flexible Topaz - John Erickson (Valencia, CA) “pilots” his Topaz to a landing at the 2008 South West Classic in Queen Creek, Arizona. No damage, but the extreme flexibility observed a few milliseconds after touchdown is quite astounding.

Photo by John Hart and courtesy of Joe Nave <<http://www.rcsoaring.com>>.

The 3 Abilities

Chuck Anderson, chucka371@yahoo.com

All too often, sailplane flyers concentrate on performance at the expense of the three abilities necessary for a successful model. I am referring to stability, controllability, and visibility. All are necessary for a successful model so the real skill of a designer is how well he compromises these requirements to achieve the model design objectives, whether it be F3B, thermal soaring, or slope racing.

The skills and handicaps of the flyer further complicate the design

requirements. A novice flyer needs a lot of stability and visibility with less controllability. Performance should be compromised as necessary so that the novice won't crash too many models while learning to fly.

The expert usually sacrifices everything to achieve maximum performance. All too often, the not quite expert falls into the trap of maximizing performance at the expense of stability and winds up with a model beyond his skill level and actually ends up with lower performance.

After all, one thumb glitch waste a lot of the performance gains from relaxed stability.

How much control power do you need? Only you can answer that but any more than necessary only hurts performance. I normally fly with just enough control to safely launch and land my sailplane. Anything more is unnecessary drag. Low rate on my transmitter is set for normal flying and high rate is set up for flying in wind and turbulence where more control power is needed.



All of us eventually fall victim to father time and must cope with slower reflexes and reduced vision. We must fly larger, more stable models that are more visible. Even Joe Wurts admits that he now flies with more stability when thermal soaring. Color schemes can help visibility but the best aid is simply bigger models. As I get older, I find it necessary to move to larger models. Polyhedral wings are also much easier to see at extreme range. I try to adjust my models so that they will do two complete circles hands off without falling

into a spiral dive or rolling out of the turn. That way, if I lose sight of the model, it should soon come back into view and I will at least have a chance to find it again. A few years ago, I bought a COP from Brian Smith to use as a backup to the Compulsion I was flying at the time. COP is Brian's name for models he assembles from parts of other models (Composed

Of Parts). That particular COP had Compulsion wings with SO1 airfoils mounted on an Ava fuselage. I assumed that it would fly like my Compulsion. It did with one exception. I couldn't see it well enough to fly as far away as I had been flying the Compulsion. Since then, I refer to the super skinny fuselages popular today as stealth fuselages and no longer use them.

It is easy to get all the free advice you need on the Internet. On the Internet, everybody is an expert so take all advice with a grain of salt. Your definition of a good model may be different from his. ■

Sailplane Calc

An Excel Spreadsheet by Curtis Suter, suterc@msn.com

I checked out one of Dr. Mark Drela's 2m designs on the spreadsheet and it gave a Neutral Point within 0.1 of an inch of Drela's calculated Neutral Point. A very valuable tool!

Alastair Robertson
Costa Mesa, Southern California

I've just finished designing and scratch building my first project using your spreadsheet and am absolutely delighted with the final result.

The model literally flew "straight off the board."

Don Berry
Adelaide, South Australia

"Sailplane Calc" is a compilation of spreadsheets I've written with Microsoft Excel which performs many complex calculations to determine the balance location of your model or, if building/designing a model, it will give recommendations on the sizes of your vertical and horizontal tails, wing dihedral and other pertinent data. What makes the spreadsheet useful is that the modeler only needs to input easily measured parts of the model with a ruler, scaled in inches, and weight in ounces.

History

I began designing the spreadsheet over 10 years ago, as I was eager to learn the

usefulness of Microsoft Excel and how to determine the initial balance location for a successful first flight of my models. I had recently crashed a model on its first flight due to the manufacturer's error in placing the balance point nearly two inches aft! I had to find a way to determine the designers balance location prior to a first flight to prevent this from ever happening again. I then read Martin Simons' wonderful book called "Model Aircraft Aerodynamics," and have used his calculations extensively throughout the spreadsheet. I am happy to say that I've never crashed a model on a first flight since! I've even moved one model 3/4 inch aft of the recommended location

for a first flight. Although the calculations are accurate for determining the balance location, it does not figure the incidence of the horizontal tail (decalage). Decalage is the angle between the main wing and the horizontal tail.

This article will walk the reader through how easy it is to measure and enter data from a popular, well designed model called the "Bubble Dancer" by Dr. Mark Drela and compare the results. I think you'll be amazed at how easy the spreadsheet is to use and how accurate it is. I'll also give a general overview of some of the terms as this will give more insight to the new sailplane builder/pilot eager to learn more about model setup.

Although brief descriptions of certain terms are given, it is not the intent of this article to cover them in detail. The purpose of this article is to inform the reader of the spreadsheet existence and demonstrate that even without the knowledge of these complex terms the novice and experienced sailplane pilot alike may easily obtain a safe initial location. It is hoped that this will light the spark so that the novice pilot will continue on his/her own to learn more about these very complex topics.

About the Spreadsheet

If you would like to follow along with the actual spreadsheet; it's available at my website on the "Files" page <<http://h1.ripway.com/cloudyifr/index.html>>.

The Bubble Dancer plans are available at Charles River RC <<http://www.charlesriverrc.org/articles/bubbledancer/markdrela-bubbledancer-3m.htm>>.

If you're unable to download the spreadsheet please email the author at suterc@msn.com and I'll email the spreadsheet to you.

The spreadsheet is saved as a Microsoft Office Excel 97-2003 Worksheet. I have seen the spreadsheet work properly with a Macintosh computer using Office 2008 for Mac. I had a user report that when using it with OpenOffice/NeoOffice the red triangles (notes) weren't always displayed and there were display issues with the graphs. This is the limit of testing

with other sources. If you do not own MS Excel then another option would be the free MS Excel viewer which Microsoft provides. It states that with Excel Viewer 2003 you can open, view, and print Excel workbooks, even if you don't have Excel installed. You can also copy data from Excel Viewer 2003 to another program. However, you cannot edit data, save a workbook, or create a new workbook. Here's the link to the free viewer:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=c8378bf4-996c-4569-b547-75edb03aa0&displaylang=en>

All calculations are visible for your perusal except for the data for the graphs, which are hidden and not useful to the user. The entire spreadsheet is "locked" so that the user is not able to change the formulas accidentally; this protects the integrity of the spreadsheet. However, once model information has been typed into the yellow cells a new spreadsheet may be saved by using the "Save As" command and using a different file name.

Disclaimer

This is not a thousand dollar program that takes into account all of the effects of airplane design. It will certainly do many complicated and time consuming calculations accurately and quickly, faster than reading this article. As with any computer program, information out

is only as accurate as data in. Unusual model designs such as excessive dihedral, very high mounted wings, as is popular in free flight models, forward swept wings, etc., have not been tested. The author is not responsible for the demise of your model.

Let's Get Started

When the spreadsheet first opens, you'll find yourself at the "Instructions" tab which contains a general explanation of what each of the computation tabs functions are. The spreadsheet has several tabs located at the bottom of the Excel window labeled Instructions, Wing, Wing Dihedral, Horizontal Tail, Vertical Tail, Balance Point, Tail Sizing Checks, Results, Glossary, Credits and Links.

To use the spreadsheet, your data is entered in yellow rectangles and the tabs are completed in logical order, from left to right. If you see a small red triangle in the upper right corner of a cell, hover the mouse over this triangle and a small window should appear with pertinent information.

To start, it would be simpler to assemble the model and place it on a large table or the floor and align it so that the wings are in a straight and level flight attitude.

All right, simple enough, let's move to the "Wing" tab and we'll start entering some data

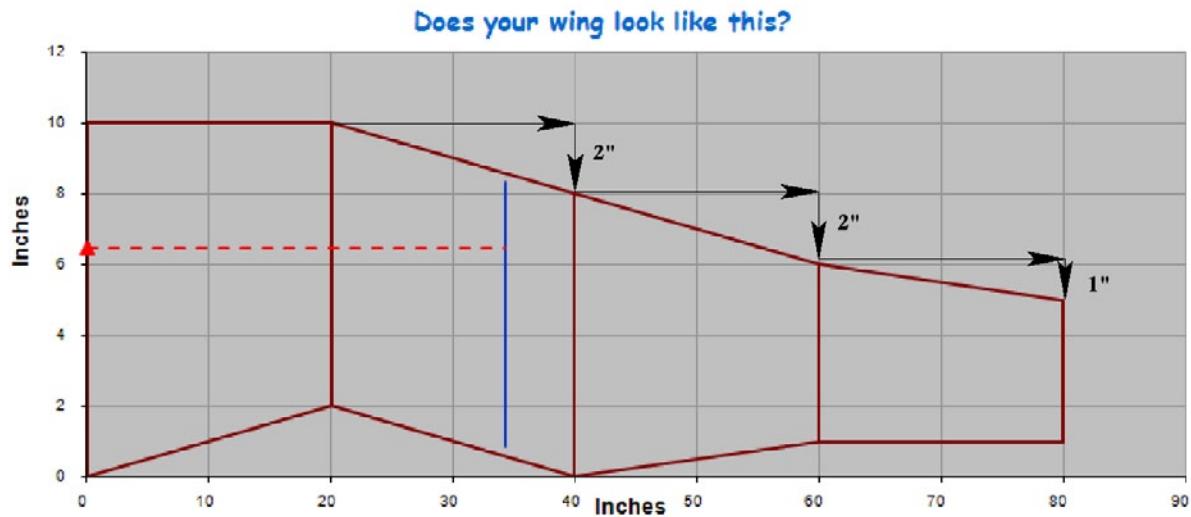


Figure 1

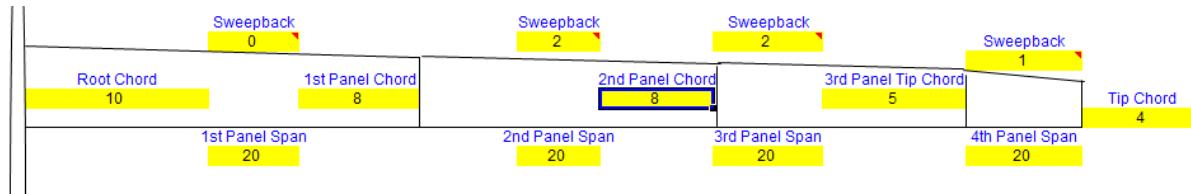


Figure 2

Wing Tab

We're only interested in one half of your wing. You'll notice there are data blocks (yellow rectangles) for four different wing panels.

To determine how many panels your wing has, look at your wing and note where there is a change in the wing chord or a change in the angle of the leading edge. Ignore the angle change of the

trailing edge as it will automatically be calculated. Where these changes occur is a separate panel. *Definition of Chord:* The distance from the wing leading edge to the trailing edge.

Measuring the panel span and chord are easy and self explanatory. However, let me review how to measure the sweepback. *Definition of Sweepback:* The distance the leading edge changes

forward or aft. Example: To determine the sweep entries for a wing see Figure 1. It's quite obvious this wing has four panels. Progressing from left to right or from the wing root to tip, the first panel will have a zero in the sweep entry as there is no angle change in the leading edge, but notice how the trailing edge moved forward? This is because the first panel tip chord changed in length. For the second panel there is a sweepback of the leading edge, so we'd measure the distance that the second panel tip sweeps back from the root of the second panel. In this case two inches. The third and fourth panel sweep is measured the same as before. See Figure 2 for the corresponding values that have been inserted. Remember, ignore the trailing edge sweep, as measuring the leading edge sweep and respective panel chords will automatically calculate the trailing edge.

In the Bubble Dancer (BD) plans, see Figure 3, there are three panels, so we need to make sure that zeros are entered in the fourth panel section.

Figure 4 shows the Bubble Dancer wing entered into the spreadsheet. There are two entries for weight, i.e. mass, as shown on the upper right of the plans, as the BD may be ballasted. I entered the weight without ballast. First I entered the root chords, panel spans and sweepback angles. Remember that everything is

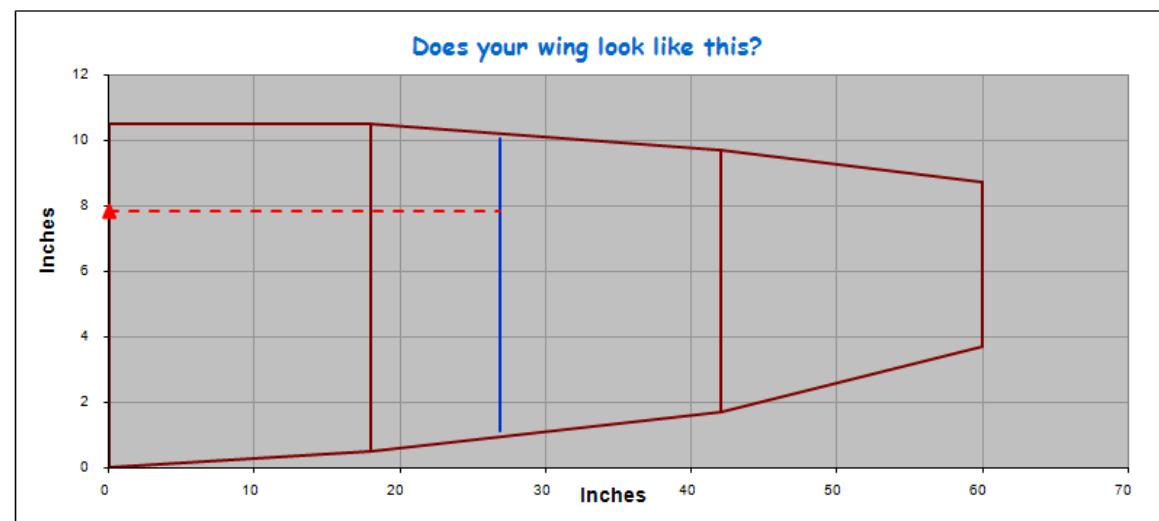
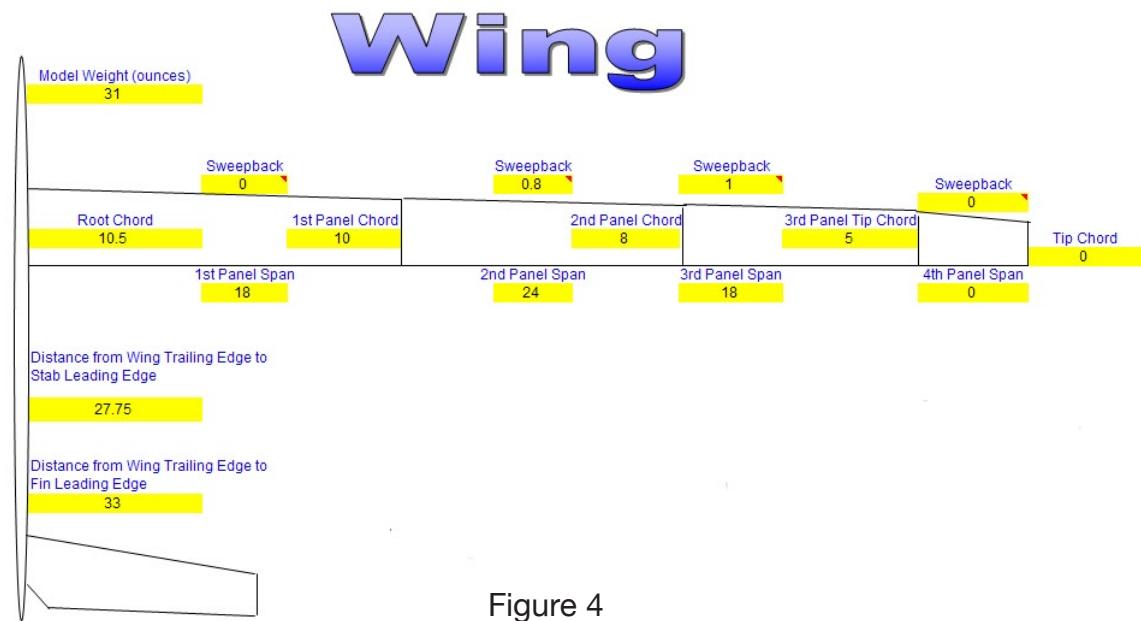
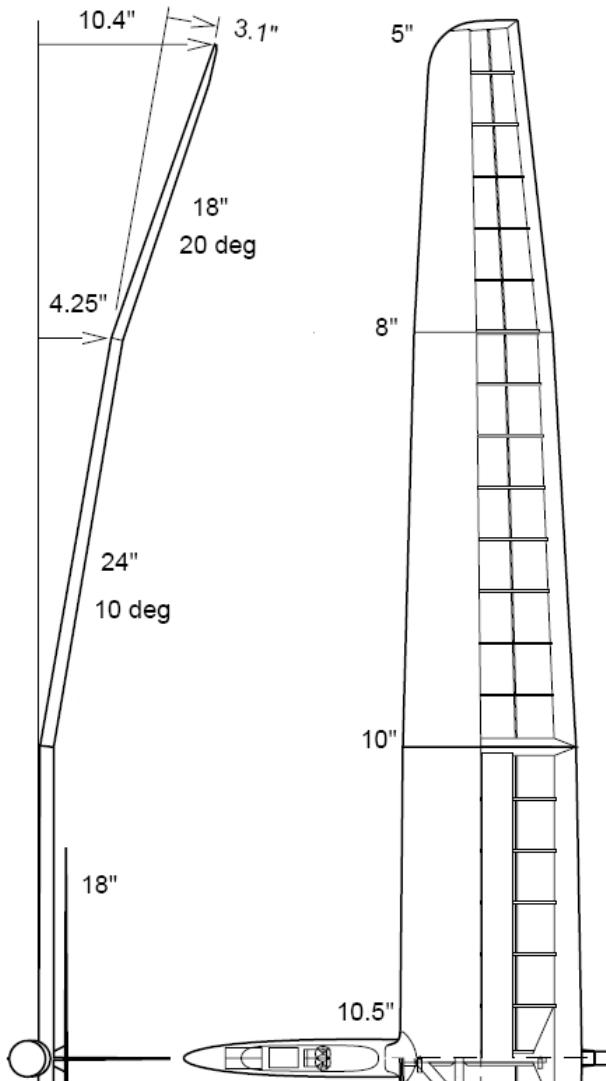


Figure 5

measured in inches. Notice the small red triangle in the upper right corner of the sweepback rectangle? This is a reminder of where to measure the sweepback.

Now enter the measurements from the wing trailing edge to the leading edge of the horizontal and vertical stabilizers where they intersect the fuselage. These tail distances will be used in the final balance calculations and Tail Sizing Checks. For the experts out there who know that in actuality the distances should be from the wings 1/4 chord location to the 1/4 chord location of the horizontal and vertical tails, you are correct and the spreadsheet calculates these automatically, which is yet another indication of the simplicity of the program.

There is a graph, see Figure 5, that will give a general planform view of your wing along with several important locations marked in blue and red. These will be explained in the Balance tab.

Now that the information is entered for the wing, lets see what data is calculated and what it means to us.

Total Wing Results (See Figure 6)

- Total Span is the distance from tip to tip of your wing not taking into account the width of the fuselage.
- Total Area is the surface area of the wing.
- Wing Loading is the amount of gross weight that each square foot of wing must support in flight to provide lift, expressed as “ounces per square foot.”
- Mean Chord is the average geometric chord of the wing.
- Mean Aerodynamic Chord (MAC) is the average aerodynamic chord of the wing. “This is an imaginary chord - capable of representing an entire wing, where all of the forces present on a complete wing may be assumed to act.” Note: This does not take into account such factors as twist, wing protuberances, varying Reynolds numbers, etc., across the span. However, this is a very good approximation and can be used for normal balance (CG) calculations.

Total Wing Results

Total Span	120.00 in.
Total Area	1035.00 in. ^{^2}
Wing Loading	4.31 oz./ft. ^{^2}
Mean Chord (area/span)	8.63 in.
Mean Aerodynamic Chord (length)	8.92 in.
Wing Aspect Ratio	13.91
Location of 0% point	0.52 in.
Location of 25% point	2.68 in.
MAC distance from root	26.89 in.

Effective Wing Results

Total Span	117.07 in.
Total Area	1014.09 in. ^{^2}
Mean Chord (area/span)	8.66
Wing Loading	4.40 oz./ft. ^{^2}
Aspect Ratio	13.52 in.

Figure 6

- Wing Aspect Ratio is the ratio of the wing span to the mean chord. The higher the aspect ratio the skinnier the wing is and the wing will produce less drag and more lift.
- Location of 0% point is required for my calculations
- Location of 25% point (1/4 chord) is the aerodynamic center of the wing — the place on the airfoil where all aerodynamic forces may be assumed to act at a single point, i.e. 25% MAC.
- MAC distance from root is required for my calculations. Note that aerodynamically speaking this length is not a measurable location from leading to trailing edge on the wing, although in many planforms it appears as though it is. An example of this later.

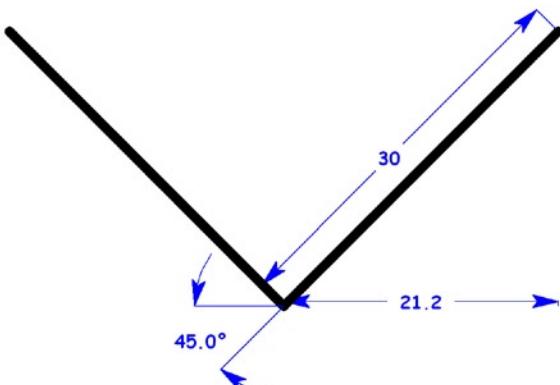
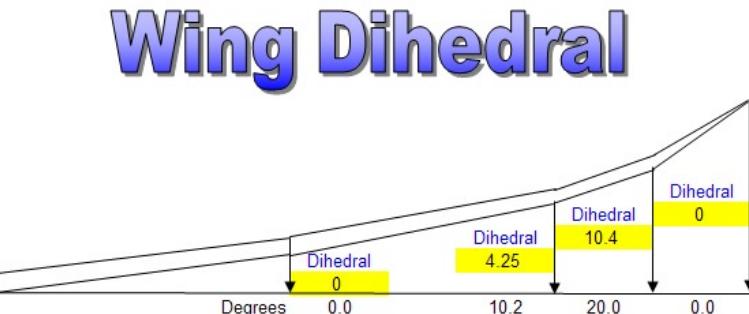


Figure 7

Reynolds Number	
Estimated Speed	15 mph
Result	100912

Figure 8



Does your Dihedral Look like this?

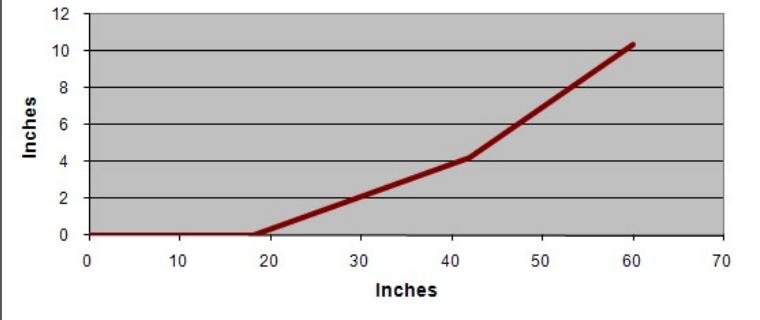


Figure 9

Effective Wing Results (See Figure 7)

These results are very similar to above, however this is how the wing is flying aerodynamically in flight if the wing has dihedral. **Definition of Dihedral:** The degree of angle (V-shaped bend) when viewed from the front or rear. Example: If your wing has a measured span from root to tip of 30 inches and 45 degrees of dihedral you'll notice the effective span, which would be measured from the horizontal is only 21.2 inches.

Reynolds Number is calculated based on sea level pressure and standard temperature.

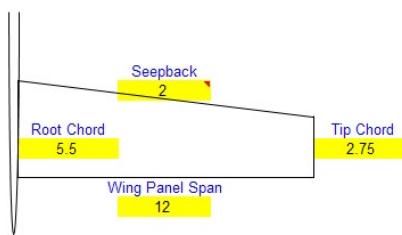
Definition Reynolds Number: It's a non-dimensional parameter which establishes relative viscous flow effects useful in airplane design. That's a mouthful. Reynolds number is based upon chord length, speed, and viscosity. I used a viscosity based on sea level standard pressure day. Normally, R/C models operate around 120,000. Its usefulness is in comparing different objects movement through a medium such as air. See Figure 8.

All other information on this tab is required calculations.

Dihedral Tab

The Dihedral tab is used for the Effective Wing Results on the Wing tab and for the Tail Sizing Checks tab. See Figure 9. Once again you can see the four panels of a wing, but we only use three, so make sure a zero is input in the fourth panel. In this instance we're measuring

Horizontal Stabilizer



Total Horizontal Stabilizer Results

Total Span	24.00 in.
Total Area	99.00 in.^2
Mean Chord (area/span)	4.13 in.
Stabilizer Aspect Ratio	5.82

1/2 Stabilizer Results

Area (dS1)	49.50 in.^2
25% MAC (x1) from R.L.E.	1.96 in.
Location of 0% point	0.93 in.
Location of 25% point	1.96 in.
Sweep Angle	9.5 degrees

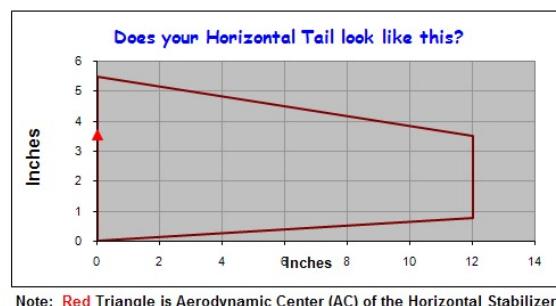
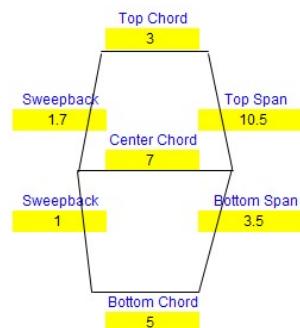
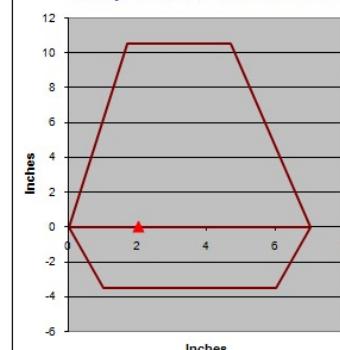


Figure 10

Vertical Stabilizer



Does your Vertical Tail look like this?



Note: Red Triangle is Aerodynamic Center (AC) of the Vertical Stabilizer

Note: Use only the top portion unless your vertical stabilizer has a top and bottom component as is popular in Discus Launch Gliders (DLG's).

Total Vertical Stabilizer Results

Total Span	14.00 in.
Total Area	73.50 in.^2
Mean Chord (area/span)	5.25 in.
Location of 0% point	0.72 in.
Location of 25% point	2.03 in.

Figure 11

each panel perpendicular to the table or floor. Actually, we need to measure to the bottom of the wing, so subtract the distance the wing root is being held above the table or floor by the fuselage. I've entered the measurements for the BD shown on the plans.

Horizontal Stabilizer Tab

The horizontal stabilizer includes the entire horizontal areas i.e. the fixed portion and the moveable portion, the elevator. This data is entered exactly as the main wing, thus we're only interested

in one-half of your horizontal tail. The Results are similar to the main wing, so we won't cover them again.

Because the measurements are not given on the Bubble Dancer plans, I used a CAD program to find them and have entered them into the spreadsheet. See Figure 10.

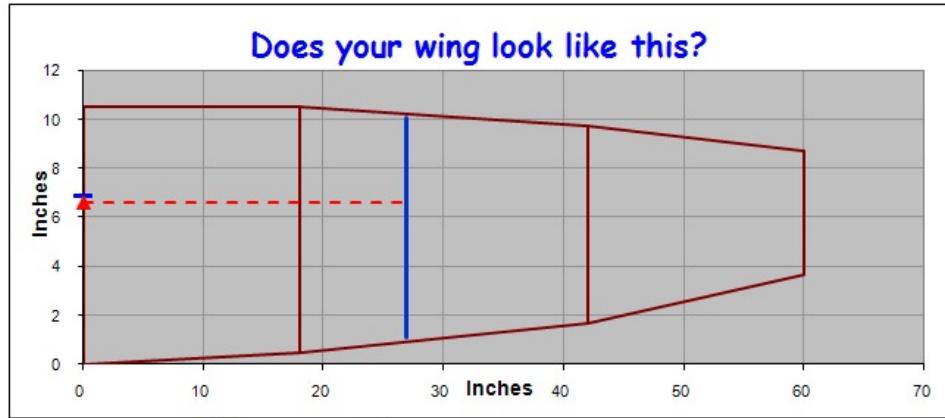
Vertical Stabilizer Tab

The vertical stabilizer includes the fixed and moveable portions, i.e. the fin and rudder. The main thing to note here is that only the top panel is used and zeros

must be entered in the bottom panel unless you have a fin that has multiple sweeps or a tail that projects below the fuselage such as is popular in discus-launched gliders. The Results are similar to what's already been covered, so we won't cover them again.

Once again, because the measurements are not given on the plans, I've used a CAD program and have entered them into the spreadsheet. See Figure 11.

Balance Point (CG)



Note: Blue Dash is the balance location with the static margin specified in Row 36

Red Triangle is Aircraft's Neutral Point at Root Leading Edge

Blue Line is the MAC location

Where Blue MAC line and Red dashed line intersect is the Neutral Point of the Model

Warning!: For the first flight of a model the red Triangle, (neutral point of the plane) should NEVER be forward of the blue Line, (CG).

Stabilizer Efficiency	0.60	Static Margin (%)	Distance (inches)	% MAC
Neutral Point (%MAC)	0.0	3.92	39.4	
Enter Static Margin	3.4	3.63	36.0	

Figure 12

Balance Point Tab

Now we are finally getting to the main part of the spreadsheet — where to actually balance the model. See Figure 12. There isn't much to enter here, but there is a lot of important information and the data that you do enter will affect the balance location. First is stabilizer

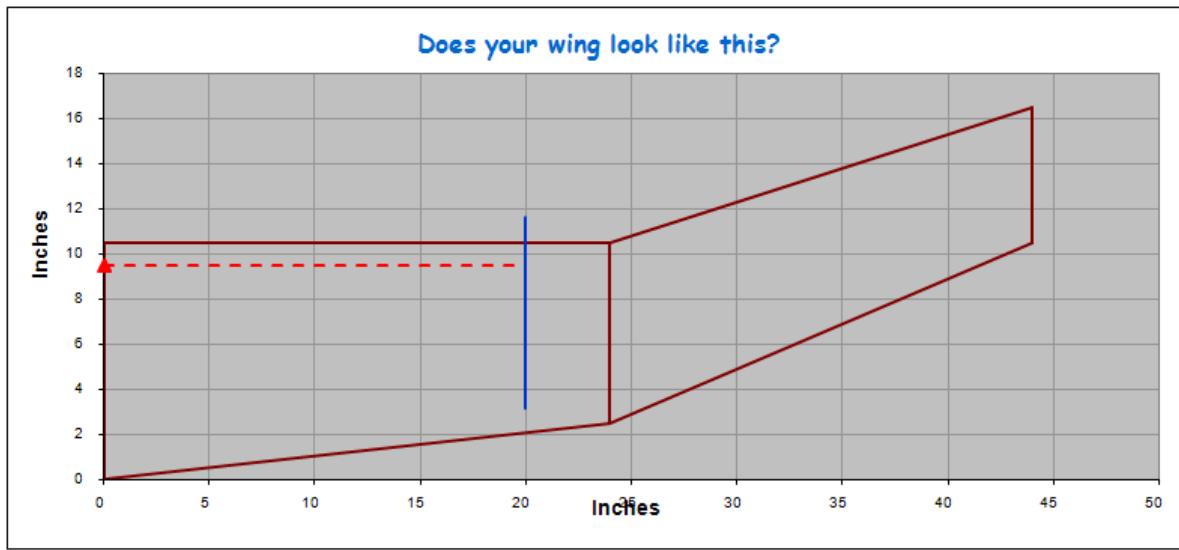
efficiency, and this need to be estimated. A cruciform or cross-tail is assumed to be 60% (0.6) efficient and a T-tail 90% (0.9) efficient. Notice that I haven't mentioned V-tails. This is because there is a separate spreadsheet that covers V-tails. It's available at the same website given previously. Secondly, the desired

static margin is entered. *Definition*

Static Margin: The distance between the aerodynamic center and the balance location as measured in percent of the mean aerodynamic chord. This is a measure of the amount of static stability possessed by a glider. If zero is entered here, your model will possess zero static stability. This means that if in straight and level flight your model is hit by a wind gust, your model will not return to straight and level flight. Your model is called neutrally stable. If the static margin is negative then your model will diverge even further than was disturbed by the gust. However, if your model possesses positive static stability (desirable) your model will slowly return to normal straight and level flight. For a thermal duration model this value is set at 5-10 percent for a safe first flight. Notice how a static margin of 0% places the CG at the neutral point. *Definition Neutral Point:* This is the aerodynamic center of the whole aircraft. It's the position through which all net lift may be assumed to act.

To have an easily measurable and accurate balance location, it is referenced to the center of the fuselage and measured aft from the root leading edge of the wing.

Now lets take a look at the graph. It should show the exact planform as was worked out from the Wing tab, but there are three points that have been added.



Note: Red Triangle is Aerodynamic Center (AC) of the Wing
 Blue line is MAC location
 Where Blue MAC line and Red dashed line intersect is the Aerodynamic Center of the Wing

Figure 13

The solid blue line, a red dashed line, a blue dash, and the red triangle.

Lets look at the blue line first. This is the MAC length of your wing planform. Technically speaking, this line can be measured outward from the root of the wing, but it does not always measure from the wing leading edge to trailing edge. This is a theoretical line. Notice in Figure 13 we have a wing that is swept aft then forward; thus the MAC length is not measurable on the wing, but this is quite accurate and is why the location is projected to the center of the wing for easy measuring.

What's important is the 1/4 chord location of this length. The red dashed line is this 1/4 chord location projected to the center of the wing. The red triangle is the neutral point of the model. Notice I said neutral point of the "model"? This location is different than on the Wing tab, as that's only the neutral point of the wing, whereas on the Balance tab this location is taking the tail length (moment) and tail areas into consideration. Thus it's the neutral point of the whole model. The blue dash is the recommended balance location with the specified static margin the modeler provides.

There is a static margin converter which is useful to convert a known location or percent MAC to a static margin.

Tail Sizing Checks Tab

This tab is for someone who is designing their own model or wishing to change the flying characteristics of a model. Recall this is not a thousand dollar program, but these values will get you closer to a final design than guessing! The author has limited knowledge and model design experience to comment further than the notes that are already included in the spreadsheet.

Results Tab

This tab takes all the important results from the previous tabs and puts them in one easy location for review or printing.

Now that all the information for the Bubble Dancer has been entered, let's compare how close Sailplane Calc has computed to what Dr. Drela has on his plans. See Figure 14. Dr. Drela only listed "effective" results, so we'll compare those. Remember this is how the wing is actually seen in flight due to dihedral. How are those results for quickly measuring the model?

There is a misconception about balancing a model. Many people believe that the airfoil being used affects the results. This is not true, and notice there has been no mention in this article about the type of airfoil used.

Comparison of Sailplane Calc results to the Bubble Dancer Plans

Main Wing	Sailplane Calc	Bubble Dancer Plans
Effective Span in inches	117.07	117
Effective Area in square inches	1014.09	1014
Effective Loading in ounces per square foot	4.4	4.4
Effective Aspect Ratio	13.52	13.5

Tail Sizing Checks		
Spiral Stability (B)	7.27	not given
Horizontal Tail Volume (Vv)	0.41	0.4
Vertical Tail Volume (Vh)	0.026	0.025
Dihedral Sizing - Roll Control (VvB)	0.189	not given
Equivalent Dihedral Angle (EDA)	12.42	12.4

Figure 14

Now let's see how the balance location compares.

The plans show a balance location of 36% MAC and I measured in the CAD program the distance aft and came up with 3.78" aft of the root leading edge.

When the 36% MAC is entered into Sailplane Calc's Static Margin Converter, we obtain a static margin of 3.4% and a balance location of 3.63 inches aft of the root leading edge. That's a 0.15 inch

difference, about the width of the pencil erasers that I use for balancing!

Dr. Drela is very accurate in his calculations, and with the location shown on the plans I would not hesitate to fly a first test flight with those values. However, if this was a personal design or the static margin was a negative value, or greater than 10%, I would have to rethink where I'd balance for the first flight. Personally, I would go back and ensure

the model was measured correctly. If there were no changes, I would trust the spreadsheet and use a static margin of 5-10%. This is what the author has done for years and has had perfect success. Now that I've successfully flown the model, I would then conduct further flight testing to fine tune the balance location to my preference of flying. I personally use the Dive Test method. I'll leave it up to the reader to research this technique, as much has already been written about this subject.

Glossary Tab

This tab has a short list of definitions.

Credits Tab

Please view this tab. If it weren't for the folks and companies on this tab I would have never been able to develop this spreadsheet.

I have many folks to thank, but would like to add a personal thanks to Herk Stokely for his timeless efforts and patience in answering hundreds of questions, to Martin Simons' book on "Model Aircraft Aerodynamics," and lastly to *Radio Controlled Soaring Digest* for kindly publishing this article.

To join a discussion about this article, there will be a thread in the "Modeling Science" forum at www.RCGroups.com.

BUILDING THE GLIDER GUIDER POPULATION IN YOUR CLUB

By Ed Anderson, aeajr@optonline.net
Aeajr on the forums

If your soaring club has a healthy membership and is not looking for new members then this discussion will not be of interest to you. But if your numbers are shrinking, if there don't seem to be any new glider pilots joining, then read on. There may be a tidbit of assistance buried somewhere in the discussion that follows.

Why aren't more people interested in gliders?

A guy walked up to me and asked if I would like to galoop on a tr raft. I said I appreciated the offer but that I really wasn't interested. He looked somewhat surprised, then walked away disappointed. And I walked away wondering what he was talking about.

Hold that thought, I will get back to it.

Now, reset to five years ago. I had always wanted to fly RC airplanes but they were big, expensive and I didn't know anyone who did this. I ran into a friend who told me about these things called parkflyers. They are inexpensive, quiet, clean, fly well, and can be purchased ready to fly.

They are hard to break, easy to fix and you can buy spare parts at low cost. *Wow, I need to get into that.* So I buy an Aerobird and can't wait to learn how to fly.



Photo by Rudi Oudshoorn

I learn of a local RC club that flies small electric planes and gliders, whatever gliders are. Oh, wait, sure, gliders are those \$1 little things you buy at the toy store. Or maybe they're those \$6 big foam things. I have one of those in the garage. It was fun for a day or two, but without a motor it got quite boring.

I tell them I want to join and learn to fly electric planes. I tell them I think this is such a cool idea and I can't wait to get started.

missing out and how I really wanted to fly gliders and how I should build a kit. It was all noise that meant nothing to me. And my response was that I was not interested in gliders or building kits, I wanted to fly RTF electric planes. So they walked away disappointed, mumbling something about the decline of America or something like that.

Is the world losing interest in gliders?

Model Aviation magazine did a survey of its readers, asking about what parts

After all, how many people have ever seen a full scale glider in flight, live and in person. Not me! I have seen photos and videos, but never have I seen one live.

And, while slope soaring can look like fun on a video, thermal duration looks like watching grass grow when watched on a video. Who would want to do that?

Fast forward to today. I have six electric planes and 18 gliders. I fly gliders 70% of the time. I fly TD, DLG, slope and aerotowed gliders. I also have three

This is not some magic formula I invented, it is one that I had the privilege to walk into...

"Well, don't you want to fly gliders? We are primarily a glider club."

"No thanks, I am not interested in gliders. I want to fly electric planes. Should I go somewhere else?"

Now, if I had walked into your glider club and said that, what would have been your response? Would you have welcomed me with open arms, or would you have rejected me?

The club accepted my application and money, though I am not sure they were completely happy about it.

Everyone was telling me how I was

of *Model Aviation* magazine interested them. The survey results showed that 30-40% of the members responding to the survey were interested in the soaring columns. So, if at least 1/3 were interested in soaring, why do we feel that there is a decline in the number of glider guiders?

It goes straight back to that lack of understanding, lack of access, and lack of support for soaring for new flyers. Most people have not been exposed to gliders, don't know anyone who flies gliders, and so they are not interested.

electric gliders. I like my electric planes, but I love flying my gliders. Soaring with the birds and riding the slope lift is what I dream about.

What changed? And how can this story help your glider club?

I don't think I was all that different from the typical new parkflyer pilot. I saw a low cost way to get into RC flying. I understood planes with motors and that was what I wanted to do. All this discussion of gliders meant nothing to me. Frankly, it sounded dull and stupid. It was like talking to the guy who



Dayle, age 11 and youngest club member, learns to use the winch.

Photo by Ed Anderson



wanted me to galoop on a tr raft. I didn't know what it was, so naturally I was not interested.

What changed?

Over time I gained exposure to gliders and glider pilots. I met some friendly guys who accepted me and my interest

in electric planes. They helped me learn to fly my Aerobird, and during the process they became my mentors and my friends. During the process of helping me learn to fly my parkflyer, they taught me about soaring. Once I got a taste, the rest was easy. Within six months of

joining that club I had my first glider, a Spirit RTF. I didn't buy that Spirit because it was required, I bought it because now I was interested.

It is important to note that this club only allows a limited range of electric planes. All electric gliders are welcome. Fast and aerobatic electric planes are not allowed. Planes must be slow to moderate in speed. They are typically high wing designs with a wing span of 60" or less. They are to be flown in a glider-like fashion. No low level flying, no high-speed passes, and no 3D. Warbirds, pattern planes, pylon racers or the like are not permitted as they are intended, by design, to be flown in a manner not compatible with a glider field. And, naturally, gliders always have the right of way.

What that means is that these parkflyers are seen as trainers and as slow to moderate flyers. As long as they are flown in a fashion that is compatible with thermal duration gliders, they are welcome on the field.

For new pilots this is a wonderful training environment. There is no one making low level passes and no one

boring holes in the sky. They can learn in comfort and relative quiet. For some of these new flyers this is what they want to fly going forward — slow to moderate speed electric planes. We are happy to have them as members.

Some learn to fly their parkflyers, then leave after the first season and seek other clubs that are more compatible with their high speed or aerobatic interests. But while they were with us, they learned about gliders. Some of these people have dual membership, flying high speed aerobatics, helis and perhaps jets at their other club, flying slow planes and gliders with us. We are happy to have them as members, too.

Of those who remain members, I estimate that about 75% take up thermal duration soaring as part of their regular flying and about 50% end up flying gliders, too. Electric gliders are a common second plane.

While the balance is difficult to maintain, what has developed is a steady flow of new members. I would estimate that 90% come in as new parkflyer pilots looking to learn to fly. And so they learn to fly their parkflyers. Over time, about half also take up soaring as a regular activity. If they had not had the opportunity to be exposed to soaring, they never would have tried it or found that they love it as much as the rest of us.



Photo by Rudi Oudshoorn

Has your glider club considered accepting parkflyer pilots?

There is a fear among glider clubs that if they open their doors to electric pilots the electrics will soon take over and destroy the glider club. I have heard the horror stories about this actually happening. So the rest of the discussion is a suggested approach to strike a balance.

This is not some magic formula I invented, it is one that I had the privilege to walk into and which I have had the privilege to help nurture along with the other members of our club. It is not heaven, as there are always those who will seek to shift the balance. However, with a little patience and diligence it can work quite well. The key is to help these new parkflyer pilots become good pilots first. Then, over time, expose them to the



Photo by Rudi Oudshoorn

fun, the excitement and the joy of thermal duration soaring, slope soaring or both.

I encourage you to accept electric TD gliders as simply gliders using an alternate launch method. Once they climb to height, they are soaring machines and are a convenient way to

learn thermaling skills. Likewise, your more senior pilots who might find it difficult to use a hi-start or the winch can continue their soaring using an electric motor to launch their plane. Just stay focused on the manner of flight rather than the launch method.

If you also accept electric planes, consider the approach of limiting the range of planes that can be flown. View these parkflyers as trainers or as slow flyers. With the proper training they can be kept very compatible with a glider field.

If you make it very clear, in writing, up front, that this is not a high speed or aerobatic field, then misunderstandings can be reduced, but they will still occur. Just deal with them as diplomatically as possible.

Once you let the monster in, how do you control it?

By teaching!

The role of instructor, teacher, coach is a very powerful one. Once you become someone's mentor they will tend to look to you for guidance and will likely follow your advice. If you, as a glider pilot, do not take on this role of teacher/coach, then one of the electric pilots will. When that happens, who will teach them about the joys of soaring?

What follows is not a club program, it is the program that I follow. It seems to work well, but requires patience. Just as I was not about to be forced into gliders, so I do not expect others to be forced into them. But if the right exposure is provided, many new pilots see the beauty and the wonder of soaring and want to learn to fly gliders, too.

I will give a summary here. You may find some tidbits of value here or you may not. If you want to know more about my teaching approach you can find more depth here:

Teaching Someone To Fly - Tools and Techniques <<http://www.wattflyer.com/forums/showthread.php?t=5767>>

THE 10 STEPS FROM PARKFLYERS TO GLIDERS

- 1) *Welcome the new parkflyer pilots, especially the untrained pilots.* If they are set on a first electric and don't have one, recommend one that is also a good glider. The Easy Star is an outstanding choice. This is my number one recommended plane for new pilots. The T-Hawk, the Aerobird and similar planes can be flown as electric planes and as gliders.
- 2) *Don't lecture them about how they need to fly gliders.* Telling someone that their new pride and joy is ugly is not a way to win their respect. Help them learn to fly their parkflyers.
- 3) *Teach them how to fly and how to fly safely.* Teach them how to yield to the gliders, respect the winch, and the like. They will make



Photo by Rudi Oudshoorn

mistakes, but if you don't help them, how will they ever know? Telling is not teaching. Lead by example as well as by instruction.

- 4) *Remember that learning to glide is a valuable lesson for an electric pilot.* If the LVC kicks in and they lose the motor, they need to be comfortable flying in a glide. This is THE first step to introducing them to gliders.

- 5) *Teach them to fly their parkflyers in a glider-like fashion.* They have absolutely no idea that this can be done. The first time an Aerobird pilot catches a thermal and rides it, he becomes a thermal duration glider pilot. At least 50% will continue to pursue this along with their other flying. The more talented they become in riding thermals with their Super Cub or T-Hawk or Easy Star,

the more likely they will move into gliders.

Suggest an e-glider as their next plane. The Easy Glider Electric is a wonderful next plane, especially with a brushless motor and lipos. The Ascent is also a good choice. Now help them set it up and look for lift. They will love this. If you slope soar, too, take them slope soaring. The Easy Glider and Easy Glider Electric are great on the slope.

6) *Once they are safe, let them try one of your pure gliders.* Use a buddy box if you feel the need, but I don't. I can count on one hand the number of times I have used a buddy box in the last five years. My Easy Glider Electric is my favorite plane for this. It is stable, it thermals well, and the motor can get them out of trouble. However, I also let them fly my Spirit, my Sagitta, and, if they are good, my Thermal Dancer.

7) *When they are ready, help them research and buy that first pure glider.* Don't focus on contests, focus on fun and success. The Easy glider is a great first glider as is the Tower Vista, the Spirit, the Gentle Lady, and lots of others. They are probably comfortable with foam, so don't shy away from it. If they

are flying ailerons then perhaps the Cularis (a full-house 100" foamy) would be appealing.

- 8) *Now help them learn to launch, to hunt, to ride and to enjoy.* If this is a pure glider, recommend they get a hi-start, too, so they can fly even when there is no winch at the field. Get them flying confidently first, then work on precision landing.
- 9) *DRAG them into the club contests.* At first have them time for you. Let them be your helper. Let

It takes time and work, but it is so much fun!

them understand how it works. Teach them to be a good timer such that others will ask them to time for them. This will bring them into the fellowship of glider pilots.

- 10) *Be sure to have Limited Motor Run contests for parkflyers and e-gliders.* Don't focus on winning. Focus on achieving personal bests. This gives them something to work on where they achieve success at every contest. Get them in the air and you time for them.

The top scoring pilot in our LMR contest series last year was a pilot who normally flies a Pike. He won the LMR series with an Aerobird. The parkflyer guys were amazed that an Aerobird could be flown in this fashion. BTW, that was the Aerobird that he brought to the field when he first joined the club.

How long does this take? In some cases it is a matter of a few months. That is how it was for me. However, I would say the typical cycle is two seasons. First they need to learn to fly. Then they learn to thermal or slope their parkflyers. Then they want to taste gliders.

Before you know it, they will be beating you in the club contests. Also, what you will see is that they will be welcoming in the new parkflyer pilots, teaching those guys how to fly their parkflyers in a glider-like fashion and building the club's glider population.

It takes time and work, but it is so much fun! And once you get it going, it starts to flow on its own. ■

If you would like to discuss the topic of building your club's glider guider membership, a discussion thread has been created at <<http://www.rcgroups.com/forums/showthread.php?t=833723#post9354182>>. Feel free to visit the thread, ask questions about this article, or share your views.



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