

THE VINTAGE SAILPLANE ASSOCIATION

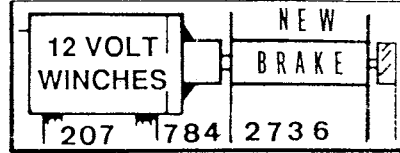
VSA is a very dedicated group of soaring enthusiasts who are keeping our gliding history and heritage alive by building, restoring and flying military and civilian gliders from the past, some more than fifty years old. Several vintage glider meets are held each year. Members include modelers, pilot veterans, aviation historians and other aviation enthusiasts from all continents of the world. VSA publishes the quarterly magazine BUNGEE CORD. Sample issue \$ 1.-. Membership \$ 10.- per year.

For more information write:

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Route 1, Box 239
Lovettsville, VA 22080

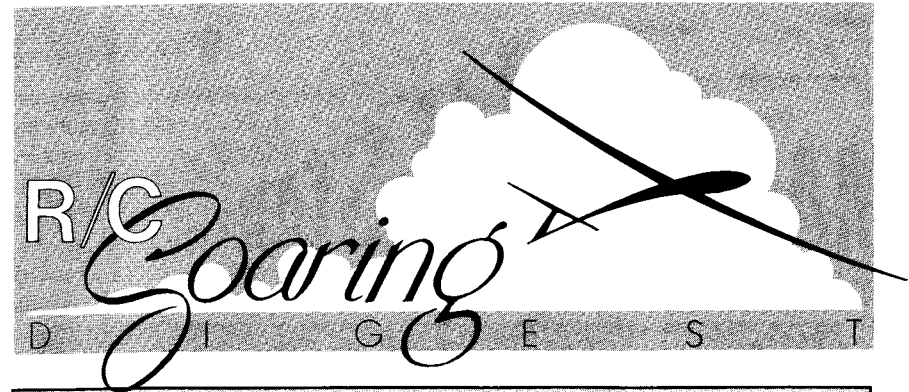
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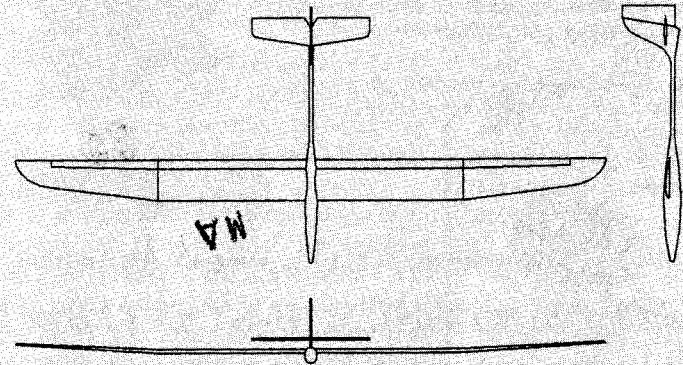
Vol. 6

No. 12

December, 1989

P H O E N I X

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



PHOENIX

Featured on pages 12-15
New from Competition Products

* * *

Special Announcements in this Issue:

The SGC DG-202 by Scale Glider

Components on page 8

Model Construction Videos (MCV)

on page 9

The Washington Fun Fly on pgs. 20-21

SPECIFICATIONS

SPAN : 132"
AREA : 1047 SQ. IN.
WEIGHT : 72 - 76 OZ.
LENGTH : 56"
AIRFOIL : S4061
ASPECT RATIO : 16.7 : 1
WINGLOAD : 10 OZ./SQ. FT.
CONTROLS : RUD., ELEV.,
AIL., FLAPS

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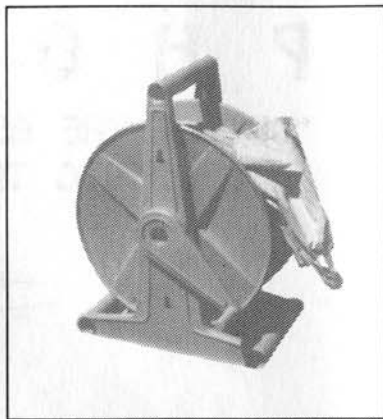
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High Start

Momentous events have occurred in 1989 which ought to be known as the year of change. Two MAJOR events — Hurricane Hugo and the California earthquake — immediately come to mind, and I'd like to take this opportunity to mention that our Production Manager, Judy Slates and her husband Jerry (Viking Models USA) were not harmed by the 'quake although they live in the San Francisco Bay area. For those RCSD readers who have been disastrously affected by either the earthquake or by Hugo, please accept our heartfelt sorrow and sympathy. RCSD will do all it can to help, so please let me know what I can do personally to expedite the delivery of RCSD to a new address or make other changes for your benefit.

Other events, not quite so drastic, occurred this year, and more will be coming in 1990. For example, the concept of Sportsman Multi-Task Soaring was introduced and accepted by many clubs and pilots across the nation. The RCSD "Challenge" was met by a new sailplane — The FALCON 880 — designed and kitted by Mark Allen. Cross-country soaring became THE way to fly for fun, and RCSD increased in size from its usual 28 pages to a consistent 32 pages.

One change that I'd like everyone to note is that RCSD is now being designed and produced in California, and has been for most of 1989. Because of this, and beginning in January, RCSD will be MAILED from California where it is also printed.

Because of your efforts, RCSD continues to go from strength to strength, and I like to think that our new separation of the production and editing functions will bring you an even better magazine. At the very least it will allow Peggy (my wife and business manager) and me some time to get out and do some travelling and soaring. Stay tuned for further developments and Season's Greetings!

Happy Soaring,
Jim Gray

About RCSD...

RCSD is a reader written publication. The articles & letters were 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. 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.

Pilot Error

November Issue —
Author Correction

The software review of Sailplane Design 3.0 was written by Tyson Sawyer of Silver Ranch Air Park in Jeffrey, NH 03452. We inadvertently credited it to Doug Klassen. RCSD hopes that the two authors will accept our sincere apologies.

October Issue — Author
Correction

In the article on Using
Turbulators

The formula in this article should be properly credited to Fred Pearce of Hampton, VA, and was improperly credited to Frank Zaic. RCSD thanks both Mr. Zaic & Mr. Reifer for bringing it to the attention of RCSD and apologizes to Mr. Pearce for the error.

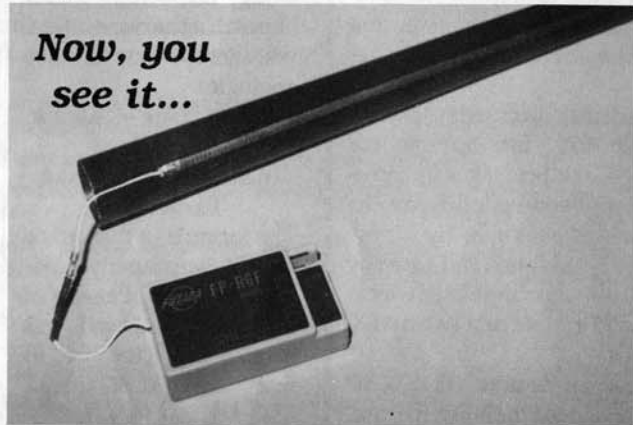
October Issue

Product Name Change

The "Super Zebco" is now called the E-Z Retriever. Jim Harger's ad for the E-Z Retriever appears in this issue.

Over the last few years, I have heard several horror stories dealing with fiberglass fuselages that were reinforced with carbon fiber, and one fuselage that was 100% carbon fiber, from England. Yes, they were strong and almost unbreakable, but the carbon will block any signal to your radio receiver antenna when installed inside your fuselage. So, those of you who have built your dream machine with that unbreakable carbon fiber fishing rod, and had to run your antenna on the outside of your fuselage or fit it into the wing, there is another way.

Now, you see it...



And, now you don't!



An Invisible Antenna VS Carbon Fiber from... **Jer's Workbench**

The carbon will block any signal to your radio receiver antenna when installed inside your fuselage..

The Construction
The local stain glass store carries copper foil tape by the roll. 36 yards of 1/4" tape costs about \$2.50. Cut a length to match your antenna and apply to the bottom of your fuselage. Solder the remaining short end of the antenna to the copper foil. A pin jack may be added to the antenna, as seen in the picture, so that the receiver is removeable.

In Summary
I have talked with one TV repair man and several ham radio people about this type of antenna and can find nothing wrong with it. The original idea for this antenna was by Don Anthony's wife, Jo Ann. I have been watching Don fly with this system for sometime, and it really works.

Jerry Slates
2026 Spring Lake Drive
Martinez, California
94553
(415) 689-0766

In recent months the various uses of carbon fiber have been discussed at some length in many of the modeling journals. It appears that carbon fiber technology is finally reaching the general modeling enthusiast. I must say that it is about time. I was introduced to carbon fiber about three years ago, and like a great many other people did not really realize the varied applications of this material and the real benefits that can be obtained.

Carbon fiber is available from a variety of sources, and in a variety of shapes and sizes. The carbon fiber rod material is an excellent carry-through device that is stronger and lighter than the metal rods we have used for years. Add to this the carbon fiber mat that is available and you can make the "everyday" sailplane virtually indestructible.

Carbon fiber mat can be used for a variety of purposes, and it is extremely easy to use. In a foam wing application it can be used to strengthen the trailing edge of the wing. It can be used to add compression and torsion strength over spars under the wing sheeting. Further uses include, using squares to strengthen the servo box for in-wing servo applications.

The technique is basically the same for all of the above applications. If you are bagging the wing sheeting or glassing the wing, add the mat to the inside of the sheeting along the trailing edge or any other locations you desire. Cut strips of carbon fiber mat approximately 1 1/2 inches wide the length of the trailing edge and lay it in along the line of the trailing edge of the wing. If two pieces are required, you can lap them together when you apply them to the trailing edge location. Squeegee some resin into the mat, and apply the sheeting or glass cloth to the core as you normally do. During this process you can add carbon tow (heavier strands of carbon fiber) for a spar or add mat over the spar on the core prior to applying the sheeting/glass.

The process is somewhat different if you are using contact cement to apply the wing skins. Ready the foam core as you normally would, but in addition to the spars and other tasks apply a layer of carbon fiber mat along the trailing edge and squeegee in some epoxy or resin. When this has been accomplished on both sides of the core, place the cores in the foam beds with wax paper between the bed and the core and weight the foam beds down to keep everything straight. You can also do the same thing with carbon fiber mat over the spars or wing boxes at this time, too.

While the preceding techniques have been simplified somewhat, I think that there are some ideas that will stimulate some thinking in the uses of carbon fiber. If you can come up with a better way or another idea, so much the better. But, by all means, pass the word on your ideas so that everyone can benefit.

A Neat Tip

Belt Dressing, sold for use on flat belt for old farm equipment (it comes as a solid stick), works great for stabilizer pins. I never worry about them coming off.

Jim Harger
1911 Wolcott Dr.
Columbia, MO 65202

Gordon Jones
214 Sunflower Drive
Garland, Texas 75041

On The Wing

...by B²

Nearly all of the best performing tailless aircraft exhibit a leading edge sweep angle of 20°, and we thought it might be an interesting exercise to attempt to determine why this might be so.

As we've mentioned in a previous column, it is sometimes convenient to think of a tailless aircraft as actually having a tail by assuming that the tail is a part of the wing. The "tail" on a plank design can be considered to be the rear 20 to 25% of its reflexed airfoil. On a swept wing, the stabilizing "tail" is the outer portion of the wing, near the tips. A tailless airplane must have some portion of the wing capable of applying the downforce needed to counteract the pitching moment generated by the lift producing section of the wing. Planks thus use reflexed sections, swept wings use aerodynamic twist to provide this force.

We've previously published a set of computer routines which assist in picking airfoils for root and tip while assuring stability in pitch. With some experimentation, it's possible to design a stable swept wing with a mini-

mum of physical (geometric) washout. Excessive washout, while providing increased stability, will make a swept wing behave much like a plank with excess reflex—the wing's speed range and maneuverability will suffer.

Those of you who have experimented with the above mentioned computer routines will have also noticed that one way of reducing the amount of washout (twist) needed is to make the sweep angle greater. Unfortunately, this has three negative effects.

Cross Span Flow

First, the air moving over the wing will tend to move more toward the end of the wing, rather than the trailing edge. This is called cross span flow and is something to be avoided. Cross span flow means that the air is no longer following the airfoil; rather, it is following the spar line. The boundary layer gets very deep very fast in this situation, and laminar separation can occur at odd and unexpected places along the span. This is not only drag producing, it can be downright dangerous. Imagine separated flow over the wing tips ("tail") and the resulting loss of stability!

Large Amounts of Sweep

Second, large amounts of sweep make steep towline launches very difficult, as any yaw is immediately translated into a large rolling force.

Third, it becomes more difficult to construct a torsionally rigid wing as sweep increases.

While planks do not suffer from any of these three problems, we want better performance than a plank has to offer. What we're looking for is sufficient sweep to improve performance substantially above that of the plank configuration while at the same time avoiding excessive sweep that will lead to further problems.

Winglets

Assisting us in our search is the necessary vertical fin area. If this fin area is located on the centerline of the aircraft we will most likely need some type of boom (read "fuselage") to get the moment arm long enough. But if winglets are used we can obtain good leverage, the vortex from the wing tips can be controlled, and we can inhibit cross span flow to some extent. By using winglets we can safely get a bit more sweep into the design.

Aspect ratio is a determining factor when computing the sweep angle needed for a given level of stability. A look at the formulae shows that sweep is given in terms of a ratio equal to sweep distance divided by average chord. A low aspect ratio dictates a greater angle of sweep, all other things being held constant. While a higher aspect ratio will decrease the sweep angle needed, it can also lead to frail structures, just as with conventional tailed aircraft.

A Compromise

So it turns out that the 20° angle is a compromise, and an excellent one! Twenty degrees is enough sweep to provide stability for a number of airfoil combinations without resorting to reflexed sections over the majority of the span; it does not promote uncontrollable cross span flow; it allows steep winch launches without the worry of yaw induced roll; it does not hinder the construction of torsionally rigid wings.

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

Coming Event

Southern Soaring League
Scale Radio Controlled Sailplane
Competition 1990

April 21st-22nd 1990

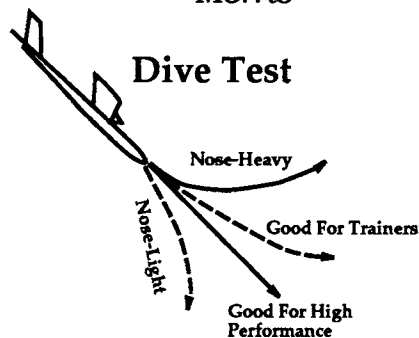
Waikerie Gliding Club Aerodrome, South Australia, P.O. Box 320, Waikerie, 5330, Telephone: (085) 41 2644. The Waikerie Gliding Clubhouse has accommodation for about 40 persons in dormitories and self-contained units. There is a caravan park and room also for camping. In Waikerie town there is a Hotel/Motel and another large caravan park.

This information was provided by Martin Simons, 13 Loch Street, Stepney, South Australia 5069. Martin says, "The group organizing this thermal soaring contest for scale sailplanes would be glad to hear of anyone else doing something similar, especially if any changes are suggested to the rules. The idea is to do as much soaring as possible with the scale models, from winch or line launch, rather than slope soaring."

The Dive Test

...by Pancho
Morris

Dive Test



Drawing by Chuck Fisher
"Super Graphics Artist"

Now that we have the sailplane flying at a fairly slow speed with the trims in neutral and the surfaces level, let's check the balance point. With a good amount of altitude, put your plane into a steep dive of about 30 degrees. Hold the dive until it has picked up good speed, then let go of the stick. What did it do? Did it pull up or tuck under, or just stay in the dive? With a flat-bottom airfoil, beginner-type floater, it should pull out slowly. If it does, your balance point (CG) is just where you want it. This means it will want to recover from a dive by itself, yet it will not start to porpoise whenever it picks up speed as in a turn or wind gust.

If it pulls up sharply, you have too much weight in the nose, and you have to fly with a lot of up elevator to keep the nose up. In this condition, your plane will always be wanting to stall or porpoise.

If it tucks under, you will need more lead in the nose and have to fly with a lot of down in it to keep the nose down. This plane will want to

...continued on page 6

Kit Review
The ASW-24
...by Willie Bosco

After being absent from the hobby for a few years, I got the bug to fly, again. "This time," I said, "I'm getting something with at least a 100" wing. When I saw the new Robbe ASW-24, I knew it was the one."

The kit is beautiful as is the plane that finally emerged from it. I've never had so much fun and relaxation building an airplane. I stretched and savored the experience for over a year of building.

Construction of the ASW-24

I followed the construction sequence to the letter. Absolutely nothing is left for the builder to ponder or wonder about. Every detail is explained and each piece has a number and is in a sealed bag. This is not an ARF kit, but is highly prefabricated. For instance, the wings are already sheeted with balsa and pushrod tubes installed. The fuselage is a work of art. It's made from an almost unbreakable plastic. The wings have a gorgeous planform and airfoil transitions from one modern foil to another. The large canopy and pilot figure add to the scale realism.

It's real, it's big, it's beautiful. I couldn't wait to fly it. All systems were go. The large rudder wagged, the symmetrical elevator sitting on the T-tail worked smoothly with no slop. The ailerons were sure and positive with a standard servo in each wing root. Finally, the spoilers which were listed as optional (and, I highly recommend them), popped up and down at the flick of a switch. I had dual rates and aileron with rudder couple for options. I love these modern radios!

The Final Test

I was ready to fly. I knew hand launch off the slope for starters was out, so I decided to get a high start. At 7 1/2 lb. (which is the target wt. of the kit), I ordered a Magnum 200 from the Magnum High Start company as advertised in *RCSD*.

Since I didn't know how far to stretch the high start for launch, I dropped Don Seigle, owner of the company, a line. Much to my surprise, he called me on the phone a couple of days later and explained everything about launching big birds, as he flies a big DISCUS. Now Jim, that's service in the hobby business for you!

For the first flight, I flew out of our local airport. The Magnum 200 pulled the plane forward and, as

Specifications
Type: Robbe ASW-24
Wingspan: 11 1/2 feet
Fuselage Length: 60 inches
Wing Area: 973 sq. inches
Tailplane Area: 100 sq. inches
Total Surface Area: 1073 sq. inches
All Up Weight: 7 1/2 lb.
Wing Section: HQ - 3.0 / 13-10-13

The Dive Test

...continued

get into an ever-steepening dive when it picks up speed, a very dangerous situation. It will also be extremely touchy, if not unmanageable, on elevator.

A ship with a semi-symmetrical airfoil (or one of the other high performance sections) as found on the Sagitta, Metrick, Golden Eagle, Pantera, etc., will work best when the CG is set so that the plane does not pull up or tuck under but just continues a straight dive. This allows an experienced flier to build up great speed to search for lift or make speed runs without having to fight to hold the plane down. It will stay where he puts it.

Add or remove lead at the nose and retrim as before for a fairly slow flight with a level elevator.

Pancho Morris
2715 Eastbrook Dr.
Mesquite, TX
75150



Willie Bosco & his new ASW-24

through. The forward fuselage section folded, the servo tray busted out, one wing cracked at the aileron bay and the spoiler servo stripped its gears. Not bad considering the power of the Magnum 200. We learned our lesson: launch at low angles of attack and feed in a small amount of down elevator to start. Then stretch out the pull with up elevator. Of course, only rudder is used on launch, so remember to uncouple the aileron input. A plane this large (11 1/2 ft. wing span) flies fairly fast and turns in larger arcs than a 2 meter. Also, landings need to be planned out and executed on track. The spoilers really do work well in getting the large plane to sit down.

The Rebuild

The rebuild was easy. I massaged the wing back into shape with UFO glue as it doesn't attack foam and worked well getting the cracked balsa sheeting to stay in place as I held the wing in its original shape. I should have added carbon fiber tape in the forward base section, during the original construction, from the wing roots around to the nose. I used it on the rebuild!

Aero Composites Co. has lots of goodies for strengthening models. I called them and found out exactly what I needed for my repair job. These people were very helpful.

I'll never build another model without forward reinforcement, especially when the servo tray sits glued to the bottom of the fuselage half-shell because, when the fuse tweaks, the tray pops out.

And on...to Electric Flight

I'm now considering the 10 cell flight pack from Robbe for large sailplanes. I know the plane will fly faster with the added weight, but it will expand my launching possibilities.

I will remove the batteries and folding prop for slope flying. I do still plan to use the high start on launches in combination with electric flight. After the plane comes off the tow, the electric can be used for more altitude, if necessary. After following Felix Vivas' "Electric Currents" column, I have decided to purchase a top of the line charger and pretty much go electric.

Willie Bosco
1588 Miller Creek Rd.
Garberville, CA 95440

Scale Glider Components Announces the SGC DG-202

Specifications
 Length: 66-3/8"
 Span: 3.75m 12'4" 148"
 Wing Area: 1044 sq. in. 7.25 sq. ft.
 Aspect Ratio: 21
 Weight: 9-12 lbs. 144-192 oz.
 Wing Loading Range: 19-26 oz. sq. ft.
 Radio Functions: 4-5 Channels
 Price \$650.00 US
 Shipping & Handling \$25.00
 California residents add 7%
 Available Nov/Dec 1989

High quality and high performance — five words that best describe the SGC DG-202. The kit is of the same quality one would expect from the best of the European model makers. The SGC DG-202 also incorporates several technical features not found on any other 1/4 scale glider kits anywhere!

Initially, the SGC DG-202 was conceived as a high speed slope model. The thin (8.25% average thickness) high aspect ratio (21) wing, in addition to being clean and fast, surprised everyone by also having good performance at the other end of the performance scale; a very respectable sink rate. The model can also thermal.

The SGC DG-202 is made entirely in the USA.

Kit Features Fuselage

The fuselage comes gel coated and is a one piece molding. With the gel coat sprayed in the mold rather than brushed, and no tape to join the fuse halves, the resulting fuselage is over 1 pound lighter than other fuselages without sacrificing any strength. No other scale models anywhere in the world offer this advanced technology.

An epoxy canopy frame and a clear canopy are also included in the kit.

Wings

Departing from the common European practice of relying on the thickness of the wing for strength, the SGC DG-202 brings the performance advantages of thin wings to quarter scale gliding. The proven Eppler 374 airfoil has been computer thinned to an average thickness of 8.25%. The low drag of the wing gives the SGC DG-202 a very wide usable speed range, from thermalling to dive speeds in excess of 100 mph. A healthy carbon fiber spar gives the wing its strength. Obechi wood wing skins allow the builder to film cover, paint or fiberglass the wings. The wings are supplied assembled - with wing joiner tubes, carbon fiber spars, wood leading edges, fiberglass cloth backed obechi wood skins and control rod passages all in place.

The horizontal stabilizer/elevator and rudder are also foam cored and obechi sheeted.

Four-five foot long music wire pushrods are also included in the kit for positive, slop-free actuation of rudder, elevator and ailerons.

Retracts

Our retract units for gliders are the finest available anywhere at any price. All of the aluminum parts are made from mill fresh 6061-t6 alloy. No surplus yard scraps are used. The aluminum parts are made on a CNC machine. All parts are identical and beautifully machined, not crude stampings. All standoffs and axles are made from drill rod for high strength and a long life. An over center linkage design keeps loads off the servo in the locked up and locked down positions.

The 1/4 scale retracts are offered in two versions: standard and heavy duty. The STD unit is for gliders weighing up to 10 lbs, and the HD unit is for the really heavy models. These units are laminated in place in the models and require a pattern type servo to operate them. The largest wheel diameter is 3-1/2". Installing a HD retract in a glider adds approximately 11 oz. to the weight of the glider. This includes: servo (Futaba s-130), linkage, retract unit (HD), wheel (3") glass cloth and resin.

The 1/5 scale retract has all of the features of the 1/4 scale units, and is a size smaller.

The retracts are all the same price. They all require the same amount of time to manufacture.

Price \$50.00 US
 add \$5.00 shipping & handling
 CA residents add 7%

Pushrods

Scale Glider Components now has 1/16" music wire pushrods in 5' lengths. These hard to find pushrods are perfect for linkages in 1/4 scale glider wings and fuselages. They are supplied with a nylon outer casing for slop-free, smooth actuation of control surfaces.

Due to the stiffness of the wire, these pushrods are primarily for straight applications, but will work with large radius bends.

Price \$3.00 each
 add \$3.00 shipping for up to 6
 pushrods
 CA residents add 7%

Scale Glider Components
 7034 Fern Place
 Carlsbad, CA 92009
 (619) 931-1438



Model Construction Videos (MCV)

...by D.O. Darnell

There are a lot of us who would like to see not only the contents of various kits, but also what is involved in their construction, and would be willing to pay for that kind of information. If video tapes of various ships were available, it might be a great boon to the soaring enthusiast.

So, I would like to announce that several such tapes will soon be available from our newly-formed enterprise: Model Construction Videos ("MCV"...catchy name, huh?). Presently, we are wrapping up the tape on Ed Benton's two-meter Mariah sailplane. Others currently in the mill are Mark Allen's Falcon 880 and Bob Sealy's Ultima. Everyone we have talked to is very excited.

Each tape shall start off by opening up the kit and examining the materials, laying them out on the table and making appropriate comments about quality and workmanship. The plans and instructions will then be examined for clarity and completeness. Construction of the major components will be covered showing various details and helpful tips. Radio installation, maiden flight and trimming will also be covered! The price of each tapes will be \$19.95, a bargain considering the price of most competitive kits is in excess of \$100, today. Watch the OTHER guy do the work first! Yeah!

If any readers have any suggestions for future projects, I would appreciate hearing from them. Presently, just drop me a line at the address below. MCV adds will be forthcoming.

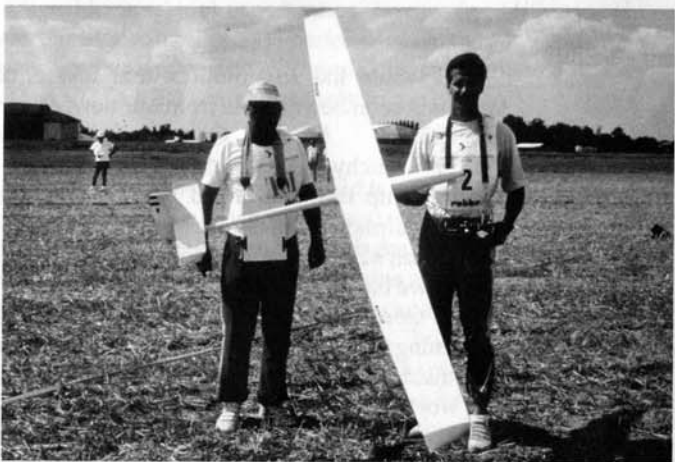
D.O. Darnell
 4227 E. 83RD St.
 Tulsa, OK 74137



Some Photos of the F3B



Nic Wright, Great Britain 1989 F3B World Champion. The model is the ELECTRA E1 with an RG-14 airfoil trimmed to 7%. Wing skins are all carbon fiber laminate. Photo by Terry Edmonds.



Karl Wasner Jr., Austria, 4th place. Karl Wasner Sr. on left. Model is QUASAR. Austrians were first place team. Other Austrians were Peter Hoffman (2nd) and Friedrich Haupt (11th). Photo by Terry Edmonds.



Jeroen Smits, Netherlands, 6th place. Netherlands team was 2nd. Other pilots were Joris Ten Holt (3rd) flying ROWING IMPULS and Henk Bonestro (14th). Photo by Terry Edmonds.

A Simplified Weight Conversion Formula & Reference Chart

...by Thomas R. Pipic

While building HL gliders, I finally got tired of doing a long calculation for each piece of balsa. So, I put together a sheet containing a simplified weight conversion formula and a "handy reference chart". Only one word of caution — on very thin stock (1/32"), a small deviation in thickness can mean a significant error in weight calculation, so a fudge factor may be necessary. (P.S.: I use a triple beam balance, but a postal scale is accurate enough to do a good job.)

BALSA WEIGHT CONVERSION FORMULA

Weight in lbs./cu.ft. = $3.8 \times$ weight in gms. / cubic inches

Cubic Inch Volume of Common Dimensional Balsa

36 X 3 X 1/32	3.4
36 X 4 X 1/32	4.5
36 X 2 X 1/16	4.5
36 X 3 X 1/16	6.8
36 X 4 X 1/16	9.0
36 X 2 X 3/32	6.8
36 X 3 X 3/32	10.1
36 X 4 X 3/32	13.5
36 X 2 X 1/8	9.0
36 X 3 X 1/8	13.5
36 X 4 X 1/8	18.0

Thomas R. Pipic
9065 Concord Rd.
Powell, Ohio 43065

Pounds per Cubic Foot

Wt. in Gms.	4	5	6	7	8	10	14	18
36 X 3 X 1/32	3.6	4.5	5.4	6.3	7.2	8.7	12.5	16.1
36 X 4 X 1/32	4.7	5.9	7.1	8.3	9.5	11.9	14.3	16.6
36 X 2 X 1/16	4.7	5.9	7.1	8.3	9.5	11.9	14.3	16.6
36 X 3 X 1/16	7.2	9.0	10.7	12.5	14.3	17.9	25.1	32.2
36 X 4 X 1/16	9.5	11.8	14.2	16.6	19.0	23.7	33.2	42.7
36 X 2 X 3/32	7.2	9.0	10.7	12.5	14.3	17.9	25.1	32.2
36 X 3 X 3/32	10.6	13.3	16.0	18.6	21.3	26.6	37.2	47.9
36 X 4 X 3/32	14.2	17.8	21.3	24.9	28.4	35.6	49.8	64.0
36 X 2 X 1/8	9.5	11.8	14.2	16.6	19.0	23.7	33.2	42.7
36 X 3 X 1/8	14.2	17.8	21.3	24.9	28.4	35.6	49.8	64.0
36 X 4 X 1/8	18.9	23.7	28.4	33.2	37.9	47.4	66.3	85.3

Note: Volumes & weights for thicker stock can be easily calculated by addition of values from the table.

Examples: Cubic inch volume of 36 X 4 X 1/4 = 18 + 18 = 36
A sheet of 5 lb. 36 X 4 X 1/4 weighs 23.7 + 23.7 = 47.4 gms.

When you set down at a drafting board to design "THE PERFECT" sailplane it becomes apparent that almost anything you can think of has been done before! Even if the wings were in the tail and the tail were in the nose, it still wouldn't be original. We all know the perfect sailplane doesn't exist and never will. However, design and construction methods could be improved to produce a winning high performance sailplane.

Our two meter MARIAH was performing so well using a S4061 airfoil it was decided to stay with the winning horse. We used this airfoil for several reasons, it has a small clean undercamber, good speed range and performs exceptionally well with a rear CG. PHOENIX'S wing aspect ratio is 16.7:1, area is 1042 square inches, span is 132 inches and the CG is at 41%. To increase stability with a rear CG the wing planform has a straight trailing edge with no taper, the leading edge is straight for 52% then a single taper to the tip. Also, the wing has a flat constant chord center section with plug-in tips at 3 degrees dihedral. Flaps are a very important part of the overall flight performance of PHOENIX, their area is 23% of the center panel! This allows for a steep dive angle while maintaining a safe speed and provides absolute control on landing. The S4061 airfoil will efficiently increase lift with small amounts of flap deflection or trailing edge camber, for this reason flaps are used in a thermal and for launch. In normal flight the S4061 is exceptionally "clean" and does not have the drag of higher cambered airfoils.

Aileron servos are wing mounted for possible centering, also to allow for optional full trailing edge camber and CROW when using a "state of the art" radio. With 23% flaps it is very important that centering and alignment be positive. To accomplish this both flaps are connected with a rigid adjustable coupler that is driven from inside the fuselage.

PHOENIX

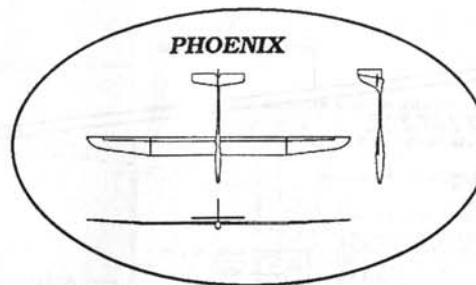
"OUT OF THE ASHES....."INTO THE WINNER'S CIRCLE

...by Competition Products

PHOENIX is a high performance unlimited class sailplane designed with one goal in mind, to win. It is a NO SHORT CUTS — NO COMPROMISE sailplane. As you review the reduced plans it becomes obvious that NOTHING has been compromised. From the way the hatch is fit, to the built-up elliptical wing tips! There are many designs and easier ways to construct a wing tip but the end result would not be the same. As you save time on the building board you lose precious seconds in the air. The entire design and building of PHOENIX is based on this idea, if you want a superior sailplane you MUST build it that way.

PHOENIX is a top quality no compromise kit that includes both wing and stabilizer FULL-SIZE construction saddles in addition to the standard foam cores. Also included are pre-cut brass tubes, over 40 laser cut parts, wing and stabilizer cores pre-cut for spars and all hardware. The fiberglass fuselage is made with two layers of 6 oz. cloth and is assembled, there is no fiberglass work required. All fuselage formers and doublers are laser cut for precision, so are the balsa ribs and leading edge for the elliptical wing tips. Both hatch and wing fairing are made from the same mold as the fuselage insuring an accurate fit. Building plans (3-36X48) are full size and very detailed as are the building instructions.

PHOENIX is a very easy sailplane to fly, stability and performance are both OUTSTANDING! The long tail moment and high aspect ratio wing (16.7:1) in combination with the elliptical tips provide flying characteristics hard to believe. Speed range of the high aspect ratio wing is surprising, from very slow to extremely fast. The launch is almost vertical and landing with PHOENIX'S wide flaps is extremely easy.



Wing tip design is like the cure for the common cold — everybody has a different one. We tested a high performance sailplane with several different wing tips, only the actual tip was changed, everything else remained the same. The elliptical tips were superior. We estimated speed was improved 8-10% and tip stall was substantially reduced. Improved performance comes from ailerons being 8 inches inboard of the wing tip, this maintains a "clean" airflow over the tips, also each tip has 2 degrees of wash-out. The built-up elliptical wing tips add substantially to the clean wing design. They are very light, "clean" and almost as important they look great.

The fuselage is a fiberglass pod and boom design and is very clean. Forward hatch (canopy) and wing fairing are built to keep the seams as close as possible to "0" gap. To maintain stabilizer - fin alignment larger brass bushings are used in the plywood fin base. Weight in the tail is kept to a minimum by using dacron pull-pull cable rudder controls instead of a push rod. This type of control is very positive and light weight.

Aerodynamics of PHOENIX is only half the project, building materials, construction procedures and attention to details are the other half. To insure accuracy of the airfoil and a straight trailing edge FULL-SIZE construction saddles are included for both wing and stabilizer. Foam wing cores are cut for spar, sub-spar and alignment blocks. Stabilizer cores are also cut for both pivot and alignment rod supports. All brass tubes are machine cut to size and all hardware is included. There are 44 laser cut parts: included are balsa ribs and leading edge for the wing tips, plywood formers, bulkheads, doublers and the plywood fin base complete with all cut-outs. Plans are full size (3-36X44) and very detailed as are the building instructions. The fiberglass fuselage pod is made of two layers of 6 ounce cloth and is assembled, no fiberglass work is required.

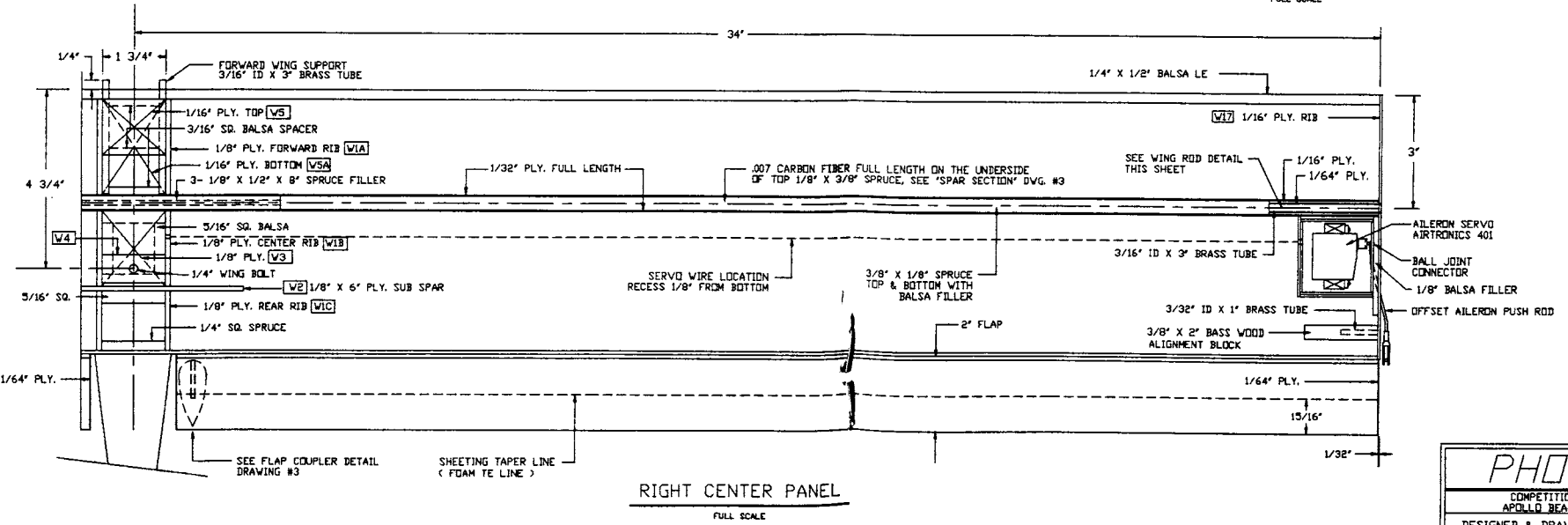
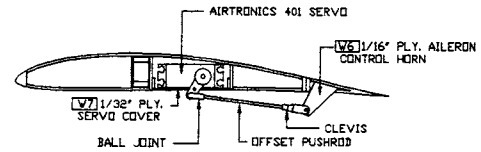
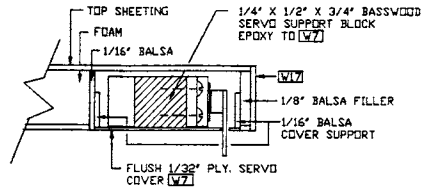
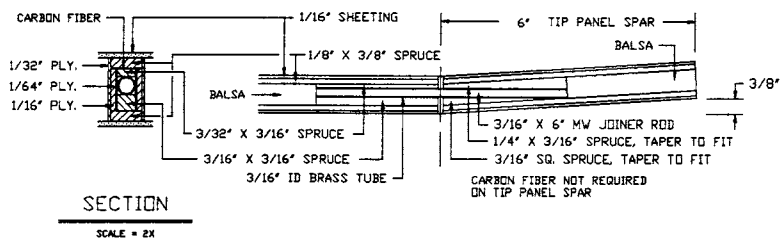
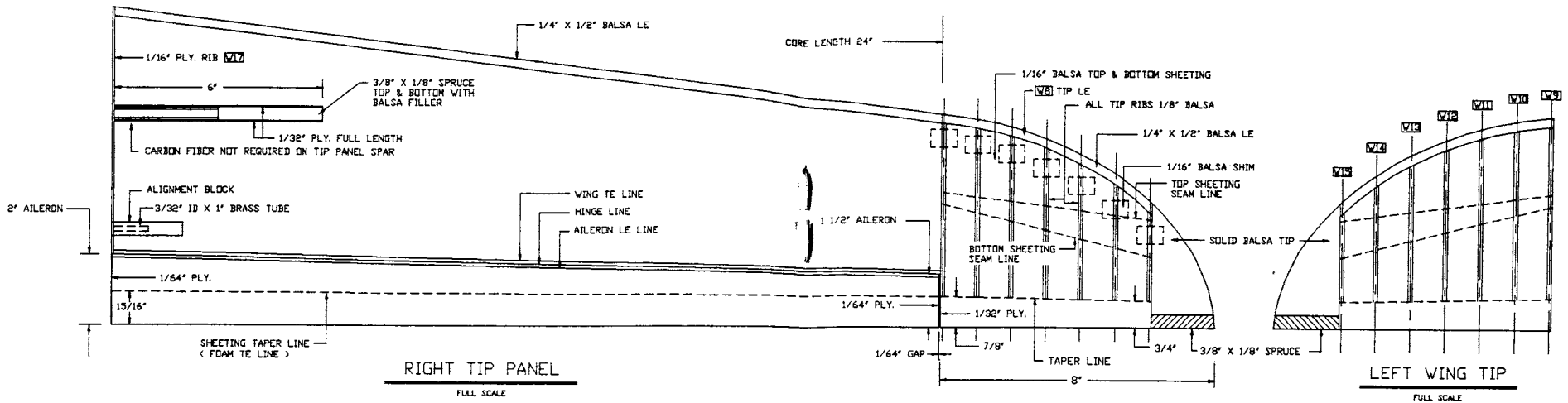
PHOENIX is a high performance sailplane that flies as well with a "state of the art" radio as it does with a standard 4 channel. It is not a beginner's sailplane, it is for the contest flier looking for that all important advantage, it is also for the pilot on top...to keep him there.

See ad in this issue for additional information.



The F3B

Swiss team placed
6th. Roland
Muller (center
pilot) placed 9th.
Models are all
TRANTULAS.
Photo by Terry
Edmonds.



PHOENIX		
COMPETITION PRODUCTS APOLLO BEACH, FL. 33572		
DESIGNED & DRAWN BY: ED BERTON		
SCALE: AS NOTED	AUG. 1989	1

THE GRAY AREA



About the REIHER...

Dear Jim,
I've recently discovered an omission in its markings. On the right side of the fuselage, under the cockpit, there should be an NSFK emblem. You can see the same emblem on the GRUNAU BABY in the pictures you sent me. I'm having decals made of that emblem to include in all future REIHER kits and, of course, I'll send one to everyone who has already gotten a REIHER. The bad news is that it takes four to six weeks to get the darn things made.

I'm also going to try to put together some kind of documentation package to go with it. It's the sort of thing that should have been done to start with, but better late than never. Sincerely, (signed) Greg Harding, P.O. Box 1157, Kotzebue, AK 99752

* * *

An Update on the September Issue

Dear Jim,
I still have a couple of dozen of the book *Alianti-Soarers-Planeors-Segelflugzeuge*. Anyone interested in getting a copy has to send me \$30 (check or money order...whichever is more convenient). The price includes registered shipment via surface.

The full size plans of my oldtimer model "LAROS" are now distributed in the U.S. by Bill & Bunny Kuhlmann with their B² Streamlines set-up. This is the only book on this subject which has the longitudinal and lateral stability indexes of the sailplanes shown. I had patiently calculated them using large scale plans supplied by the manufacturers.

Best Regards, (signed) Ferdi Gale, Via Marconi 10, 28042 Baveno (No.), Italy

A Couple of Questions for the Readers Jim,

First: Is there any commonly used method of estimating the required torque needed to deflect a control surface? It seems that there are a fair number of servos of various weights and torque outputs and, in the interest of building light, it would make sense to match the torque output to the load.

Second: Is anyone out there using an Amiga computer to plot airfoils? I am looking for software to do this.

Thank-you, (signed) Chris Munson, 2160 Beach Dr., Victoria, B.C., V8R-6J8, Canada

Response: Can anyone help Chris with his questions? JHG

* * *

Jim,

In reference to your handicapping article in Oct. '89 *RCS*, I'd like to offer the following information:

In development of the Central Oklahoma Soaring Association (C.O.S.A.) club, we faced this very dilemma. We have past Nats winners, local hot shots and MANY new flyers in our club. We haven't flown any "multi-task" events as of yet, but we do handicap our flyers. It works this way...We use a percentage landing tape usually, 5%, 10% or 15% of the flight score. The newcomers get automatic 15% landing scores. If they "trophy", they move down to 10%. If the trophy again, they are moved to 5% and so on until they no longer get any unearned landing points. If we use the 100 point tape, we allow 75, 50 and 25 point handicap. If the flyer earns more than his unearned score, he receives the better score. For example: a flyer is receiving the 75 point bonus on the 100 point tape, and his actual landing is an 82. He will receive the 82 points. This causes the pilot to make an effort to land in the circle, instead of just landing within the confines of the field.

It is a little tough on the non-bonus flyers to accept being beaten by someone who is given their landing point when he has to earn them, but we try to remind them that

the newcomer is excited about winning and beating a better flyer and will give them the desire to come back and compete again. And, they will also lose some of their unearned bonus the next time out. All flyers are pushed to become better and this seems to work out okay with our club.

Thanks & Thermals, (signed) George Voss, 1403 Lincolnshire Rd., Oklahoma City, OK 73159-7709

* * *

What One Reader is Building & Flying

Dear Jim:

In March, I got a couple of Gemini kits for the club meeting raffle and our two day contest. I traced the plans and then drew up and worked out the math for something I would enjoy flying. I have been influenced by your friend, Bob Champine. I have stretched the tail moment 2 inches, the center wing panel to 54 inches, and the tips to 36 inches. The main wing panel foil is a Selig 2027 upper contour with a 4233 for the lower. The main panel is flat — no dihedral. The tip panels have 3 degrees for each pinion. The tips have S 2027/4233 at the root, with a transition to a S 4233 full foil at the end rib. I will be using a 2° washout in the tip panels. With this foil choice and washout used, the CL for the entire wing winds up being exactly the same at the root and tip ribs, even though we are looking at different RNs. Also, the camber turns out to be exactly the same at both ends (3.125% for both foils). Using the same planform as the kit plans, all the forces and moments act and appear at the same position at each station along the wing.

I realize that this is an old way of thinking and designing, but Rich Spicer and I prefer this to the modern philosophy of design. I don't care for a wing with the A.C. of the root being ahead of the CG or, the tip A.C. being way aft of the CG.

I designed this "Gemi M" for ailerons, flaps, etc. I want something I can use in contests and not worry about losing a ship or radio. Those that win contests seem to have what I consider "throw away" ships. So, I am going the same way. Have a "FU-TUBE-A" attack

radio on channel 40. Since I've never liked this brand, starting back when the military started importing it and MRC into this country, who cares what happens. Had a similar experience not too long ago. Had a Tower 6 channel and a Craftair Step Two. Neither was of that great value, but I had a lot of fun flying them. Could care less whether they lasted or not. Did every conceivable trick that could be thought of with them. I still have both.

Well, on the Cumic Plus, the elevators and rudder are framed and sanded. The elevators are ready for forward portion upper and lower sheeting. One part of one wing main panel is framed. The main reason for delaying the Cumic Plus is that I am waiting for *Soartech VIII*.

A Lesson on Pushrods

I went to a contest with Jeff. After one of the launches, I went around behind Jeff to lead him away from the winch. The last time I saw his ULTIMA, it was headed up, away and out as beautifully as ever. He was at good height for this flight. Next thing, I see her on her back and behind the last position she was in, and headed down. I screamed, "Hit full up." At that exact same instant, the sound of flutter from the T-tail stab., rudder, and flaps sounded her death nil. She hit terminal speed at about 70+, straight down. With all the flutter, there was no response on the elevator. The ailerons didn't flutter, surprisingly, but they were directly connected to the aileron servo and not through any bell cranks. Jeff had followed the plans and used the supplied wire rods for elevator and rudder.

Mention to ALL CONCERNED: "THROW AWAY KIT WIRE PUSHRODS. USE ONLY FIBERGLASS ARROWSHAFT PUSHRODS TO ELEVATOR AND RUDDER." They will have to use a bell crank system like the Accipiter CCT has for the elevator, but this won't flex as much as braided cable rods do.

Happy Flying Mate, (signed) Ed Devlin, 839 E. Verdugo Ave., Burbank, CA 91501

Dear Jim,
Certification of model flying is an issue in the U.K. We are going through a period of negotiation with the air safety people and it is important that we are seen to be taking action with regard to safety aspects. A useful compromise is working, at the moment, with U.K. model building authorities pushing the achievement schemes as a measure of competence and, hopefully, safety. Whilst there is certainly a resistance to being forced to take part in the achievement schemes, at least these schemes are being organized by modelers and not by faceless bureaucrats. By a very big coincidence, I have come across the official at the CAA who is negotiating with the SMAE. He is a man called Tempest — a highly appropriate name for a pilot. About ten years ago, he lived in Leicestershire and was working as an instructor as well as flying Pitts at exhibitions. His son and daughter were at the school where I worked. The son was an excellent modeler and was heavily involved in the electric RTP stuff we were doing then. The daughter, after she left school, flew with the local Tiger Moth group, where she did "wing walking" in the 1930's style at airshows. Dad had the typical UK background, for a flying enthusiast, of starting with modelling and then, as soon as he was old enough, doing everything he could to get into an aircraft cockpit. The point of the anecdote is that Tempest turns out not to be "faceless", but an enthusiast who well understands the problems of both full size and model aircraft.

For the first time this year, people flying at the SMAE Nationals will have to have a silver achievement certificate (about on a par with LSF Level II). Not too demanding, but it will be interesting to hear the comments from the competitors. It was for this reason I have started to push LSF in the UK, again. There will be more people involved with U.K. schemes, so LSF might get carried along with the general trend.

Regards, (signed) The Poplars, Harringworth Road, Seaton, Oakham, Rutland, LE15 9HZ

* * *

An Invitation to RCSD readers

Dear Jim:

I really enjoyed the September '89 issue of RCSD. We also fly "scale" at 12 inches to the foot! We invite your readers to visit us at Gillespie Field on "Skid Row" ...and we are "tail draggers, too".

We have the following full-size sailplanes: The SCREAMIN' WIENER aka LI'L DOGIE, the prototype DIAMANT White Knight, Laister-Kauffman LK-10A, a Schweizer TG-2, and two varieties of hang gliders. (Wally Wiberg renamed the SCREAMIN' WIENER LI'L DOGIE and registered it as N44W. I applied for this number but it had been reissued to another aircraft, so I then applied for the original number — N14287 — and got it! This number is under the stabilizer in three-inch size.)

The SCREAMIN' WIENER was retired this Labor Day weekend at the Sailplane Homebuilder's Association Vintage Sailplane gathering at Tehachapi. We made an in-flight video using the "LK" as camera ship. I then made a super car tow on 900 feet of 1/4" nylon that stretched forever. The WIENER is fifty years old, and the car tow was to commemorate the first flight by Irv Culver at Tehachapi in 1939. His flight was straight ahead to an altitude of 10 to 12 feet. Mine was to an altitude of 700 feet, and a full pattern was flown. The WIENER has a lower rate of sink and a better L/D than published in *Soaring*, but it needs TLC and a complete rebuild, and I just don't have the time.

The White Knight is now enjoying a retractable landing gear that we test flew on Memorial Day weekend at Hemet '89 (CA). Our White Knight is the oldest competitive machine flying and looks spectacular.

The LK is flying now, but we plan to rebuild one wing this winter.

The TG-2 is being restored, but some parts are missing, so we'll have to find those somewhere to complete the job.

We have drawings for the TG-2, SCREAMIN' WIENER (it whistles as it flies), and the White Knight.

I have a 140-slide tray of gliders and sailplanes that covers the time from mythology to the beginning of "glass" machines. I have not taped or written a description of the slides yet, but showed them at Tehachapi '89. One of the slides was a photograph taken at Pacific Beach, San Diego in 1929, showing a primary in flight. Irv shouted, "That's me!" This was long before he designed and built the SCREAMIN' WIENER. Culver has been a T.W.I.T.T. speaker and contributor, and his articles on flutter and pitfalls in flying wing design are a must to read.

We have Grunau Baby wings that Hawley Bowlus copied and modified for his famous BABY ALBATROSS of the late '30's. We also have some Bowlus BABY parts, and my son, Doug, plans to build one some day.

We have a Stan Corcoran CINEMA TG-1 aileron to give away, and we gave a Pratt-Read fuselage and wings to a fellow in Oregon. We gave a tandem control stick assembly to a friend in Georgia and a small, light-weight sailplane to a friend in San Diego. We need the room!!!

We have had many visitors at our home. Once, Al Backstrom, Rudy Opitz, and Don

Mitchell were here all at the same time. These are all "flying wing" people. We've also hosted Johnny Robinson, Ruth Bowlus, Bob Storck, and Peter Riedel as guests in our home. Bruce and Georgie Carmichael are frequent visitors.

Readers of RCSD are welcome to come to our hangers for scale documentation, or just to visit.

(signed) Bob Fronius, c/o T.W.I.T.T. (The Wing Is The Thing), Box 20430, El Cajon, CA 92021, (619) 224-1497

Response: Bob, you are, indeed, a pioneer in motorless flight and have hosted many of the "greats" of soaring in the United States and Germany. Many of our readers who do not have the full-size soaring background won't recognize these names or realize their significance, but almost everyone you have named is world-famous in the field of soaring and/or aero engineering, and the talent represented by them is monumental. They are the "who's who" of the sport.

Soaring people, whether of full-size or model sailplanes, are a great fraternity having a common interest. You will find yourself welcome among them as typified by Bob Fronius' generous offer to visit his hanger. JHG



314-443-6708

Jim Harger
1911 Wolcott Dr.
Columbia, MO 65202



Behind the Scenes
with
Pete Bechtel
...by Jerry Slates

Those of you who are over 35 will remember him as "Windspiel Models".

Back in 1970, Windspiel Models, located in Santa Rosa, California, was an all glider hobby shop owned and run by Pete Bechtel. He imported many fine glider kits from Europe. Some of the more popular models were from Graupner, Wanitschek Models, Wilhelm, Multi-Plex and Rowan. In addition to the European kits, Pete carried some of the more popular American models from Francis Products, Fliteglass Models, Astro Flight Inc. and Windspiel Models.

In addition to the importing and filling of orders for mail order, Pete found time to produce two kits: Cobra-17 and Kestrel-19. These were complete kits with a fiberglass fuse, hand picked wood and a complete hardware package.

Seven or eight years later, Pete retired and moved to Coeur D'Alene, ID. For the last ten years, Pete has been enjoying his retirement slope flying 1/4 scale gliders on the northwestern slopes of the U.S. and in Hawaii.

Well, so much for retirement as Windspiel Models is back. In 1990, Pete will start importing "Fiber Glas Fluge Unlimited" products. These are said to be the Mercedes-Benz of all fiberglass model gliders from Germany. Pete says that his inventory will start with three models of ASW...the 19, 20 and 22. There will be two sizes of Salto H101s along with miscellaneous hardware items.

Look for his advertisement to appear in the near future. Welcome back, Pete.

CONTESTANT FEE:
\$35.00 U.S.

ADDITIONAL ENTRIES
\$2.00 per plane

Price Includes
Banquet, Raffle,
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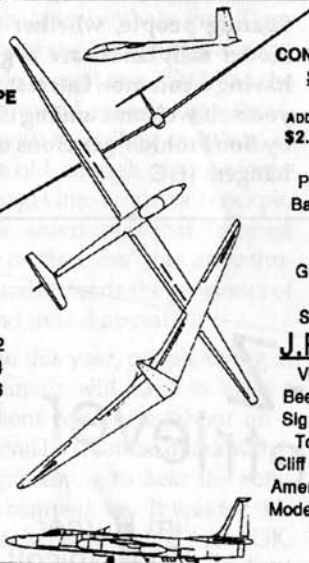
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ENTRY FEE: INCLUDES ONE ENTRY TO RAFFLE & BANQUET DINNER -----\$35.00

ADDITIONAL MODELS: ----- QUANTITY _____ x \$2.00 ea. _____

Late Registration Fee will be an additional \$5.00 Sorry no exceptions!

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Clover Island Inn

May 26,1990 7:00 PM

Banquet will include 3 entrees, salad, choice of potato, vegetable, roll, butter, beverage, and desert.

Also included: No Host Bar, Guest Speaker, Slide Presentation, Raffle, and pilots choice awards.

Additional Banquet Guests: Number _____ x \$20.00 ea. _____

Total \$ _____

ROOM RESERVATIONS

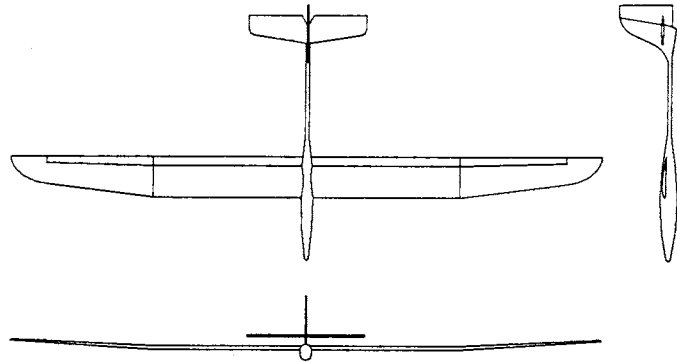
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LENGTH : 56"
AIRFOIL : S4061
ASPECT RATIO : 16.7 : 1
WINGLOAD : 10 OZ./SQ. FT.
CONTROLS : RUD., ELEV.,
AIL., FLAPS

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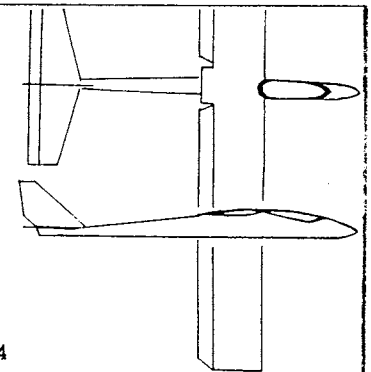
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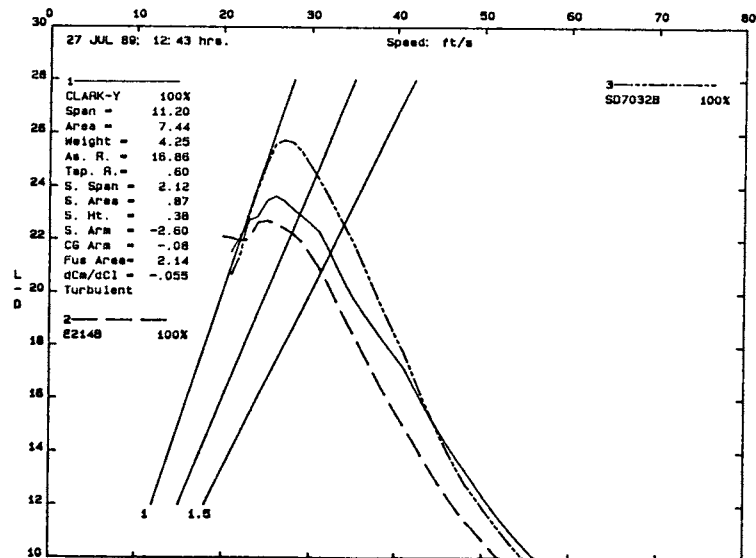
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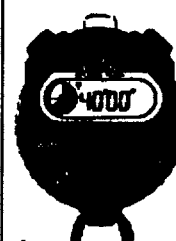
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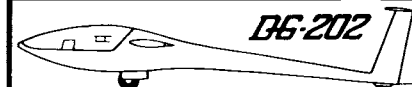
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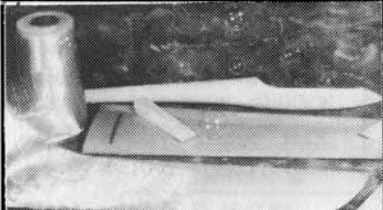
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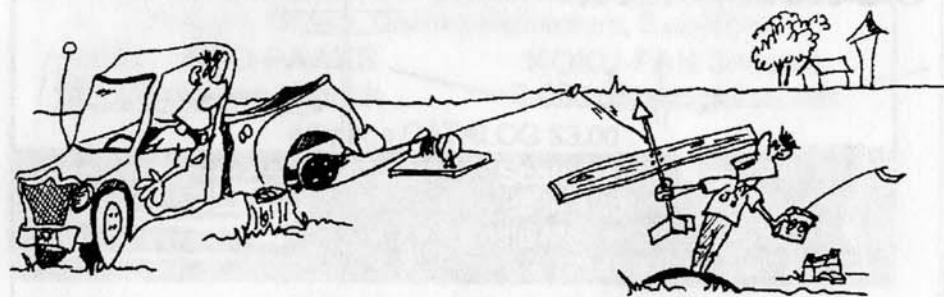
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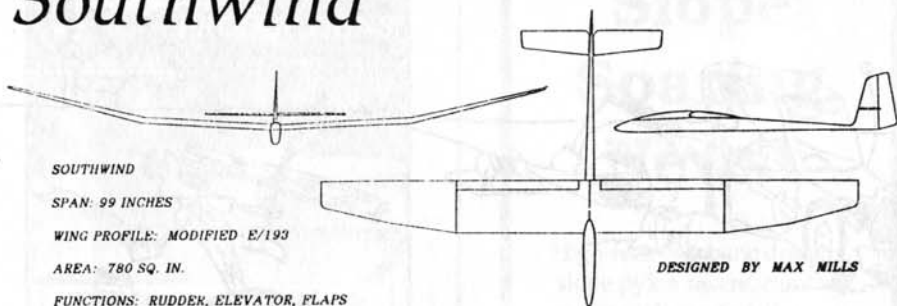
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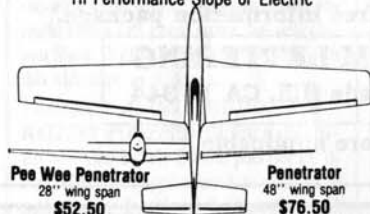
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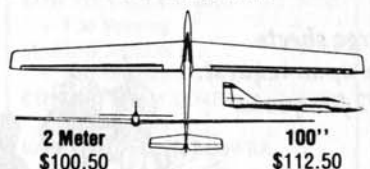


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