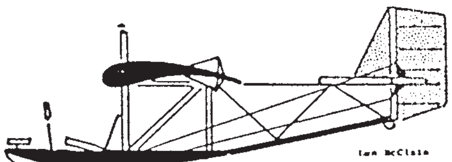

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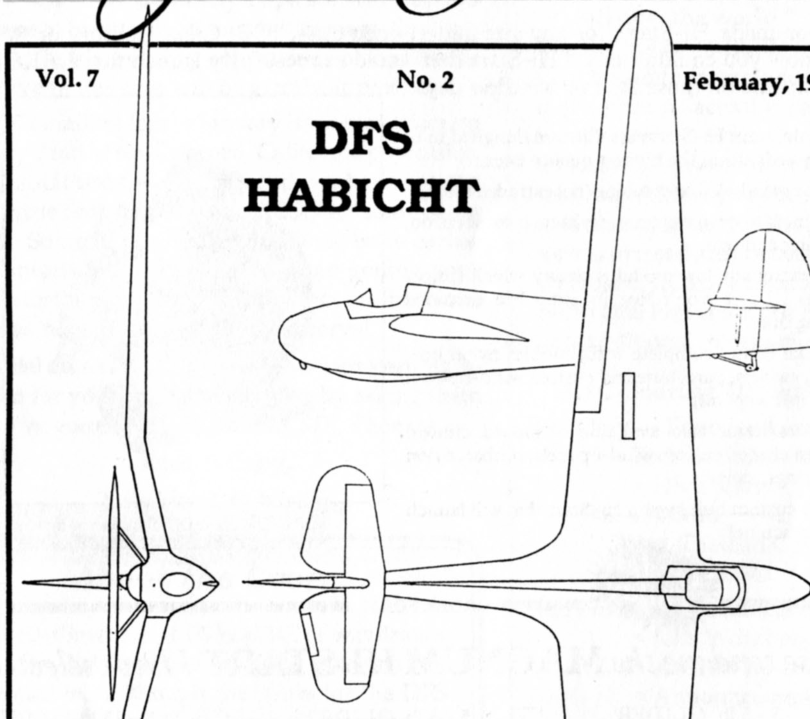
Vol. 7 No. 2 February, 1990

DFS HABICHT



Specifications

Wing Span	**13.60M**
Length	**6.58M**
Wing Area	**15.82M²**
Empty Weight	**250.00KG**
Gross Weight	**350.00KG**
Wing Loading	**22.15KG/M²**
Aspect Ratio	**11.7:1**
Airfoil	**DFS-Gottingen 756/676**
Stalling Speed	**60.00KM/h**
Max. Speed	**250.00KM/H**
Sink Rate @65KM/H	**0.80M/SEC**

The Soaring Site

"The Soaring Site" is intended to bring you monthly changes and an introduction to each issue of *RCSD*. And, with this issue, all of the production and publishing responsibilities have been completely shifted to California. Will this cause *RCSD* to change in any way? We definitely hope so! We hope to continue to bring you an even better magazine each month. As always, any suggestions or comments you have in this area will be greatly appreciated.

The bulk mailing for the January issue took place on January 2 out of the Concord, California post office. Although it went well at this end, we have noted a shift in the time it takes to get *RCSD* for some of the states. Some of you are getting your issue earlier and, unfortunately, some of you are getting your issue later than expected. In the case of the first class, we have noted no change in the interval.

A special thanks is due to each of you for keeping an eye out for your fellow subscribers by asking them if they've gotten their issue of *RCSD*! Thanks!

Read & Enjoy,

Judy Slates, Publisher

About the Cover...

The 3-View of the DFS HABICHT was drawn by Jim Ealy and is one of the plans he has available. Although the plans for the DFS HABICHT cost $35.00, Jim is offering them at a sale price of $25.00 (including S&H). Rolled plans are an additional $3.00. Jim may be reached by writing to: Archaeopteryx Avion Associates, c/o Jim Ealy, 128 Etra Road, Hightstown, NJ 08520; Phone: (609) 448-8726.

The HP-18A, on the cover of the January issue, was also drawn by Jim Ealy. Please see the ad for Archaeopteryx Avion Associates, towards the back of this issue, for additional information.

About RCSD...

RCSD is a reader written-publication. The articles & letters are freely contributed to *RCSD* in order to provide:

"The widest possible dissemination of information vital to R/C soaring to enthusiasts all over the world."

It is the policy of *RCSD* to provide accurate information, but if we print a factual error, we want to make it right. Please let us know of any error in *RCSD* that significantly affects the meaning of a story. The opinions expressed are not necessarily those of *RCSD*. Please see the back cover for subscription costs and additional information.

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High Start

Sportsman Multi-Task Soaring — A Year Later

...by Jim Gray

Just a year ago the *RCSD* Challenge was announced in the February 1989 issue and suggestions for a beginner's-type of F3B soaring event, including rules, tasks, and sailplane specifications, were proposed for consideration by the R/C soaring fraternity. Concurrently, a six-man committee was appointed to choose the sailplane that best met the Challenge and to formulate some guidelines for tasks and rules.

Now, it seems appropriate to see what happened during the year, how these proposals were received and implemented by individuals and clubs around the country, and -- in essence -- what happened.

One of the first changes made by the committee was to change the name of the proposed event to Sportsman Multi-Task Soaring, S-MTS, to de-emphasize the F3B connotation and accentuate the sportsman and multiple-task aspects behind the idea. Because thermal duration was a known task to most, the committee considered addition of speed and distance tasks to be within the capability of most clubs if the rules were kept simple. Hence a wide range of tasking and rules was allowed the CD, quite unlike the rigid and restrictive F3B program.

Individuals within clubs were polled as to their preferences, and consensus reports were sent to the committee. Nine sailplanes from a wide variety of manufacturers were submitted to meet the *RCSD* Challenge, which culminated in June '89 with the selection by the committee of the Falcon 880 as the sailplane that best met the proposed criteria.

During the '89 soaring season more than a dozen clubs changed their schedules and/or added a S-MTS event to their calendars. Results were encouraging and pilots seemed to enjoy the "new" tasks, although many found it difficult to fly in straight lines between the "gates". On balance, most clubs decided the effort was worth the trouble and planned to schedule S-MTS events for 1990.

Further, many clubs kept experienced F3B pilots out of the contests or scored them separately, thus preventing early discouragement of beginners to this type of soaring.

So far, all seemed to be going along in great shape, but soon a disturbing factor began to appear: some builders and designers began to take advantage of the simple and straightforward proposed spec's for S-MTS sailplanes. Whereas I had originally suggested a maximum wing loading of 12 oz. per square foot and a total weight of 75 ounces for a sailplane to meet the criteria, the committee did not agree with the wing loading limitation...so I discarded it, and thus arose the problem.

I had foreseen dyed-in-the-wool F3B'ers building slim-winged "bombs" to gain imagined advantages over other competitors — and so they did! A new class of limited-span or limited-chord machines that meet the weight limitation but not the wing loading limitation are beginning to show up. Loadings are up from the suggested 12 oz./sq./ft. to 16 and even 20 oz./sq./ft.! This is ridiculous in the light of what S-MTS was originally intended to be...and I think, if left unchecked, will either turn S-MTS into just another shoot-out for the "experts" or kill it altogether. I am strongly in favor of reinstating the 12 oz. limit on wing loading and letting the F3B types stay to heck out of the S-MTS play pen! Your thoughts will be greatly appreciated, so write!

Have a good orbit for 1990, and Happy Soaring.

A Message to the Readers On The Falcon 880

...from Mark Allen

"Thank-you for your support. For those of you whose orders have not been filled, please be patient. We're very sorry we have gotten behind...we're working hard to catch up."

The Falcon 880 started out as a "side idea". I was manufacturing only a few kits a month, and I was working out of my garage. Most of my time was spent working on a winglet project for a full size CESSNA twin engine 414. But, the *RCSD* Challenge changed all that overnight!

The response has been overwhelming. In 1989, I shipped roughly 175 sailplanes and I am currently 60-70 orders behind. Our production rate of 35 kits a month places us on an eight week schedule, which is an improvement over what it was before!

Since the orders haven't dropped off, we're working hard to improve our schedule even more. After the current orders have been filled, we will discontinue the sheeted wing version of the kit because of the length of time it takes to complete. Because of the schedule, if anyone wishes to have their money refunded, please let me know right away. I'll understand.

A great many people have written to me requesting additional information which, in most cases, I don't have available. I wish to apologize for not having responded to these requests. Although I have stopped to read the letters, I haven't stopped to do much else. Until we catch up, we'll continue to work until 9:00 P.M. - 10:00 P.M. every night.

We know it's worth it based on the overwhelming response we are receiving from the people who are starting to fly the FALCON 880. We, here at Flite Lite Composites, believe in the importance of having an aerodynamically clean sailplane that looks beautiful in the sky and are pleased to hear from others that the FALCON 880 meets these needs.

Once again, I wish to thank all of you for your support. And, I wish to thank my team here, Tom and Steve, for their dedication in bringing to you a new design in the FALCON 880.

♣ ♣ ♣

(In the November issue of *RCSD*, on page 22, there is a photo of Steve Hug. Actually, Mark says it's Tom Roberts. We wish to apologize to the two, because Mark says it has caused some confusion. He keeps getting the two of them mixed up! Our apologies, Tom & Steve! JAS)

Special Announcement

The Desert Union of Sailplane Thermalists (D.U.S.T.)

The Desert Union Of Sailplane Thermalists has been in a dormant state. Newly revived, the membership now stands at about 28 and they have some programs in effect to try to raise that number. They have 5 of the "finest winches" available to the club and plan to host some great contests and events. The club flies every Sunday. For more information, contact David Hall, 3030 Cypress Rd., Palm Springs, CA 92262; phone (619) 320-5814.

On The Wing

...by B²

There is no technical reason for a tailless sailplane to do any less well than a conventional design.

Carl R. Illinik, of Southern California, asked in a recent letter, "If flying wings are so good, how come they're not blowin' 'em away in F3B? An excellent question, as there is no technical reason for a tailless sailplane to do any less well than a conventional design.

From a practical standpoint, however, there are a few good reasons.

First, 'wings fly faster than conventional sailplanes of equal wing loading. If a sailplane has a glide ratio of 25 to 1 and travels forward at 25 feet per second, it will drop at 1 foot per second. If it is traveling at 50 feet per second, it will drop at 2 feet per second with that same glide ratio of 25 to 1. Translated, this means that if our 'wing and a conventional sailplane have the same glide ratio and are launched to the same height in "dead" air, our 'wing will be on the ground first. (We will have covered the same distance as the tailed airplane, however.) This is not a problem in the speed or distance tasks, but it is a problem in the duration task. The new flying wings we've been seeing tend to have better glide ratios than tailed 'craft, however, so this first disadvantage is at least partially offset. The new 'wings also have camber changing capability, and as a result their scores are going up. So "practical" seems to be getting closer to "technical".

Second, although tailless performance is now very good, there is also little doubt that we still have some problems with the planform itself. We need some hard data on airfoils (particularly those with low C_m and high lift), sweep vs. cross span flow, and camber changing devices which are more effective. Control systems need improvement. And because of their higher speeds and lower drag, 'wings will always need landing aids in the form of flaps and/or spoilers. So there is much yet to do in the way of advancement.

Ode to a Met Officer

(R.A.F. Anonymous)

The following bit of "poetry" was contributed by Eric Marsden (Horndean, England) who served with the R.A.F. — Royal Air Force — from 1939 to 1945. The term "Met" refers to meteorology.

The nephoscopic inference shows turbulent confusion,
A cold front and a warm one in the form of an occlusion
Are bringing Altocumulus with evidence emphatic —
Convectional disturbances entirely Katabatic.
The tropospheric lapse rate and synoptic indication
With relative humidity will cause precipitation;
The forecast for the area shows every possibility
Of orographic stratus and haboobal visibility.
Thus spoke the noble Met. Man, his face all (cirrus) clouded,
His words all nimostratic and his meaning fog enshrouded.
O come into the open, friend — O clarify your brain,
Just say it's looking cloudy, and you think it's going to rain!

Third, we Americans tend to see F3B as only that which happens at the World Championships. Allow us to explain that statement through a single example.

The F3B pilots in Germany are rated according to a class system, and the German pilots going to the World Championships are the country's top flyers. The Germans do not fly thermal duration very much at all, they fly the F3B schedule almost exclusively, and this gives them a lot of practice in competition. The German team at the WCs, therefore, consists of the top three pilots of the last two years, and they are well practiced. Tailless F3B machines have simply not yet "come up through the ranks" of the German system. They're actually doing quite well at the local level.

Fourth, and getting more direct to the question, the top European pilots tend to be conservative when it comes to sailplane design, and are thus flying conventional tailed aircraft. The 'wings being entered in competition are being flown by good pilots, but certainly not Europe's best. There was a flying wing at the '87 WCs, not entered in competition. It impressed the likes of Ralf Decker and did a 26.4 second speed run during a demonstration. Now 26.4 seconds sounds pretty good, especially when compared with the speed runs we witnessed at the NATS in Richland this summer. But, the top European pilots are consistently flying the speed run in under 21 seconds, sometimes under 18, and the record is 14.6 seconds, or some such thing, flown at a German meet.

The Bottom Line

It is our impression that current 'wings are capable of the performance required to win, but piloting skills need improvement.

The bottom line is this: Until an excellent F3B pilot can wring astounding performance from a tailless sailplane, we will continue to see tailed aircraft dominate F3B. (Of course there's also the possibility that tailless sailplanes, once they dominate F3B, will be outlawed from competing in the event. Should you doubt this, look at the history of RC pylon racing!)

On a slightly different note, Dr. Helmut Quabeck was recently asked what he thought the F3B machines of the future would look like. He drew a 100" span V-tailed canard(!), so maybe there is some movement away from conventional aircraft after all.

Bill & Bunny Kuhlman
P.O. Box 975
Olalla, WA
98359-0975

Special Announcement

Seattle Area Soaring Society (S.A.S.S.)

The Seattle Area Soaring Society has re-awakened, after a period of dormancy, following their November 4th meeting. It looks to *RCSD* as if there will be some fine soaring events staged by this club in 1990, and we wish to congratulate the new officers and members for a fine effort. If you wish to contact this up-and-coming club, that now has 25 members and is looking for more, please contact one of the following:

Walt Volhard, President	(206) 774-8840
Ric Miles, V.P.	(206) 771-8429
Waid Reynolds, Sec./Treas.	(206) 772-0291

How to Fill In A Troublesome Gap from... Jer's Workbench

Do you have a large unsightly gap between the stabilizer and the vertical fin on your favorite sailplane? Do you have a small gap, but would like to "clean-up" your glider so that there is less drag? One way to "clean-up" this troublesome gap is by filling it in with some foam rubber...the same stuff that you pack your radio in works well. Removal of the stabilizer and vertical fin will not solve the problem.

Construction Steps

- Determine the amount of gap that needs to be closed. The example shows a gap of 1/16" X 1/2". (Note: Most gaps are approximately 1/16" or 1/8" wide.)
- Slice the foam rubber slightly larger than 1/16" X 1/2", using a band saw or a pair of scissors in order to make a nice clean cut.
- Glue the foam rubber to the root of the stabilizer using rubber cement. The control rod holes will not be hard to locate later.

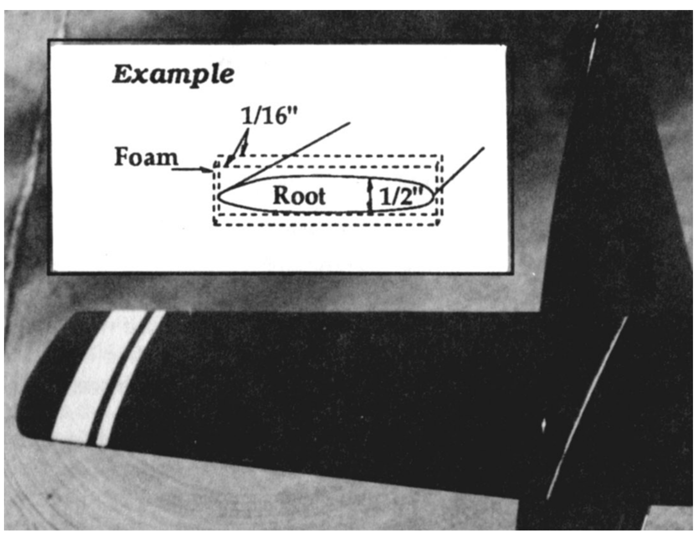
Don't fill in the control rod holes with cement!

- After the cement has dried, trim the excess foam rubber away using a pair of scissors. Use an ice pick or a pencil to locate the rod holes in order to install the stabilizers.

...And Bees Wax

If the stabilizers have a tendency to slide a bit, I use a form of bees wax. Most local sporting goods stores carry "Bow String Wax". This wax is thick, somewhat sticky and comes in a block. Once rubbed onto the stabilizer control rods, it helps to keep the stabilizer in place. Of course, the stabilizer is still removable, as this is not a permanent installation

One way to "clean-up" this troublesome gap is by filling it in with some foam rubber...



A Crow Call & Flying

...by Rick Palmer

Three crows came to my call...

The other day, I tried something new. I took a crow call with me when I went thermal flying. The crows are thick around here lately, and I thought I might be able to trick them into helping out.

After a high start, I started calling for the crows. As soon as they showed up, they started flying the thermals — even weak ones — which helped out greatly. At one time, I was just making it when three crows came to my call and showed me where I had just passed a thermal. It was just about 40 yards or so to one side where I'd just been flying. The very first flight, with only one launch, lasted 30 minutes with the crows helping out three or four times. Ho, Ho!

The crow call goes into the flight bag every time, now!

Rick Palmer
Box 1513
Springerville, AZ
85938

Above: Peter Gengler of Providence, Rhode Island with a Windsong. Right: A rebuilt Hobie Hawk. Photos by Peter Gengler.

Velocity Calculation in Excel

...by Waid Reynolds

Those who have PCs with spreadsheet programs like Excel, Wingz, or 123 can do a lot in the way of computer analysis without writing (or buying) a single line of code - if you have the right formulae. That's the secret. Actually, not so secret if you read **Soartech**, *or even* **RCSD**. *Besides analysis, one could even plot airfoils using the graphing capabilities of the typical spreadsheet program.*

I was curious about the difference in velocity that adding ballast to my Lovesong would make, so I put the formula for velocity (see "Flys Faster", Michael Selig, Page 5, 11/89 **RCSD**) into an Excel spreadsheet on my IBM-compatible 286 PC. Two different cases are compared here: actual flying weight without ballast, and weight with the addition of 1 pound of ballast. The parameters and results for coefficients of lift in the range of 0.1 to 1.5 are reproduced below. In reality, it is unlikely that a lift coefficient of 1.5 could be reached without stalling. On the other hand, I would swear that the Lovesong will glide well at speeds less than 20 fps. One of these days I'll use a stop watch and find out for sure.

	Case 1	Case 2	
weight	76	92	oz.
area	1000	1000	sq. in.
density	0.002378	0.002378	lb-sec²/ft⁴ (for standard conditions)
C_L	Vel- ft/sec	Vel- ft/sec	
0.1	75.8	83.4	
0.2	53.6	59.0	
0.3	43.8	48.2	
0.4	37.9	41.7	
0.5	33.9	37.3	
0.6	31.0	34.1	
0.7	28.7	31.5	
0.8	26.8	29.5	
0.9	25.3	27.8	
1.0	24.0	26.4	
1.1	22.9	25.2	
1.2	21.9	24.1	
1.3	21.0	23.1	
1.4	20.3	22.3	
1.5	19.6	21.5	

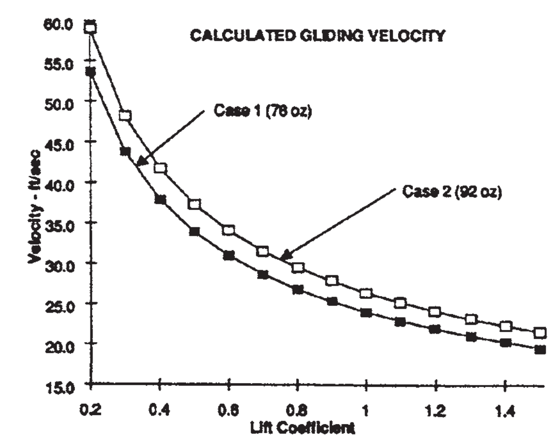
Note how little the weight change effects the calculated gliding speed - only 10 percent increase in velocity for a 20 percent increase in gross weight. It's not much, but I sure could have used 10 percent increased velocity on unlimited soaring day at the Richland Nats last Summer. In the third round an additional half foot per second airspeed could have made a significant improvement in the outcome of my flight!

The Microsoft Excel formula for the first velocity in case 1 looks like this:

```
=SQRT((2*(weight/16)/(area/144))/(density*B9))
```

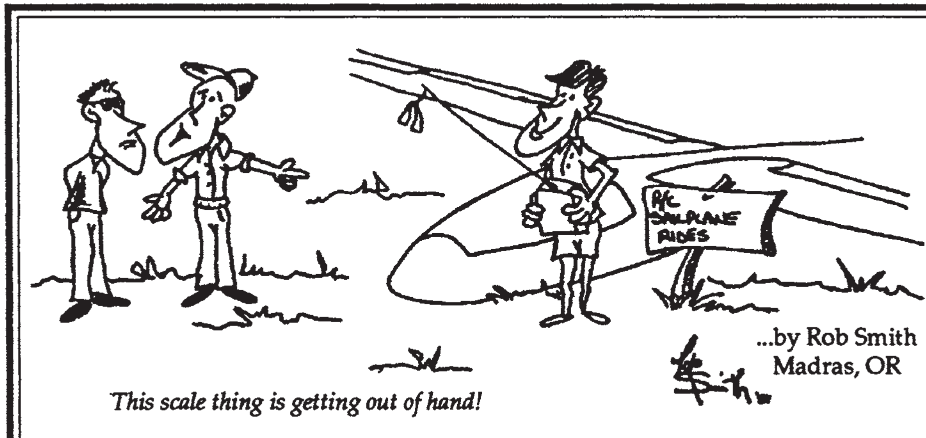
The cells containing the first column of parameters are named "weight", "area", and "density". Cells in the second column are "weight1", etc. Excel allows you to name cells so that you don't have to use the more complex row/column addresses. "B9" indicates the cell immediately to the left of the first velocity column, which contains the C_L. This particular run applies only for standard conditions. Changes in altitude and temperature will change the value of the atmospheric density, which will effect the velocities calculated.

Graphing these values with Excel makes it easy to visualize how slowly the velocity decreases at lift coefficients greater than 1:



The beauty of spreadsheets is their complete flexibility. Here is a business tool doing engineering. Simple engineering, admittedly. But, capable of doing much more complex tasks.

Waid Reynolds
12448 83rd Ave. S
Seattle, WA 98178



This scale thing is getting out of hand!

...by Rob Smith
Madras, OR

A Kit Review on The Buzzard (A Generic Glider)

...by Gordon Jones

When Dave had completed the first prototype, he sent it to me to "Gorilla Test".

Background

Last winter Dave Acker of Precision Foam Cores and I were talking, and he expressed an idea for a generic fuselage to go along with the foam wings he sells. He wanted something that would allow an easy transition for the beginning modeler into the world of fiberglass fuselages and foam wings and, at the same time, be used by the more experienced modeler for one off designs or a fuselage to use with all those spare wings and tails that seem to accumulate over the flying season. He also wanted something that could be used for gliders from 2M to Cross-Country and for the slope or thermal. I wanted a fuselage that used standard sized radio equipment. Dave finally selected the Bounty Hunter for his modifications because the pod and boom setup could be cut to length and, at the same time, allow the builder his choice of tail configuration. Major modifications were made to the fuselage in order to allow for a "Bolt-on", "Banded" or "Plug-in" wing arrangement.

Testing the Prototype

When Dave had completed the first prototype, he sent it to me to "Gorilla Test". With this in mind, I enlisted the aid of a relative novice for the construction of the craft, Dan Doyle. Dave requested that Dan and I try constructing our version with a "Flying Stab" and "Plug-in" wings. We then selected the tricky construction aspects of the project and devised a plan of attack. Dan would build the fuselage and set-up the wing for sheeting, and I would bag the balsa sheeting. (I had been wanting to try balsa, anyway.) This fuselage was to be completed using the instructions provided and, if any problems were encountered, we were to make an alternative decision and advise Dave of the problem and our solution. We did not have to make any changes, although we did add a few things to the instructions.

Our glider, intended for an experienced modeler, required us to plan out the entire building process in advance. We found that the instructions will carry you through in fine fashion, but be sure to read them prior to beginning the building process. Dan used an interlocking scheme on the "Plug-in" wing saddle area to make it a permanent "generic" set up for "Plug-in" wings rather than the removable system suggested in the plans. The permanent set-up was not available in the original instructions, but is being added. There is nothing tricky about the permanent set-up, but watch the alignment all along the way. The drawings for this procedure are being included in the revised instruction set. The built-up fin Dan devised worked out very well and uses an interlock with the boom. This was accomplished by designing a dowel into the rear of the fin that extends through the rear of the boom through another dowel which was epoxied into the rear of the boom. The dowel in the fin passes through a hole drilled into the boom dowel. This procedure provides for automatic alignment accompanied with great strength and, without a weight penalty (thanks to Don Chancy). These were the only different techniques that were used that deviated from Daves' instructions. He provides some excellent building instructions and ideas for various configurations. In addition, there is an excellent guide for test flying and trimming the "Buzzard" or any other newly completed plane. For that extra wing or stab that is gathering dust in the shop or for a good next project, he has provided an excellent idea in the "Buzzard".

Currently, the fuselage comes in two versions. The first is intended for those flying an OLI II, or similar glider. It allows the modeler to simply move the OLI parts to the new fuselage

A Series of Programs for the Schuemann Wing

...by Len Griffin

I had fun writing these programs & wanted to share them with others in the sport...

The project I wanted to tell you about is a computer program I've written. Like everyone else, I've been sitting in front of the P.C. dreaming up ways the computer can help me.

This project came about when building the 124" version of the FREO. I wanted to build the Schuemann wing platform into this design and, in the process of laying out the design, I developed a simple computer program to help me. One thing led to another, and I have now developed a series of programs to aid in the design of the Schuemann wing platform.

The programs were developed to run on the Apple series of P.C.'s (excluding the MAC series, of course), but I'm in the process of converting the programs to IBM and compatible. The programs will develop the Schuemann platform for any wing or airfoil, beginning with a known wing span and either a given wing cord or total wing area. This permits the designer great flexibility and permits trying different aspect ratios, etc. After deciding on the exact configuration of the wing, the program will calculate the exact wing area for this rather complex platform.

Additional programs will give you the proper size and placement of flaps and ailerons, should you decide to use either. All the programs are menu driven and you are provided with several graphic presentations of the data calculated. You also have the option of getting hard copies of all the calculated data. The programs are preceded by instructions, and I've tried to make the process as simple as possible. All the programs are tied together by a master menu and are available on one disk.

If anyone is interested in obtaining the Apple version of this series of design assistance programs, it's yours free for the cost of the disk and postage. Please send me either a 5 1/4" disk and the necessary return postage or $2.00. When I get the programs converted to the IBM version, I'll share these with you, as well. The conversion process is not much fun, so it's not real high on my priority list, but I'll get to it.

♣ ♣ ♣

A Program on Contest Scoring

I got busy over the Christmas vacation and adapted a really neat program on keeping track of contest scores. It will handle results from all the sailplane contests I know of, and will normalize the scores. You can keep old contest results, add to them, and with just a little side calculation work, come up with "End-of-Year" standings. As with the Schuemann design program, I'll share this program with anyone who sends me the 5 1/4" disk & postage or $2.00. Unfortunately, because of the graphics, each program requires its own disk.

Len Griffin
N9946 River RD.
Wisconsin Dells, WI 53965

Buzzard...continued

and comes with all the necessary instructions and plans for a bolt-on tail, banded wings and a lot of good building ideas. The second version, intended for the more experienced modeler, comes with the building instructions as well as plans for a "Bolt-on" or "Plug-in" wing arrangement.

Gordon Jones
214 Sunflower Drive
Garland, Texas 75041

Kit Review
The SILHOUETTE
...by Rick Palmer

Specifications	
• Wing Span:	43
• Wing Area:	232 Sq. In.
• Wing Loading:	9-11 Oz. per Sq. In.
• Airfoil	Mod. Eppler 374
• Radio Needed:	Mini 2-Channel

Being that this is my first kit review, I was glad to have the chance to build the SILHOUETTE. This glider kit is made by Douglas Aircraft model aviation. Doug Hertzog, the man in charge that developed the SILHOUETTE, designed it as a small, aerobatic, slope glider with a pleasant look as well as a smooth flying style.

Construction

Take some time and read through the instructions and carefully familiarize yourself with what you are going to do with the body. There are some things that don't match the plans. The bulkheads are marked wrong, and there is no CG mark or side profile of the wing. However, these are covered in the instructions. A reference to a cable for the elevator sent me looking in the box thinking that it might have been left out. I was wrong. You have to supply one yourself. The fuse can be finished three different ways: covered with monokote, fiberglassed or painted. A fiberglassed fuse can be purchased from Doug for a few extra bucks. It is my opinion that you should fiberglass the balsa and paint it. This makes one tough body that will take abuse.

The wing is no trouble to build. Once again, please pay close attention to the instructions and references to reduce drag. You will be asked to attach a sub-leading and leading edge BEFORE attaching your wing skins. After doing this, you sand back to the proper shape. This is important! The trailing edge of the wing and aileron has a spruce stiffener glued to it so that a fine sharp edge can be made that will help make the SILHOUETTE fast. This also helps to keep the trailing edge from being nicked or damaged.

The horizontal stab and elevator are no problem. However, the rudder has no extra support at the point where it is glued to the horizontal stab. You might want to beef this up with glue, epoxy, or whatever.

Flying

After what felt like a lifetime, the winds came and I headed out to try the SILHOUETTE. After arriving at the slope, I found that I was facing winds of about 30 MPH. Now, to tell the truth, I was uneasy about trying this small glider out on such a wind speed. I thought it might not handle very well. HA HA! It will handle 30 all right. It might even take on more. This 16 oz. glider loved it. The first thing that impressed me was the stability. It penetrated just great. The tracking was superb, even cross wind. The aileron response was so great that the rolls were fast and true. After a few minutes of rolling around, I tried to see how many maneuvers the SILHOUETTE could do. Loops, split-s, immelman turns, and inverted flight were all made easy with this glider. Heck, I even worked out some so-so reverse top hat and down drift rolling circles. The last two might even look good if I would practice them more.

In coming in for landings, I did have a hard time in trying to slow down. The first time I aborted landing three times. After the fourth flight I conceded that hot landings might be the normal, but the difficulty might be in the landing zone I had picked for the test. It has a nasty rotor to contend with. As soon as I get a chance, I will try the SILHOUETTE at another slope to see how it lands there.

In the building of this kit, please pay careful attention to all the references about drag. The speed that the SILHOUETTE travels at makes any aerobatics a lot easier to perform.

To Finish Up

The SILHOUETTE is a good choice for the person who takes their sport flying just a bit more serious. You can take this glider racing, use it for aerobatics, or dogfight if you want. If a thermal comes by the slope, it will make good use of it. The only problems that you might encounter are the instructions or the fast landing speed. As for me, the performance far outweighed both of these.

If you would like to ask about something else that I did not cover or, if you would like more information on buying a SILHOUETTE, Doug Hertzog can be reached by writing to P.O. Box 92472, Long Beach CA 90809; Phone: (213) 498-1737. Or, you can get a SILHOUETTE from American Sailplane Designs.

Rick Palmer
Box 1513
Springerville, AZ
85938

Something else to tell you about...

Your own flying technique can limit how well the SILHOUETTE performs. This glider has a lot of control movement and should be flown with a gentle thumb. This is not to say that the SILHOUETTE is a touchy glider to fly. I found it to be a smooth flier, and the energy that it retained while in flight allowed me to do graceful maneuvers extremely well.

Rick Palmer & The SILHOUETTE

Special Announcement

Sacramento Valley Soaring Society (SVSS)

The SVSS is now an official AMA chartered soaring society and is accepting charter memberships.

They meet every Saturday at the Florin High School sports field at 9:30 A.M. The time will change when the days get longer. Beginners and spectators are always welcome. For further information, contact Kenneth Knox at (916) 682-3400.

Understanding Thermal Soaring Sailplanes

Part 1 Section 2

on

Penetration

...by Martin Simons

(This is the second in a series of articles by Martin Simons. The material in this section will refer to information & drawings in section 1. Reproduction of this material requires the permission Martin Simons.)

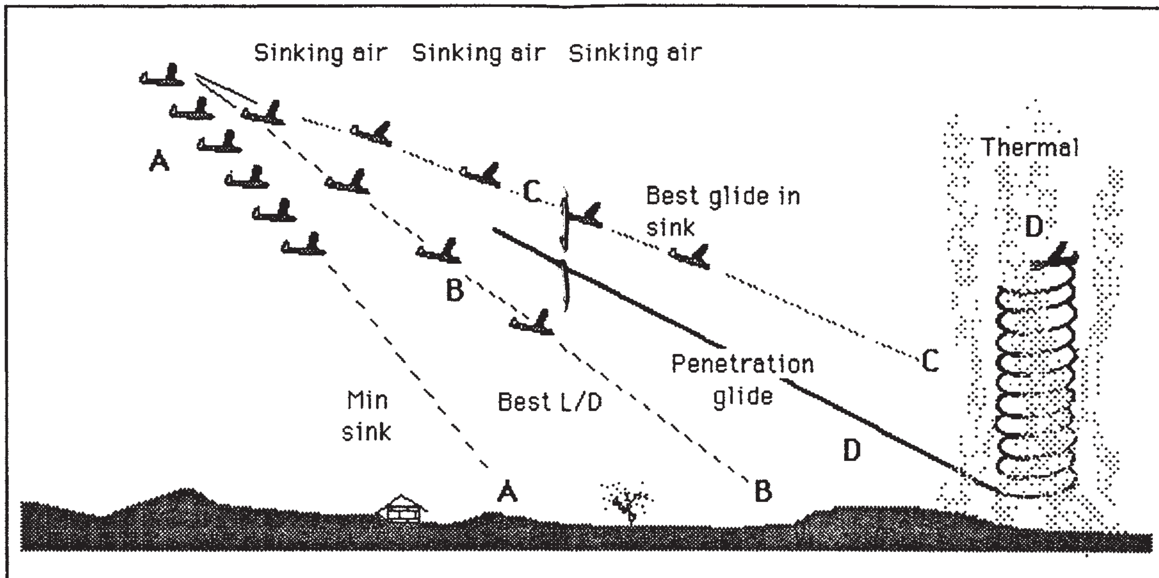


Figure 5 The meaning of Penetration

There has been some argument in the past about the word 'penetration' as it is used in glider flying. It is not very fruitful to argue about words, providing their meaning is clear, so what follows is partly intended to clarify the meaning of the term but mainly to expose some underlying principles.

If thermals are present the air which rises must be replaced by air coming down so there are regions of sinking air. When searching for a thermal the model will usually be gliding through sink. It is important to get through the bad air, that is, to **penetrate** the downcurrent with the smallest possible losses of height and time, so as to reach an upcurrent while still having some height left. A sailplane which can do this has 'good penetration'. The best trim for penetrating through sink, as will become clear, is always faster than that which gives the best still air glide ratio.

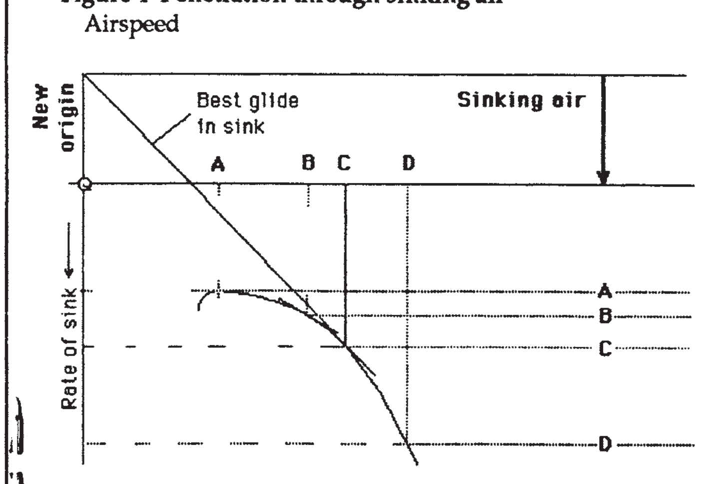
Figure 4 shows the same polar curve as Figure 1, but now the air in which the model is flying is sinking. This can be shown on the chart by shifting the entire polar curve downwards. The vertical scale is extended by an amount equal to the strength of the downcurrent, using the same scale intervals as for the glider's sink rate. The shape of the polar curve is not changed, because the glider sinks relative to the air just as it did before, but the air itself is now descending.

Suppose there are four pilots with identical models, all of the same weight, all starting at the same height, say immediately after launching at the beginning of a time slot in a contest. Pilot A, inexperienced, thinks the way to score the best possible duration is to reduce the rate of sink as far as possible. The trim chosen settles the glider to fly at the top of the polar curve. The model does descend at its minimum sink rate but it is in sinking air, so it actually descends at its minimum sink rate plus the rate of the downcurrent. It is unlikely that a high flight time will be recorded. Of course an element of luck is involved. Pilot A may be saved by stumbling into a thermal but on most occasions this will not happen and the model will have to land very soon despite flying at 'min sink' trim.

Pilot B is more experienced and knows the important thing when in sinking air is to get out of it and find a thermal. B aims to search the air as much as possible, even if this means accepting for the time being a faster rate of descent than A. Model B is trimmed to fly at its best glide ratio according to the still air polar, faster than the minimum sink trim. B loses height more rapidly than A but makes more progress horizontally which does increase the chances of finding lift. B's prospects are better than A's, despite sinking more rapidly at first. of course, B may fail to reach a thermal; luck does come into the picture, as always.

But even B is not following the best policy. B is not, in fact, searching through as much air as possible.

Figure 4 Penetration through sinking air



Pilot C knows that the origin of the glide ratio lines on the chart has to be changed when in sink, because the entire polar has shifted down. The best glide ratio in the downcurrent is found, not by drawing a line from the old origin, but from the new one, allowing for the downcurrent. The tangential line drawn from this point touches the polar curve at a faster airspeed. The pilot therefore trims faster than the nominal best L/D trim. Glider C loses height more rapidly but, having a better glide ratio, has more height to spare and has a better chance of finding lift than B.

It is important to take this point. Suppose that A, B and C all go off ...*continued on page 16*

Understanding Thermal Soaring Sailplanes ...continued

in the same direction. (They do not have to do so, but for the sake of argument assume they do. Figure 5.) As A glides along slowly at min. sink, B at every moment will be ahead, flying faster but getting lower. As B goes on, C in turn will at any moment be ahead, and lower, because C's airspeed and sinking speed are greater. If there is no thermal in this direction, C will have to land when B is still flying some way behind. B will score better duration than C. But A will still be flying when B lands, because A is trimmed for minimum rate of sink. None of the three will score a high time but A will score least badly.

But if there is a thermal, and C, flying fast at the best glide in sink, and so penetrating the downcurrent, reaches it, B will be behind and still in the bad air when C starts climbing. C will be gaining height all the time B is struggling on at best L/D through the bad air. B's model may not even be able to reach the thermal and even if it does eventually arrive at the thermal it will be lower than C was at this point.

Arriving at the thermal low down adds to B's difficulties. Near the ground, thermals are smaller in diameter so they may be easily missed altogether by a searching model. Even if found, steeper angles of bank and greater skill are needed to use the narrow core, than when the lift is encountered high up. Hence model C, by flying fast, not only penetrates the sink better than B or A, but also has better chances in the thermal when, and if, it is reached.

Glider A, meanwhile, will still be floating slowly through the sink, losing height slowly but not covering much distance. Very probably A will never arrive at the thermal at all. Despite flying at minimum sink, A will be on the ground first.

Finally, Pilot D, a confident person who can locate thermals when others cannot, is sure that there is a strong thermal ahead. Perhaps this pilot has noticed a soaring bird circling, or sees dust rising, or recognises a spot on the ground which is producing strong lift, or has sighted another climbing model. Even though it means losing a lot of height model D is trimmed to fly even faster than C, coming down quite rapidly, as the polar diagram shows, but penetrating through the sink at high speed. D goes out well in front of C, but loses a lot of height in a short time.

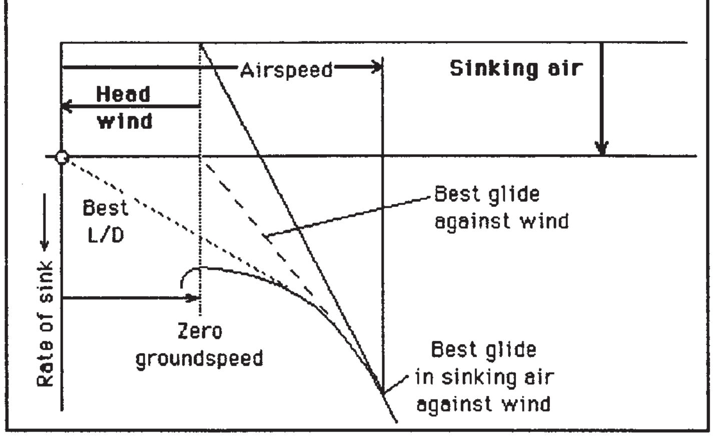
If this pilot is right model D gets to the thermal first, probably low down but flying fast. Some of the lost height can be regained by pulling up into a climb to convert excess airspeed into altitude. Quickly centered in the thermal D continues climbing. When C arrives, later, it will be higher than D was when D arrived, because C flew at the best glide ratio in sink. But by now D may be already well above because it started climbing rapidly while C was still on the way. Gliders A and B of course fall behind C as before.

There is an obvious risk in flying too fast and if D is wrong about the thermal the model might be forced to land. D has to be very sure where the thermal is, if such a risk is to be taken. But if the thermal is found, even if it is weaker than expected, D will be climbing while the others are still losing height.

In full-sized gliding, pilots have various instruments and computing devices in the cockpit which indicate fairly accurately the best airspeeds to fly through sink, and can adjust the trim accordingly. With model flying, such fine judgments cannot be made because the information available to the pilot on the ground is very limited. The principles remain valid, nonetheless.

The rule is, to fly fast through sink to penetrate to the thermal and slow down only when the model is in lift.

Figure 6 Making headway against the wind



Experience and judgment are all-important here. It is also important for each pilot to watch other gliders, since if one finds a thermal, the others will probably seek to join the climbing model. D, for instance, may race forward and find a thermal, thus 'marking' it for all the others. Then the model which is able to cover the greatest distance through the downcurrent with least loss of height, that is, in this example, C, has an advantage. C can watch D's model while searching a different part of the sky. If D does not find anything, C still will have some height to spare to continue the independent search. But if D does find lift, C will still be high enough to fly in that direction. On average, over a number of competition tasks the pilot who adopts C's technique will do better than those who fly more slowly or faster. C may sometimes be beaten by D if D is good at finding thermals, but if D makes an error C will do better. A and B may occasionally be lucky in finding a thermal without having to search far, but when this does happen C will be in a good position to join them too.

It was assumed above that all four models were identical but if, as a result of aerodynamic improvement, a sailplane can fly fast without a great increase of sinking speed, it will penetrate sinking air better than any of the four models considered in Figure 5. If, for instance, a superior model can fly at D's airspeed and yet have C's glide ratio in sink, it would reach the thermal well in front and higher than any of the others. In a future article, ways of achieving this will be considered.

Thermal soaring gliders frequently need to cover distance against the wind as well as getting through sink. Even an ordinary soaring flight on a club afternoon will find the model drifting downwind in every thermal so that the pilot has to bring it back against the headwind. In a contest, the bonus will be lost if the model cannot reach the landing target, and all points may vanish if the model lands far out. The polar curve helps again (Figure 6).

In the diagram the headwind can be entered on the scale by moving the origin of all the glide ratio lines to the right by an amount equal to the speed of the wind. To emphasize the point it is supposed in this example that the headwind is equal to the airspeed when the glider is trimmed for minimum sink. At this trim the glider will make no distance over the ground at all because its **ground** speed is reduced to zero. It will simply descend vertically, slowly, at its minimum sink rate. Whatever height it may have reached by climbing, it cannot get back to the target at this airspeed.

Trimmed for best L/D, against such a breeze the model will make some distance over the ground. But the best trim against the wind is not the best L/D *...Continued on page 18*

Understanding Thermal Soaring Sailplanes ...continued

glide. A faster airspeed is required. The point of origin for the best glide in the headwind situation is shifted to the right, as shown, and the required airspeed is found from this.

If, as well as a headwind, the model on its way home has to get through sinking air, an even faster trim is required. The point of origin for the glide ratio lines moves to the right, to allow for the headwind, and now also upwards on the chart, because of the downcurrent.

The principles discovered in this diagram apply for all wind speeds. In a perfect calm with neither wind nor sink, as mentioned above, the best glide ratio is that found on the simple polar. But flying to reach the landing target, the rule is: fly fast against the wind and faster if there is sink as well. The rate of descent is high but the vital thing in such conditions is to make distance over the ground.

Inexperienced pilots having difficulty reaching the landing target on windy days often try to 'stretch the glide' by trimming slower. The nose of the sailplane rises and a little height may be gained momentarily, since the energy of the excess airspeed enables a small 'pull up' to be made. Settled into the slow trim, the illusion is created that the sailplane is gliding flatter. This is an illusion. The glider makes less progress and may well land out.

Trimming for greater speed causes a brief loss of height as the glider accelerates. Extra airspeed can only be gained by steepening the glide. This too gives a false impression. The model appears to be diving and certainly does come down faster. But more ground distance is covered and, in this situation, the ground speed is more important than the loss of height.

Once again, the importance of a polar curve which shows good glide ratios at high speeds, is clear.

Summing up

The thermal soaring sailplane should have a low stalling speed and small rate of sink in turns, to enable it to climb in weak thermals. It will also need to retain a good glide ratio at high speeds, both to help in searching for thermals through air that may be sinking, and also to get back to the landing target after drifting downwind during a climb. Strong structure will be required for launching fast and high, and powerful air-brakes for landing.

Martin Simons
13 Loch Street
Stepney
South Australia 5069

A Letter to the Readers

Dear Fellow RC Soaring Modelers:

I am writing to you as the AMA appointed RC Soaring Representative to the FAI. I am attempting to create a correspondence list of individuals who are interested in providing input to FAI soaring rule proposals. This input will be considered in formulating a U.S. vote on the proposals.

In addition to F3B, there are four other provisional FAI soaring events:

F3F RC Slope Soaring
F3H RC Soaring Cross Country Racing
F3I RC Aero-Tow Soaring
F3J RC Thermal Duration Gliders

I have not yet received the final version of the proposals for 1990. I do know there will be some for F3B, but I am not sure about the other events.

If you are interested in providing comments on proposals, please send me your name, address, phone number and which event(s) proposals you want to comment on.

I have sent this letter directly to many of you who fly FAI events that I am personally acquainted with. I am especially interested in contacting interested parties whom I do not know. I would appreciate your circulating copies of this letter to friends and club newsletters.

Sincerely, (signed) Terry Edmonds
1 Lakeview Drive
Iowa City, IA 52240

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Write Don Winiecki, 161 Stewart Avenue, Buffalo, NY 14211; Phone (716) 896-9319.

Three Versions of The FREO

...by Len Griffin

I guess there is no time like the present, so I'll take a moment to describe the FREO (Latin for "free") designs.

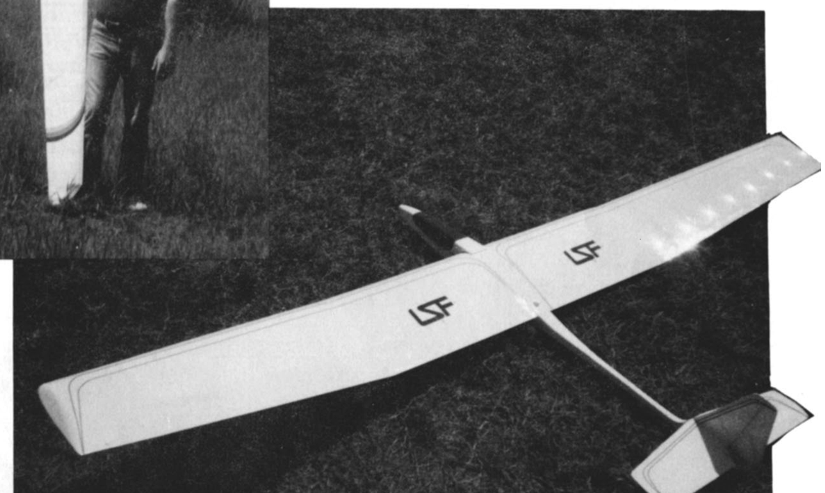
I've now constructed three versions of the FREO. A 2M version (78"), a std. (98"), and an open version (129"). The planes don't use all the current "tricks", so I guess they don't qualify as "high-tech". But, with all their simplicity, they fly great...which is what this is all about. I used an N22/SPICA airfoil drawn off of Chuck Anderson's airfoil plotting program. The top half is a NACA airfoil and the bottom is a Chuck Anderson flat bottom with my own Phillips Entry added...Simple to build and a pretty good speed envelope. The airfoil is not too different than an Eppler 214, minus the undercamber. The wings are conventional built-up construction. I'm a true believer in "Turbulators" (current catch phrase is "A Trip")...and I've done a little work on finding the right spot...real tricky stuff!!! All three of the FREO designs have this wing...including two "Turbulators", one at 11% and the second at 22% of the cord. The "Turbulators" are accomplished by using 1/8 X 1/8 stringers in the wing's construction and then, after covering, adding stripping tape on top of the stringers.

You are "right-on" in asking how I scaled the different size aircraft. It has been my experience that this is often where people go astray. What is a good design in 2M might be a real dog if scaled up 1:1 to std. class. I believe the important design factors change with size...I'm not exactly sure why, but I've got some ideas...that, however, is another discussion. The point is that for a 2M design I've found that an aspect ratio of between 9 and 9.5:1 works best. Whereas, in a standard class plane, an aspect ratio of 10 to 11.5:1 is better. The same is true of the vertical tail volume coefficient, longitudinal stability factor, etc. I've even found that the wing loading requirements change. Now, all of this is a function of how you fly best...So, for some people, the change may be very minor. For others, it may very significant.

In the case of the FREO, I started with a 2M design and, through T&E (trial & error), varied a few things as I went "up" in size. The aspect ratio, for instance, is 9.34:1 on the 2M, 11.31:1 on the std., and 14.32:1 on the open design. The wings have a flat center section with between 11 and 15 degree break at the polyhedral point...the angle increasing as the aircraft gets bigger ("longer" wings = greater need for lateral stability). The flat center section constitutes 38% of the total wing span.

All three configurations are rudder/elevator/flaps. Flaps offer all sorts of advantages that spoilers don't, and have only a few drawbacks...mostly in construction. The flap set-up on the 2M and std. versions permit -80/+6 degree flap deflection in the center section, only. This proves quite beneficial in landing, launching, and for slowing during thermaling. The airfoil is quite effective, and only about 10 degrees are used in launch and 5 while thermaling. The placement and sizing of the flaps are critical to prevent the nose up attitude that so often accompanies flap deployment. (Here is where my aileron/flap size and location program helps.) On the open class design, I choose to go with full span flaps. These are mechanically mixed (bell cranks in the wing) to achieve a 3:2 ratio center to tip panels. This slows the airfoil, yet helps prevent tip stalls. I, by the way, fly with the flaps on what is normally the throttle stick and, while all my radios have the capability to compensate for flap deployment, I've found that unnecessary if you carefully size and place the flaps.

Wing loading is very light in the three designs. ...continued on page 22



Photos by Len Griffin.

Left: "FREO GRANDE and the author after "decorations" have been added. The wing trip as well as full span flaps are barely visible. The large rock in the background has served as an effective (but often drastic) spot landing aid."

Center: "FREO JR....Wing anchor is dowel in wing L.E. and single nylon bolt in the rear."

Bottom: "FREO...White tape for wing "trip" was laid down before accent stripes were added."

The FREO ...continued

(I do not subscribe to the "Lead Sled" theory for most all airfoils!!!) Loading is 5.74 in the 2M version, 6.71 in the std., and 8.5 in the open version. All can be ballasted to the 10+ oz./sq. in. by adding weight directly under the C.G. in the fuselage...which took a little planning in the design of the fuselage. The fuselages themselves are very slim with light ply sides. Nothing really special about the fuses except the great care to cut drag to a minimum. Tail surfaces are conventional except for the horz. stab. It is raised to get it out of the wing turbulence.

Horizontal and vertical stab. areas are about at the min. I suggest at 10% and 5% respectively of the total wing area. (10-20% horz. and 5-10% vertical are my limits.) Again, I like to cut down on drag as much as possible and, to do so, is sometimes at the sacrifice of stability.

With the light wing loadings, the designs fly great in dead air. The airfoil penetrates fairly well unballasted. With ballast, the planes will penetrate all but the worst winds. These are not F3B design, but they will move out well when put "on the step". If extreme sink is encountered, about 5 degrees of positive flaps really moves you out.

Flying is what it is all about. But, when you can't fly, building is fun. Designing what you build adds to the enjoyment. Flying what you designed and built is the ultimate!!!

Len Griffin
N9946 River RD.
Wisconsin Dells, WI 53965

"My SPERBER as of 25 hours ago..." Ray Reiffer of Zeeland, MI says, "I now have "D" tube sheeting done and the linkage is installed! Yes, my hat is on backwards. I had just set up the camera for a 4 year old to snap the picture. Oh, well! I made all the Mahogany ply myself from .030" veneer."

Behind the Scenes with Jerry Slates

...by Greg Vasgerdsian

Vikings? Wait a minute, what does a viking have to do with sailplanes? Actually, quite a bit. This company really does have something to do with gliders and in a very big way (up to 215" worth!). Viking Models was an R/C model manufacturing business in England that Jerry bought in 1979. The company was then reborn Viking Models USA.

Jerry himself has been an aero modeler just about his whole life, raised around planes in the 1940's and, by the 50's, he'd built his first radio control model complete with radio tubes and rubber escapement. In the past he was very involved with the Western Associated Modelers and U-Control, as well as flying Free Flight, Wakefields and participating in early AMA contests. His European ties came mostly from just making friends and writing to fellow modelers like Mike Smart and Chris Foss, both widely known in the soaring community.

When first arriving at Viking Models (Jerry's garage) the unwary is struck by a ceiling filled with gliders. These are all models that have been run through their paces at one time or another and, occasionally, are freed to feel the tug of a winch line once again. After you get over this gaggle of sailplanes, you then begin to take in this shop that amazingly fits within the space that it does. Besides the shop, Jerry has two sheds full of other miscellaneous items, and, of course, the really slick stuff (like his Ultima 4 and DG100, plus an immense R/C library) are in the house.

Jerry has been laying fiberglass fuselages up for some 15 years now, and if you haven't seen one of his fuselages lately you don't know what beauty is. Recently, I saw a fresh scale Hornet fuselage (wingspan 158") complete with laid in carbon fiber. This thing looked great unpainted!

...continued on page 24

Jerry Slates poses with a DG 100 which was built by Master Sgt. Gene Cope...

Behind The Scenes...continued

Jerry's catalog is currently up to 18 partial kits of scale gliders, F3B machines, thermal and slope soarers. The typical kit features: fuselage, canopy and sometimes a canopy tray and plans, plus the bonus of tapping Jerry for all his building knowledge and hints. If you've ever looked into the price of a scale kit you know they can be expensive. With one of Jerry's kits you can get away with spending less money if you're willing to scratch build the wings and empenage.

Aside from partial kits, Jerry must have the biggest inventory of canopy molds. The machine that pops this stuff out is really interesting to watch, and Jerry gets full use out of it as he supplies a few kit manufacturers with parts.

Jerry's inventory is constantly growing with too many projects and not enough time. One project of interest is a small scale Libelle with a wingspan of 99" and a Clark Y airfoil, which would make a fine first scale ship. Another slick plane is his Facctor, an 83" thermal F3B model that would do well on the slope, too.

On asking Jerry about the future, the first thing that came up was that he retires in January, at which point he should have more time to fly and to take care of Viking Models. Maybe then he can get to all of those unfinished projects but, of course, we all know this can never really happen to any of us, because something new always comes up!

Greg Vasgerdsian
31 Lenelle Ct.
Moraga, CA 94556

Dear Readers,

I received the following question in a letter from a potential reader of RCSD.

"I would also appreciate any information you might have on the design and construction of a launch winch."

Sincerely, (signed) M.J. Brown

9401 Lynn Terrace SE

Huntsville, AL 35803

Although I responded to his immediate request for information as a new subscriber, I could not answer his technical question. Jerry said that he didn't know if there was a single answer to the question. In other words, there were many ways to design and construct a launch winch.

Hmmmm...In retrospect, I realized that I could have left a message on the Craftman's Workshop BBS. Have I tried, yet? No! But, you bet I will.

In the meantime, if anyone can answer this question, please do! Then, drop me a line or, better yet, write up your construction technique for others.

If you have a modem, leave me a message on the BBS. I told Doug that I intend to be there soon. Thanks, Judy

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" OUT OF THE ASHES "... *INTO THE WINNER'S CIRCLE*

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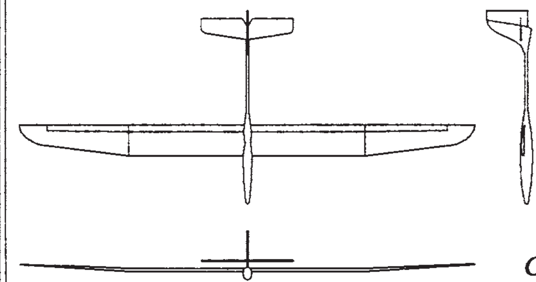

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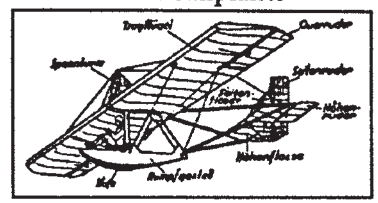

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